Assessing the need for a regional approach to Environmental Impact Assessment in southern Africa

Editors: Ebenizário Chonguiça and Rob Brett

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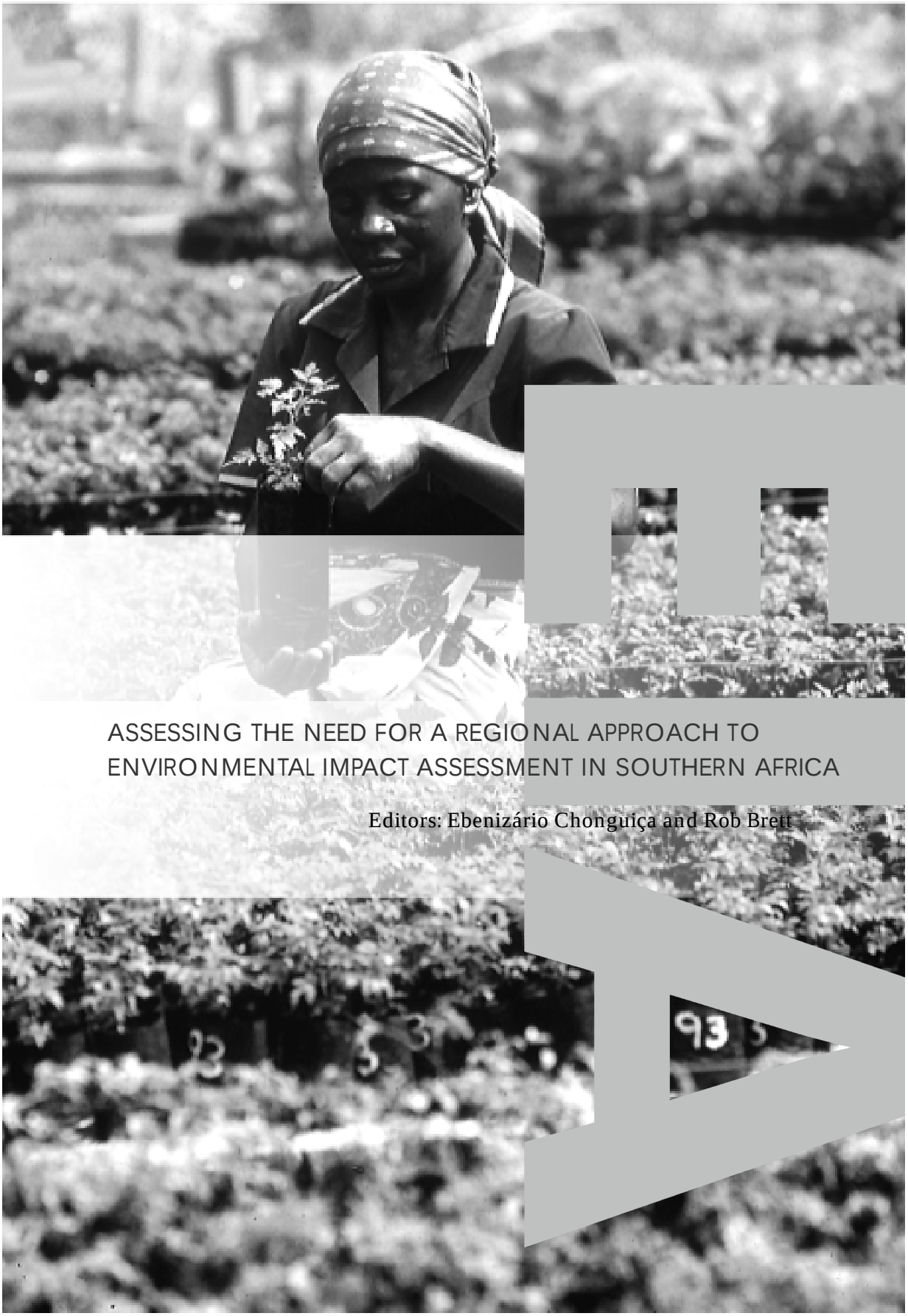

ASSESSING THE NEED FOR A REGIONAL APPROACH TO ENVIRONMENTAL IMPACT ASSESSMENT IN SOUTHERN AFRICA

Editors: Ebenizário Chonguiça and Rob Brett

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IUCN - The World Conservation Union was founded in 1948 and brings together 79 states, 112 government agencies, 760 NGOs, 37 affiliates, and some 10,000 scientists and experts from 141 countries in a unique worldwide partnership. Its mission is to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable. Within the framework of global conventions IUCN has helped over 75 countries to prepare and implement national conservation and biodiversity strategies. IUCN has approximately 1000 staff, most of whom are located in its 42 regional and country offices while 100 work at its Headquarters in Gland, Switzerland.

IUCN - REGIONAL OFFICE FOR SOUTHERN AFRICA

The IUCN Regional Office for Southern Africa was established in Zimbabwe in 1987 to serve the Southern African Region and the Southern African Development Community (SADC) in the development of modern skills in conservation and natural resource management. IUCN-ROSA coordinates such regional services to over 69 members in 11 countries through its regional support programmes, regional networks, and its country offices in Botswana, Mozambique, South Africa and Zambia.

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At the regional level, IUCN-ROSA spearheads the World Conservation Union's efforts to integrate the Union's secretariat, membership and commissions in common purpose within the framework of the Union's mission.

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LIST OF ACRONYMS

CMP	Comprehensive Mitigation Plan
DFAIT	Department of Foreign Affairs and International Trade
EA	Environmental Assessment
EAR	Environment Audit Report
EIA	Environmental Impact Assessment
EEU	Environmental Evaluation Unit
GIS	Geographic Information System
IAIA	International Association for Impact Assessment
IEE	Initial Environmental Evaluation
IFR	Instream Flow Requirements
IUCN	World Conservation Union
KOBWA	Komati Basin Water Authority
LHDA	Lesotho Highlands Development Authority
LHWP	Lesotho Highlands Water Project
LSDI	Lubombo Spatial Development Initiative
MICOA	Ministry of the Co-ordination of the Environmental Action
NDS	National Development Strategy
NEMA	National Environmental Management Act
NEAP	National Environmental Action Plan
NGO	Non-governmental Organisation
NHR	North Hlane Riverside
POE	Panel of Experts
REA	Regional Environmental Assessment
RSSC	Royal Swaziland Sugar Corporation
RSAP	Regional Strategic Action Plan
SADC	Southern African Development Community
SDI	Spatial Development Initiative
SEA	Strategic Environmental Assessment
SKPE	Swaziland Komati project Enterprise
SSA	Swaziland Sugar Association
TBNRM	Transboundary Natural Resource Management

TFCA	Trans Frontier Conservation Area
TOR	Terms of References
TTN	Tibiyo Taka Ngwane
UNECE	United Nations Economic Commission for Europe

EXECUTIVE SUMMARY

RATIONALE FOR THE INITIATIVE

Southern Africa is currently experiencing a vibrant socio-economic transformation. This effort aims at addressing the pressing demands for rapid economic growth to respond to the fundamental needs for eradicating poverty and promote economic development. The drastic geopolitical changes observed in the sub-region, combined with the regions endowment in natural resources provide the enabling environment favouring the attraction of a multitude of capital investment for social and economic development of the sub-region. For this purpose numerous large- and small-scale development initiatives have occurred in Southern Africa. These initiatives include industrial agricultural projects, hydroelectric projects, and mining projects, among others.

While the SADC states are separated by political boundaries, these boundaries do not generally correspond with natural ecological boundaries. Watersheds and other ecological units often cross one or more political boundaries. For example, all twelve of the mainland SADC states share drainage basins with one or more neighbouring states. Consequently, water use in one state affects water quality and quantity in neighbouring states downstream. A similar case exists for coastal and marine ecosystems, and for networks of protected areas.

It is in recognition of the fact that most of the region's natural ecosystems units together with the ethnic and cultural systems are interconnected, that the SADC treaty for regional economic integration was crafted (cf. Katerere, et al., 2001). The agenda of regional economic integration, therefore, aims at facilitating SADC countries to open their borders to trans-boundary and integrated regional economic development. To this end, numerous trans-boundary natural resource management (TBNRM) initiatives are underway in forms such as Trans-frontier Conservation Areas (TFCAs) and Spatial Development Initiatives (SDIs) that attempt to catalyse economic growth. Unfortunately, most of these initiatives have been and continue to be implemented without adequate consideration of trans-boundary impacts.

Another important component of an environmental impact assessment (EIA) process is the consideration of cumulative impacts. This is understood as the accumulation of effects both from the project under review and from other existing or projected initiatives within the area of influence in different space and time scales. Obviously, in a trans-boundary context, this issue becomes particularly complex. Understanding cumulative effects of multiple existing

or planned development initiatives in a region should therefore be a critical component of the EIA exercise. Individual development initiatives may appear to have insignificant effects when assessed in isolation, but the cumulative effects of multiple initiatives can be significant.

To further increase the complexity in dealing with trans-boundary and cumulative impacts, we observe that amongst the SADC member states there are significant differences in terms of national development agendas / policies, legal frameworks and institutional arrangements. Under these circumstances, there is a need for in depth reflection on the most effective way to address trans-boundary and cumulative impacts in EIA process so as to promote sound regional socio-economic integration under the prevailing regional reality of national differences.

Objectives

The current EIA review process had two basic objectives:

- Provide an increased understanding of current factors preventing effective consideration of trans-boundary and cumulative impacts in conducted EIA studies within the SADC region;

- Recommend a way forward towards the development of a concerted strategy for regional harmonisation of EIA procedures under the prevailing regional reality of national differences.

Recommendations

Based on the findings from the case studies and additional information provided by EA experts across the SADC region, the following set of recommendations is proposed.

Develop regional protocols - this particular action should entail promoting the development of an umbrella environmental assessment (EA) protocol for the SADC region addressing issues such as: development of minimum regional standards for environmental quality; guidelines for EA; mechanisms for information exchange to mention a few. With a regional protocol developed, SADC could further explore the desirability of signing the Espoo Convention. Proper institutional and legal systems should also be put in place for effective enforcement of regional obligations as per the terms of the signed agreements.

Establish co-operative arrangements - this should include the encouragement and promotion of support to partnership agreements between appropriate agencies and institutions at national and regional levels. Formal linkages for reviewing and monitoring EA should be established at regional

level. Professional co-operation could be promoted and improved through the establishment of sub-regional associations of impact assessment bringing together existing regional expertise in this particular field of development planning and management.

Improve trans-boundary links - efforts towards the development of proper cross-border consultation mechanisms could be one way of initiating such links. This should include well-established links between economic planning experts for joint planning and implementation of regional projects of trans-boundary nature.

Identify country entry points, or entry systems/mechanisms - it is proposed that each country establish a designated competent authority to undertake regional co-ordination tasks. In this respect setting up of functional national entry point in systemic framework is recommended rather then relaying on individual focal points.

Establish information-sharing mechanisms - this should include systematic publication and dissemination of existing best practices and success cases across the region and worldwide. Trans-boundary EA plans and reports should be included in appropriate regional environmental information systems specially established for the purpose. The establishment of regional database of EA experts could be an important mechanism to facilitate information sharing.

Engage in training and capacity building - institutionalise diversified training for environmental ministries as well as other organisations on an ongoing basis over long term and at different levels (e.g. university degrees as well as short term courses and workshops). At a regional level there is a need to also build capacity for international dispute resolution. Actions need to be put in place to bust regional capacity for EA review and monitoring.

Use appropriate tools and methods - there is a need to encourage greater use of available tools to identify and address cumulative impacts. Centres of R&D should also make strides to refine existing tools and methods or develop new ones adjusted to the regional condition for effective assessment of cumulative impacts.

Promote best practices - there is a need to give attention and promote special mechanisms for quality control and professional ethics within the EIA practitioner's community. Centres of excellence in EA training should be identified and strengthened.

Use economic incentives - it is recommended that SADC should identify appropriate incentives (e.g. trade) but rely on national pride in the interim. Regional and systematic application of the polluter-pays principle should be rigorously fomented. Proper mechanism to screen investor to determine who is legitimate including the use of environmental management systems should be encouraged.

ELEMENTS AND STRUCTURE OF THE BOOK

The present book brings together the key outcomes from a regional review process on the extent to which, EIA processes being applied in Southern Africa do effectively account for trans-boundary and cumulative impacts. The book is structured in three parts. Part one - Introduction; part two - case studies and part three - Other experiences and perspectives.

Chapter one in part one, by *Chonguiça and Katerere*, provides the background and justification to the regional EIA review process. It describes the methodological approach undertaken including the set of basic assumptions used for the review process. A summarised analysis of the critical findings and recommendations emanated from the case studies is also provided.

Chapter two in part one by *Asthon and Chonguiça* provides a broader overview of critical issues and trends with respect to EIA harmonisation processes based on known regional and international experiences and practices. Discussions on the conceptual frameworks related to the principles of sustainable development and technical approaches for implementation, are provided. Analysis of the critical factors preventing smooth assessment of trans-boundary and cumulative impacts are presented. The chapter further provides an analysis of what should be the role of EIA procedures in ensuring sound development planning and management. A discussion on the need for a regional harmonisation of EIA processes is provided with highlights of the prevailing critical challenges. Alternative options to overcome such challenges are presented as a proposed way forward.

Chapter three in part two by *Bodenstein and Fuggle*, comprises of the first case study on the Lubombo Spatial Initiative (LSDI). A description of the nature of the development initiative is provided in terms of major goals and objectives as well as technical composition of the proposed SDI. The methodological approach adopted for the review process is provided. Outcomes of the review process are presented with highlights of identified strengths and limitations of the conducted EA process in addressing the trans-boundary and cumulative

impacts. Possible reasons at technical, legal, policy or institutional levels that prevented effective consideration of trans-boundary and cumulative impacts are also discussed. The chapter closes with a comprehensive proposal on effective way forward and highlights of issues requiring further investigations.

Chapter four in part two by *Matela* is a case study review of the Lesotho High Land Water Project. It provides the rational and background to the development initiative with a summary of the technical specifications of the development project. A summary review of the policy frameworks governing environment and natural resources management in Lesotho and South Africa is provided. An analysis of the extent to which trans-boundary and cumulative impacts were taken into account within conducted EIA is presented. Limiting and supporting factors that affected the EIA process are discussed including a set of recommendation on the way forward.

Chapter 5 in part two by *Manyatsi*, deals with the review of the sugarcane irrigation industry in the Kingdom of Swaziland. The chapter provides a historical review of the sugar industry in Swaziland. In detailed terms the technical specifications of the scheme are provided including a summary economic analysis of the sugar industry contribution to the national economy. The chapter further discusses the existing legal, policy and institutional frameworks for environmental management in Swaziland and Mozambique. Based on the reviewed impact statement reports related to the conducted EIA processes, the chapter provides an assessment of the extent to which trans-boundary and cumulative impacts were taken into account. The chapter also provides an analysis of the outcomes of conducted survey aiming at assessing how EIA processes including the notion of trans-boundary and cumulative impacts are perceived within different segments of society in Swaziland (e.g. policy makers, EIA practitioners, developers and communities). Factors affecting the effectiveness in accounting for trans-boundary and cumulative impacts are discussed in the context of this particular development initiative and proposed way forward is provided.

Chapter 6 in part three by *Abul*, provides and overview regarding the EIA harmonisation experiences in North Africa. Specific emphasis is given to the Egyptian case in the context of existing development initiatives within the Nile river basin.

Chapter 7 in part three, by *Sekhesa*, deals with a methodological review and discussion on possible approaches to assessing cumulative impacts. Based on literature review the chapter provides additional information related to some of the technical aspects that needs to be taken into account for sound assessment of the complex theme of cumulative impacts.

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ASSESSING THE NEED FOR A REGIONAL APPROACH TO ENVIRONMENTAL IMPACT ASSESSMENT IN SOUTHERN AFRICA

CONTENTS

page

Acknowledgements

List of acronyms

Executive summary

Authors & Cotributors

PART ONE: INTRODUCTION

Chapter 1: Assessing the need for a regional approach to environmental studies of development investment in southern Africa 18

Chapter 2: Issues and trends in the regional harmonisation of E.I.A. processes in southern Africa 40

PART TWO: CASE STUDIES

Chapter 3: The Lubombo Spatial Development Initiative 76

Chapter 4: The Lesotho Highlands Water Project 120

Chapter 5: The Sugarcane Irrigation Scheme Downstream of Mnjoli Dam in Swaziland 166

PART THREE: OTHER EXPERIENCES AND PERSPECTIVES

Chapter 6: Harmonisation of E.I.A: experience of Egypt 212

Chapter 7: Proposed generic approach to assessing cumulative impacts 228

Introduction

Chapter 1: **Assessing the need for a regional approach to environmental studies of development investment in southern Africa**

Chapter 2: **Issues and trends in the regional harmonisation of E.I.A. processes in southern Africa**

Part One

Chapter One

ASSESSING THE NEED FOR A REGIONAL APPROACH TO ENVIRONMENTAL STUDIES OF DEVELOPMENT INVESTMENT IN SOUTHERN AFRICA

by Ebenizário Chonguiça and Yemi Katerere

BACKGROUND

This paper is a summary of three case studies that were carried to review and document current trends in Environmental Impact Assessment (EIA) procedures in Southern Africa. The review process focused on the examination of the extent to which currently applied EIA approaches adequately address trans-boundary and cumulative impacts of development initiatives as well as the impacts on natural resources important to agriculture or the livelihoods of people depending on it.

The approach taken was to review three projects namely the Lesotho Highland Water project, the Lubombo Spatial Development Initiative and the Sugar Cane Irrigation Industry in Swaziland. Reports of these case studies were produced and presented at a regional conference convened to assess the need for a regional approach to Environmental Impact Assessment in Southern Africa and to map an appropriate strategy for harmonized EIA frameworks in the region.

The Southern Africa sub-continent is currently experiencing a vibrant socio-economic transformation. This effort aims at addressing the pressing demands for rapid economic growth to respond to the fundamental needs for eradicating poverty and elevate people's living standards to acceptable levels. The dramatic geopolitical changes observed in the sub-region, combined with the region's natural resources endowment provide an enabling environment attracting substantial capital investment towards the social and economic development of the sub-region. Numerous large- and small-scale development

initiatives have occurred in Southern Africa. These initiatives are not only changing the biophysical, economic and cultural landscape, but are also creating new trans-boundary relations.

Southern African states are grouped together under the Southern Africa Development Community (SADC). The fourteen SADC states include twelve on the mainland (Angola, Botswana, Democratic Republic of Congo, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, Zimbabwe) and two island states (Mauritius, Seychelles).

While these states are separated by political boundaries, these boundaries do not generally correspond with natural ecological boundaries. Watersheds and other ecological units often cross one or more political boundaries. For example, all twelve of the mainland SADC states share drainage basins with one or more neighbouring states. Consequently, water use in one state affects water quality and quantity in neighbouring states downstream. A similar case exists for coastal and marine ecosystems, and for networks of protected areas. Unfortunately, numerous activities have been and continue to be implemented without adequate consideration of trans-boundary impacts.

It is in recognition of the fact that most of the region's natural ecosystems units are interconnected (together with the ethnic and cultural systems), that the SADC treaty for regional economic integration was crafted (cf. Katerere, et al., 2001). The agenda of regional economic integration, therefore, aims at facilitating SADC countries to open their borders to trans-boundary and integrated regional economic development. To this end, numerous trans-boundary natural resource management (TBNRM) initiatives are underway in forms such as Trans-frontier Conservation Areas (TFCAs) and Spatial Development Initiatives (SDIs) that attempt to catalyse economic growth.

It should, however, be observed that amongst the SADC member states there are significant differences in terms of national development agendas and policies, legal frameworks and institutional arrangements. These differences create monumental challenges with respect to optimizing, regulating and monitoring cross-border impacts. Consequently, there is a need for in depth reflection on the most effective way to promote sound regional socio-economic integration under the prevailing regional reality of national differences.

The Problem

Prevailing trends in economic development in Africa illustrate the high dependence on its natural capital. Development initiatives implemented so far, have in most cases resulted in decreased social returns of growth and

high levels of unrealised and misused production potential of the natural resource base. The deteriorating terms of trade and high debt burdens are compounded by severe and escalating costs of natural resources degradation across the continent (cf. Warford, 1989). Further, the stock of renewable resources is rarely considered in a systematic and comprehensive way at the macro-economic levels where major strategic planning decisions are made.

Therefore, comprehensive development planning mechanisms intended to increase the level of understanding of the complex and interwoven biophysical, economic and socio-cultural elements of the landscape are greatly needed in the context of natural resources use and development planning (cf. Naveh and Lieberman, 1984). These development planning mechanisms are generally placed in a framework of an Environmental Impact Assessment (EIA), perceived as a "comprehensive evaluation of the effects of human development activities or non-action on the various components of the environment (*cf.* Biswas and Geping eds., 1987). They are intended to provide information needed by planners and decision-makers to make development projects and programmes more sustainable and less environmentally damaging. Given this, EIA basically corresponds to an analytical procedure designed to ensure that the best development alternative is selected (cf. Chonguiça, 1995).

An EIA study is usually multi-disciplinary in its nature and, depending on the specificities of the project / programme in question, may cover issues such as geo-biophysical impact analysis, economic impact analysis (efficiency assessment), social impact analysis (equity assessment), and risk assessment, as well as technology assessment.

Similar to the short history of most of SADC, the history of EIA in Southern Africa is short. However, with the advent of the international environmental movement aimed at promoting the principles of sustainable development, SADC member states have increasingly recognized the organic links between environment and development resulting in the review of existing frameworks at national and regional levels or developing of new policy and legislation.

The development and consolidation of the required policy and legislation frameworks have been recognized as one of the critical factors for planning approaches that enhance sustainable development. Besides national and regional efforts to sound environmental management, SADC countries have not escaped the long arm of globalisation. Many have signed and ratified international agreements that have become central to global environmental governance.

Despite these positive efforts, many countries still lack adequate resources and capacities to effectively enforce environmental laws and regulations. In addition some countries still have weak or outdated legislation.

When it comes to the specific issue of assessing environmental impacts of development projects, the approach tends to be nationally focused and sector or project specific irrespective of potential cross-border impacts. To date, individual countries in the region have had different approaches and standards for considering the potential environmental effects of development initiatives, and little accountability is paid to neighbouring states. This situation has led to a failure of many development initiatives to adequately consider impacts to the environment and resources, particularly when these impacts are trans-boundary in nature or effect.

As most of the SADC countries are striving to attract increasing levels of development investment, it can be said that prevailing approaches to EIA application are investor driven, as they are being used as compliance tools to attract international loans and overseas development assistance (ODA). A potential paradox, therefore, is the use of EIA as a rubber stamp rather than a strategic tool to guide development planning. This practice is substantiated by current trends whereby most of the projects are approved prior to the outcomes of the EIA. The EIAs subsequently commissioned are in fact undertaken simply to provide the "greening" of an approved project.

In spite of the myriad of specific positive developments related to EIA and management of trans-boundary resources, methods of Environmental Impact Assessment lack standardization in the region, and there is still a general lack of capacity to consider the regional (i.e. trans-boundary) environmental effects of specific development initiatives, or to assess the cumulative effects of regional activities.

In summary, what are being observed as critical factors preventing effective implementation of EIAs in development projects with regional and trans-boundary dimensions include the following:

- Current EIA application procedures are skewed towards national and sector / project focus
- No context is provided to address cross border developments or impacts
- Applied EIA procedures seem to be ineffective in accounting for cross border / trans-boundary development effects
- The SADC region is affected by limited technical capacity and weak institutional arrangements to ensure EIA enforcement at a regional level
- There is prevailing inadequacy of available financial resources

Furthermore, as the Southern African region attracts investors, the need for harmonized Environmental Impact Assessment will be crucial. If investors perceive one country to have lower environmental standards than another, they will tend to invest in countries with lower standards or to pressure other countries to meet such lower standards. This situation currently occurs in other areas where economic regionalisation has been promoted (e.g. North America, where Mexico generally has lower environmental standards than the U.S. and Canada). If a project has trans-boundary effects, those effects may meet the environmental standards of the state responsible for implementing the project but may not meet the standards of the neighbouring state.

Cumulative Effects

An important component of an EIA process is the consideration of effects that are cumulative with other projects. Understanding cumulative effects of multiple existing or planned development initiatives in a region is a critical ingredient of any EIA framework. Individual development initiatives may appear to have insignificant effects when assessed in isolation, but the cumulative effects of multiple initiatives can be significant.

Given the importance of cumulative effects, it is useful to distinguish between environmental assessments (EA) for specific projects, and EA for evaluating cumulative regional effects of development. Thus, the fundamental question being raised is how to effectively address environmental dimensions of regional development initiatives to ensure equitable and rigorous consideration of the effects of specific development initiatives, while also ensuring that the combined net effects of regional aggregated activities are both understood and evaluated. The World Bank has expressed this need in recent years (Goodland and Tillman 1995). The development of a concerted regional strategy, providing sound responses to these fundamental questions, constitutes the “raison d’etre” of this particular joint endeavour between the World Conservation Union (IUCN), Southern Africa Development Community / Environment and Land Management Sector (ELMS) and Technical Centre for Agricultural and Rural Co-oporation (CTA).

METHODOLOGICAL APPROACH

Selection of study sites

In order to encourage the development of a regional strategy aimed at providing some responses and alternative solutions to the issues raised above, an EIA review process was undertaken. This process was meant to help

increase the level of understanding of the current factors affecting the level of effectiveness in EIA processes, as applied to regional projects with a high propensity for trans-boundary and cumulative impacts. Consequently, three projects were selected as case studies namely:

- The Lesotho High Land Water Project (LHWP)
- The Lubombo Spatial Development Initiative (LSDI) and
- The Sugar Cane Irrigation Industry in Swaziland

The selection of these case studies was based fundamentally on the affordability criteria in terms of the feasibility to access the required basic information and conduct the required site visits, in order to produce the outcomes within the defined time frame for the planned review process. Additional factors taken into account for the selection of these specific projects included:

- Relevance of the project to unfold or reveal trans-boundary and cumulative impact issues
- Existence of supporting scoping or impact statement reports to the project
- Regional significance of the project
- Potential impact on natural resources important to agriculture or on the livelihoods of people dependant on agriculture

Study methods

The procedures that were undertaken to conduct the review process included:

De-briefing review meetings

Two de-briefing meetings were conducted with the consultants responsible for each of the case studies. The first de-briefing meeting held at the beginning of the review process aimed at discussing the scope of the EIA review initiative, as well as strategizing and reaching an agreement of the methodological approach as well as on the required time lines for product delivery. The second de-briefing meeting reviewed progress achieved by the consultants and provided them with feedback.

Collection and review of primary and secondary data whether national or regional and relevant to identified projects

- This included the collection and review of the project document outlining the technical specifications of the development initiative under review.
- Collection and review of EIA scooping reports, environmental impact statement reports of the conducted EIA for the development initiative.

- Collection and review of existing national legislation and relevant policy documents within the affected countries regulating environmental principles and standards of development initiatives.

Data analysis process

- On the basis of the outcomes of the data collection process, a listing was developed of the critical trans-boundary and cumulative impacts likely to occur from a development initiative under assessment considering its current geographic context. The analysis was further substantiated with findings from field visit and information gathered from other sources. Some of the potential trans-boundary and cumulative impacts considered in the list include issues such as:
  - Pollution levels (e.g. air, water, soils)
  - Health risks
  - Agricultural production (e.g. increased, decreased)
  - Impact on arable / grazing land (e.g. pollution, soil fertility, salinisation, acidification, etc.)
  - Production levels or income generation in other sectors (e.g. industry, tourism, transport, etc.)
  - Changes in quality of livelihoods (e.g. before and after the project)
  - Cross-border conflicts (e.g. upstream vs. downstream impacts)
  - Uneven cross-border development (e.g. labour migration implications)
  - Positive outcomes of the investment (e.g. alternative livelihood options)
- By comparing this list with the outcomes from the actual review process the dimensions of the trans-boundary and cumulative impacts that were not accounted for from the conducted EIA exercises were identified.
- Logical reasons for the identified omissions in accounting for trans-boundary and cumulative impacts were ascertained.

Assumptions

The methodological approach adopted for the case studies was framed under a set of underlying assumptions structured in following manner:

- There is a common understanding of concepts of trans-boundary and cumulative impacts at a regional level.
- Most of the EIA studies give little attention to trans-boundary and cumulative impacts at regional level.

- EIA approaches being applied are not flexible enough to cope with the integrated needs of most development programmes and projects within the agricultural, water resources and land use planning sectors.
- EIA approaches and methods are generally operated on a project or sector specific basis, often precluding a comprehensive view of the socio-economic and physical environment.
- Capacity to consider the multiple-use of land, and the degree to which a particular resource use may be in variance with the overall regional need, is not adequately taken into account.
- Prevalence of limited availability of resources and reduced institutional environmental capacity and mandate, poor capacity to design TOR's and review EIA proposals and absence or weak EIA legislation and / or enforcement capacity.
- No clearly defined regional framework for harmonised EIA guidelines.

Case study objectives

In order to test the underlying assumptions (as previously outlined) three selected project case studies were carried out with the following objectives:

- Undertake a detailed desk study review of the three development initiatives taking place in the region, in order to understand how the EIA process was applied with respect to trans-boundary and cumulative implications for natural resources essential to agriculture or for the livelihood of people who depend on agriculture.
- Review relevant policies and legislation within the affected countries to determine how trans-boundary and cumulative effects were taken into account.
- Assess potential incompatible aspects of the regulatory mechanisms among affected countries.
- Assess existing relevant regional agreements (e.g. SADC protocols) with provisions for consideration of trans-boundary and cumulative effects on development initiatives and the associated EIA studies.
- Provide recommendations on approaches and procedures for improved EIA processes at regional level to account for trans-boundary and cumulative impacts.

KEY FINDINGS AND DISCUSSION

Technical issues related to EIA application

All of the reviewed case studies were based on the revisions of existing scooping reports (including the project document proposal and technical specifications), impact statement reports including specialized thematic study

reports such as the environmental flow assessments. These are the kinds of basic EIA documents required by most of the national environmental authorities for issuing project environmental compliance certificates or licenses.

Nature of the TORs

During the review of the content and quality of EIA statement reports it became apparent that they tend to be responding technically to what was requested in the TORs. Drafting of the TORs is, therefore, a fundamental step to ensure that all relevant aspects required for the assessment are clearly tabled at the very early stage of the exercise. Drafting of sound TORs call for an effective understanding of the nature and technical specifications of the project being proposed combined with a good understanding of the socio-economic and geographical setting of the project in its broadest sense. This combined knowledge constitutes the foundation for effective anticipation of the most likely types of issues (e.g. biophysical, socio-economic, technological, cultural, archaeological and political) requiring attention from the EIA exercise.

Notion of trans-boundary and cumulative impacts

While the background documents of case studies make reference to issues related to trans-boundary and cumulative impacts there is no evidence that these issues are taken into account. Such omissions suggest that trans-boundary and cumulative effects were not part of the key requirements as per the TORs. This leads to the conclusion that effective considerations of trans-boundary and cumulative impacts within projects in Southern Africa need to be clearly stated in the TORs. From the conducted reviews it has become apparent that most EIA processes are strongly project-specific. Several possible reasons for this type of bias include:

- Attempt to minimize time and resources applied to issues viewed as marginal to the project;
- Inadequate understanding of how the particular project might be in variance with other existing projects and / or issues at different spatial and temporal scales of the project radius;
- Limited technical capacity in drafting TORs
- Limited technical capacity to address trans-boundary and cumulative impacts given the technical complexity of the subject matter
- Application of EIA techniques and methodologies not designed to account for trans-boundary and cumulative impacts
- Perception that affected parties are limited to the immediate vicinity of the project site under consideration
- Perception that dealing with cumulative impacts implies having to pay to address problems generated by other investor / developers
- Ignorance and / or lack of appreciation.

In technical terms, the reviewed case studies have illustrated that the notion of affected parties tends to be very confined within the closer limits of the project implementation site. Again, the inadequate consideration of space and time scales confines the EIA practitioners to limit consideration of the affected parties within the immediate vicinity of the project undertaking. When it comes to parties beyond the political boundaries of the country in question, this type of distorted consideration of space / time scales is further aggravated (e.g. in the LHWP little consideration was given to Botswana and Namibia).

The limited attention being paid to the assessment of cumulative impacts is also determined by the same root causes related to the excessive sector or project focus. Little attention is normally given to the linkages between the new project being proposed with the projects already existing or being proposed in the area of intervention. The issue related to who should pay for the cumulative impact studies is also pertinent. Investors of a specific development initiative tend to be reluctant in spending time, money and energy addressing problems that might have been generated by others. A policy framework needs to be put in place to account for this type of concerns, based on the cognisance that such an assessment would obviously yield an increased understanding of the aggregated effect of any current proposal to the outcomes of the already existing or proposed initiatives in the area.

Reference needs to be made that addressing cumulative impacts does not necessarily mean to provide a full and precise spectrum of the chain reaction emanating from the new proposed initiative over the existing ones. The scoping exercise can unfold for example, existing status of water (surface and groundwater) contamination due to ongoing development activities. Critical levels of forest depletion can also be ascertained. Making use of priority criteria, consideration of cumulative impacts of any new initiative would have to determine the incremental effect of a particular new initiative on existing threshold levels of resources degradation. This type of thinking would facilitate the adoption of proper management approaches to minimize present states of resources degradation.

EIA procedures versus Strategic Assessments

The reviewed case studies tended to follow the standard procedures of environmental impact assessments as recommended by conventional textbooks for EIA practitioners. From the existing policies and EIA legislations it is a requirement to generate:

- An initial environmental report,
- A detailed environmental impact assessment report,
- An environmental audit report as well as
- A comprehensive environmental mitigation plan

Adopted EIA methods are more effective for stand-alone and in country projects. In contrats, strategic assessment, can be a useful tool in tackling the issue of trans-boundary and cumulative impacts. A strategic assessment can provide an analytical framework for a systematic, integrated and participatory assessment of development initiatives with transboundary dimensions.

At a regional level there are some examples of Strategic Assessment of development initiatives of trans-boundary nature or sectoral development programmes. These include the cases of the Strategic Environmental Assessment of developments around Victoria Falls (cf. IUCN, 1999) and the overview and initial environmental assessment of the PROAGRI (agricultural sector development programme) in Mozambique (cf. Chonguiça et al, 1998).

The regional and trans-boundary nature of the initiatives being assessed in this current study are characterized by being a conglomerate of multiple projects ranging from agricultural and tourism to transport. Consideration of cumulative impacts would, therefore, need to address the range of variables arising from the connectedness of various projects that form an integrated part of any proposed regional development initiative. Therefore, rather than applying EIA techniques under the assumption that it is one specific project to be assessed, the approach should be that of considering a conglomerate of projects and the related biophysical, economic, social and environmental variables likely to be impacted by regional development initiative. Under these circumstances, it seems that the adoption of strategic assessment techniques would be more suitable for application in regional development initiatives of this nature.

Another shortcoming in EIA approaches being applied in the region is the limited application of alternative options or development scenarios for decision-making. This could be effectively dealt with, by promoting a systematic use of existing models for decision-making purposes (cf. Munn, ed., 1975; Patera and Ríha, 1995). These models are usually based on multi-dimensional decision-making principles. The multi-dimensional context is the prevailing norm in most development programmes / projects of a regional and trans-boundary scope. Multi-dimensional principles are rooted on the idea that "... each decision maker wants to draw maximum utility from a series of diverging utility determinants such that the weighted share of these determinants in total utility reflects a certain compromise between the successive utility determinants (cf. Nijkamp, 1980). The most commonly used models are:

- The multi-objective optimisation models - based on a continuous set of possible values for the decision argument, and
- The multi-criteria decision models - characterized by the use of discrete number of possible alternative choices or strategies.

Hard or soft systems analysis techniques can be applied to both types of models for decision-making, depending on the availability of data or requirements for the degree of accuracy. An example of practical application of this type of decision-making models can be illustrated by an on-site inventory programme aimed at providing adequate measurements of resource products and trade-offs among products on a watershed. Measurements of natural and agricultural resource products can be represented as a product mix, as outlined in Table 1.

Table 1: Framework for a hypothetical product mix for alternative multiple use management system on a watershed (modified after: Brooks, et al, 1991)

Item Annual production	Management alternatives		
	M_o (Existing situation)	M_1	M_2
Wood cut			
* Fuel wood (m3)	X_{01}	X_{02}	X_{11}
* Construction (m3)	X_{12}	X_{21}	X_{22}
Wood growth			
* Fuel wood (m3)	X_{03}		X_{13}
* Construction (m3)	. . .		X_{23}
Agriculture			
* Maize (kg / ha)	. . .	. . .	. . .
* Potatoes (kg / ha)	. . .	. . .	. . .
Livestock			
* MEIAt (LSU / ha)	. . .	. . .	. . .
* Milk (litters)	. . .	. . .	. . .
Wildlife (numbers)	. . .	. . .	
Water yield (m3)	. . .	. . .	. . .
Downstream irrigation			
* Storage (m3)	X_{0n}	X_{1n}	X_{2n}

All resource products derived from a particular area or class of land can be described quantitavely in such table. A product mix representing the existing situation (M0) can be compared to alternative multiple use practices (M1 and M2). A set of comparisons form a basis for choosing multiple use management system from a range of alternatives by appraising the impacts of the management redirections upon upland (on-site) productivity and externalities (downstream, etc.) as well. The product mix represented in Table 1 can be used to select the best course of action to meet an objective of management by assigning values and performing an economic analysis that compares the existing conditions with various multiple use alternatives (cf. Brooks et. al., 1991). Importantly, an analysis should also consider the changes in products and amenities over time. For example, under the existing condition (M0), soil erosion may result in decline in productivity over time. Alternatives that include soil conservation practices may show an increase in productivity over time as well as increases in usable downstream water yield. The true benefits of each alternative, compared to the existing conditions, are represented by the differences in on-site productivity and externalities over time.

National Policies and legislation

It is a recognized fact that most of the policy and legal frameworks regulating development planning linked to EIA processes in Southern Africa are rather recent. It was observed that the level of progress in the development and consolidation of such policies and regulatory instruments vary from country to country. However, an overall assessment of current conditions, indicate that there is a sound and enabling environment for sound EIA application in Southern Africa.

It was found that most of the SADC countries have developed their National Environmental Action Plans and gazetted environmental acts (see Table 2). SADC governments have ratified most of the critical environmental conventions that are central to the promotion of sustainable development. An effort is being developed to gazette the required national by-laws to operationalise the ratified international conventions.

The critical stumbling block, with respect to the effectiveness of the policy-enabling environment, is related to actual enforcement capacity. Prevailing institutional arrangements, and technical and financial capacities do compromise the capacity for adequate enforcement of adopted policies. This becomes even more critical at the lowest levels of government administration (provincial, district and local levels), where the actual project / programme intervention generates the physical and visible / tangible impacts.

Table 2: SADC with National Environmental Action Plan and EIA regulations established

Country	NEAP	EIA Regulations
Angola	Yes	
Botswana	Yes	Guidelines have been developed
Democratic republic of Congo	No	Unknown
Lesotho	Yes	Unknown
Malawi	Yes	Unknown
Mauritius	Yes	Guidelines have been developed
Mozambique	Yes	Guidelines have been developed
Namibia	Yes	Unknown
Seychelles	Yes	Environnemental Protection Act
South Africa	No	EIA procedures developed but no enforcement or regulation to conduct EIA
Swaziland	Yes	Guidelines have been developed
Tanzania	Yes	Guidelines have been developed
Zambia	Yes	Guidelines have been developed
Zimbabwe	Yes	Guidelines have been developed

Most of the SADC countries are on track as far as the signing of international agreements is concerned. A critical constraint is the ability and level of effective domestication of such conventions at national and regional levels.

Regional protocols, policies and legal frameworks

At a regional level, it is also observed that a number of regional protocols have been developed and promulgated to facilitate the adoption of an ecosystems approach to natural resources management.

These regional protocols make provision for addressing the fundamental challenge of effective trans-boundary natural resources management under the framework of regional economic integration. These cases include the SADC protocol on shared watercourses, and the recently approved SADC forest protocol.

Table 3: Regional protocols status of ratification by SADC members states

Country	Protocol on Shared Watercourses	
	Yes	No
Angola		✓
Botswana	✓	
Democratic republic of Congo	✓	
Lesotho	✓	
Malawi	✓	
Mauritius	✓	
Mozambique	✓	
Namibia	✓	
Seychelles		✓
South Africa	✓	
Swaziland	✓	
Tanzania	✓	
Zambia	✓	
Zimbabwe	✓	

** The original protocol on shared watercourses was signed and ratified by Lesotho, Malawi, Mauritius, Namibia, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe.*

*** The revised protocol on shared watercourses was signed by thirteen SADC member states in Namibia last year and has been ratified by two member states namely Botswana and Namibia.*

Again, the critical dilemma rests on the ability of governments to operationalise these regional regulatory instruments. Effective implementation of such instruments calls for inter-country and inter-sectoral development planning mechanisms (e.g. related to water resources management). The current practices, however, indicate that despite these efforts most of the economic development planning processes, are strongly of a national and intra-sectoral focus. There is not yet any significant regional experience of integrated development planning across SADC countries. Some initiatives in that regard are starting to emerge, such as the case of the Kalagadi transfrontier intiative, the Great Limpopo Transfrontier Park (GLTP) and river basin commissions. A joint inter-ministerial project management technical committee has been established for the GLTP and important lessons can be learnt.

Institutional arrangements at national and regional levels

Institutional arrangements for EIA are basically framed to address issues of national interest. Even at the level of river basin commissions and technical committees for parks management, as previously outlined, these institutions tend to be weak as far as technical, financial and organizational conditions

are concerned. When it comes to addressing issues of regional and trans-boundary dimensions no generalized inter-country or regional institutional arrangements with the required multi-sectoral representation exist on a conventional and long-term basis. Existing arrangements are also project-specific (e.g. TFCAs, River basin technical permanent commissions, etc.) with a composition very much specialized to the core characteristics of the resources under consideration. River basin inter-country technical commissions, for example, will be over-represented by hydrologists as if managing water was simply a hydrological problem only. The role of the SADC sector bodies is also an issue requiring further reflection. It has the mandate to guide regional policy but it is not equipped with a decision-making mandate to deliberate in cases of conflicts. Importantly, most of the regional inter-country management institutions for specific projects tend to be skewed to the confinements of government authorities only. The level of inclusion of other interested and affected parties (e.g. private sector, civil society) is minimal to inexistent.

Impacts on natural resources essential to agriculture or for the livelihoods of people who depend on agriculture

Trans-boundary areas in Southern Africa tend to be at the periphery of mainstream development and border people generally tend to be marginalised. Consisting basically of rural inhabitants, their dependence on the surrounding natural resources for subsistence is high. Subsistence strategies include agricultural practices, fishing, hunting and / or harvesting of a variety of natural resource products. Under these circumstances, any development investment in these remote areas has significant implications on the nature of existing relationships between the local communities and their sources of subsistence. Possible changes in the nature of existing subsistence strategies could be determined, for example, by the changes in access to markets and accessibility to new sources of household income (e.g. different from agriculture) imposed by the new opportunities created by the new investments in the area. The prevailing development trends within trans-boundary areas in Southern Africa, tend to be skewed towards tourism, transport corridors and to some extent commercial agriculture. The prevailing approach of attempting to convert the rural areas into tourism destination is based on the assumption that rural communities can make more profit primarily from wildlife and tourism than they make from livestock and crop production systems (cf. Katerere, et al. 2001). This assumption has led to a decline in the investment in research, extension and technology development for rural-based agricultural production systems. While it is true that many areas under trans-boundary investment initiatives are marginal to agriculture the switch to tourism as a source for livelihoods for these rural communities need to take into account the following set of issues:

- rural communities might be more vulnerable to shifts into activities related to the tourism industry which are outside of their control; and
- long-term tourism revenues may be very sensitive to political unrest or changes in tourist preferences with serious implications on food security and overall subsistence of rural communities.

Given this picture, proper strategies ensuring the diversification of the rural economy need to be seriously taken into account.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The need for increased social and economic development of the Southern Africa region is certainly a noble goal. However, proper strategies are required to balance the needs for rapid economic growth with those of sustainable management of natural resources. Consequently, sound integration of environmental management principles in the overall process of development planning and decision-making is critical.

Considering the nature of ecosystem boundaries and the ethnic and cultural interfaces among SADC member states, development planning mechanisms should certainly go beyond the scope of the existing political boundaries. There is a need for establishing effective planning and management systems that account for trans-boundary natural resources management. Consequently, EIA techniques being applied to ongoing regional development initiatives need to be adjusted to this particular context. It is imperative for the regional EIA practitioners to take the lead in resolving the present technical challenges being imposed on EIA application. Technical ethics and responsibilities should be guiding principles for repositioning and enhancement of the role of EIA in development planning.

The promulgated national and regional policies and legal frameworks need to be adjusted to address the challenges of regional integration and trans-boundary natural resources management in the sub-region. A new paradigm needs to be crafted to promote policy harmonisation. Harmonisation should not be viewed as a process of developing equal policy and legal instruments across all SADC member states. As far as national policies and legislation are concerned, harmonisation should be viewed as a process aimed at promoting complementarity and positive synergies within the existing regional differences. Of critical importance, therefore, is a deep understanding of the nature and dimension of these differences in order to explore opportunities

for cohesion and the building of synergies. Issues related to institutional capacity development, decentralization and strengthening of institutions at local level constitute a fundamental paradigm shift for successful changes in the regional approach to development planning.

Recommendations

Based on the findings from the case studies and additional information provided by EA experts across the SADC region, the following set of recommendations is proposed.

Develop regional protocols - this particular action should entail promoting the development of an umbrella environmental assessment (EA) protocol for the SADC region addressing issues such as: development of minimum regional standards for environmental quality; guidelines for EA; mechanisms for information exchange to mention a few. With a regional protocol developed, SADC could further explore the desirability of signing the Espoo Convention. Proper institutional and legal systems should also be put in place for effective enforcement of regional obligations as per the terms of the signed agreements.

Establish co-operative arrangements - this should include the encouragement and promotion of support to partnership agreements between appropriate agencies and institutions at national and regional levels. Formal linkages for reviewing and monitoring EA should be established at regional level. Professional co-operation could be promoted and improved through the establishment of sub-regional associations of impact assessment bringing together existing regional expertise in this particular field of development planning and management.

Improve trans-boundary links - efforts towards the development of proper cross-border consultation mechanisms could be one way of initiating such links. This should include well-established links between economic planning experts for joint planning and implementation of regional projects of trans-boundary nature.

Identify country entry points, or entry systems/mechanisms - it is proposed that each country establish a designated competent authority to undertake regional co-ordination tasks. In this respect setting up of functional national entry point in systemic framework is recommended rather then relaying on individual focal points.

Establish information-sharing mechanisms - this should include systematic publication and dissemination of existing best practices and success cases

across the region and worldwide. Trans-boundary EA plans and reports should be included in appropriate regional environmental information systems specially established for the purpose. The establishment of regional database of EA experts could be an important mechanism to facilitate information sharing.

Engage in training and capacity building - institutionalise diversified training for environmental ministries as well as other organisations on an ongoing basis over long term and at different levels (e.g. university degrees as well as short term courses and workshops). At a regional level there is a need to also build capacity for international dispute resolution. Actions need to be put in place to bust regional capacity for EA review and monitoring.

Use appropriate tools and methods - there is a need to encourage greater use of available tools to identify and address cumulative impacts. Centres of R&D should also make strides to refine existing tools and methods or develop new ones adjusted to the regional condition for effective assessment of cumulative impacts.

Promote best practices - there is a need to give attention and promote special mechanisms for quality control and professional ethics within the EIA practitioner's community. Centres of excellence in EA training should be identified and strengthened.

Use economic incentives - it is recommended that SADC should identify appropriate incentives (e.g. trade) but rely on national pride in the interim. Regional and systematic application of the polluter-pays principle should be rigorously fomented. Proper mechanism to screen investor to determine who is legitimate including the use of environmental management systems should be encouraged.

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Chapter Two

ISSUES AND TRENDS IN THE REGIONAL HARMONIZATION OF E.I.A. PROCESSES IN SOUTHERN AFRICA

by *Peter Ashton and **Ebenizário Chonguiça

INTRODUCTION

Africa is endowed with an enormous array of natural resources that have formed the foundation for national economies across the continent. For centuries, communities and societies have relied on the abundant natural resources to sustain and support their growth, expansion and development. Over time, populations have grown considerably and this has been accompanied by a dramatic increase in the rates at which natural resources are used. In many African countries, increased population numbers combined with low agricultural productivity, inclement weather patterns and inadequate economic resources have forced individuals and whole communities alike to over-exploit their resources (SARDC, 1994; Chenje, 2000; Ashton, 2002a). Local and regional patterns of dependence on natural resources, combined with large-scale exports of agricultural produce and raw materials, exert even greater pressure on Africa's natural capital. Overall, this situation has led to a vicious downward spiral of continued resource depletion and growing poverty that has often been accompanied by political instability and conflict (SARDC, 1994).

The harrowing prospects of increasing poverty, further economic decline and a growing dependence on external sources of aid have forced many African governments to attempt short-term remedies that focus on immediate relief for communities in dire need of assistance. Whilst many of these attempts provide short-term relief, they merely represent cosmetic solutions to the underlying problems and seldom halt or reverse the adverse conditions (Ashton, 2002a). If current trends are to be arrested and reversed, greater attention must be paid to new environmental management approaches that will help to restore and conserve depleted resources. This will require bold

displays of commitment, concerted action and political will by both national governments and the international community.

Many African governments share similar visions and face comparable problems, whilst also sharing several geographic, historical, cultural and linguistic ties that supersede political boundaries (Ashton, 2002a). As a result, there is a growing need to form regional and continental coalitions or associations that can jointly address mutual aspirations and problems. This is clearly evident in regional associations such as the Southern African Development Community (SADC) and continental initiatives such as the New Partnership for Africa's Development (NEPAD). These regional linkages and co-operation agreements are particularly important in the context of joint resources such as river systems that are often shared by several countries (FAO, 2000). However, much of the success of these partnerships depends on the ability of the individual parties to reach agreement on issues of equity and responsibility, and the degree to which each party is accountable for its actions to other members (Lundqvist, 2000). Clearly, careful custodianship of shared resources will help to form the foundation of a successful partnership.

Importantly, the degree to which the policies, legislation, resources and management practices of each country are aligned and implemented with those of its neighbours will be a central factor in any regional or cross-boundary agreement between countries. Success will be very difficult to achieve in situations where there is little or no alignment; for example, where one party is unable to deploy adequate human and economic resources to meet its commitments, or where another party seeks to derive unfair advantage from its economic or geographical position (Ashton, 2002a).

Pressing demands for economic growth in southern Africa have resulted in a growing number of small- and large-scale development initiatives. Several of these developments have significant local and trans-boundary impacts that are often worsened by the extent to which countries in the region rely on resources that are shared with one or more neighbouring states (Newson, 1992; Pallett, 1997; Ashton, 2002b). Whilst there are many instances where individual projects have insignificant impacts, there is also clear evidence that multiple projects can have significant cumulative impacts (SARDC, 1996). The rapidly expanding political agenda for regional integration that presses African countries to open their borders to trans-boundary economic development has simultaneously reinforced the need to re-evaluate the systems and processes required to assess the extent that current national environmental impact assessment (EIA) approaches and practices take account of trans-boundary and cumulative impacts (MMSD, 2001).

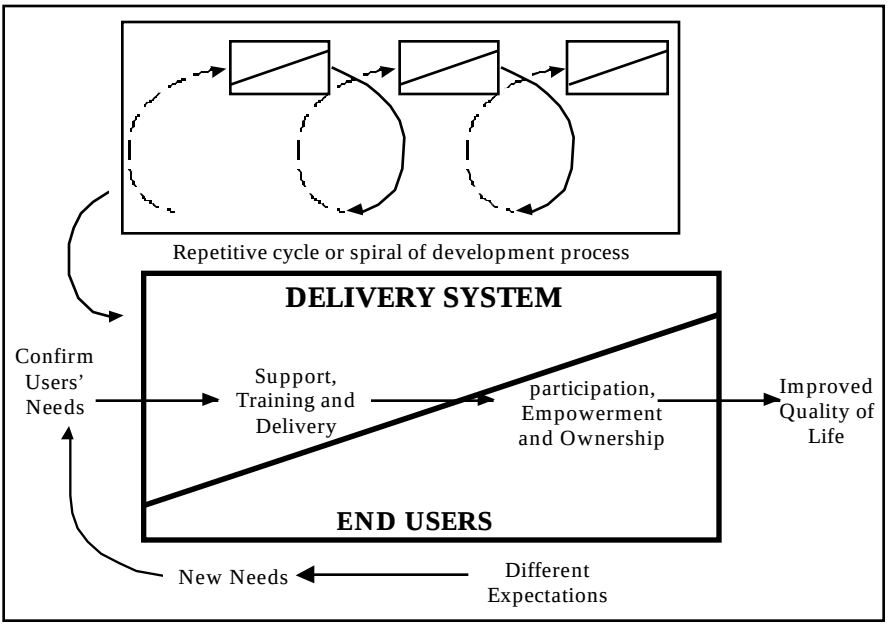
This review examines the extent to which the trans-boundary and cumulative implications of development projects are accounted for in southern Africa, as a backdrop for recommendations to improve and enhance environmental impact assessment and management practices across the region. Specific attention is focused on existing initiatives and the extent to which these are aligned with current policies and legislative instruments in southern African countries.

SUSTAINABLE DEVELOPMENT IMPERATIVES AND REGIONAL INITIATIVES

The concept of "Sustainable Development" was first introduced into the global environmental debate in the 1980's to express the interdependence between economic development, the natural environment and people. The most widely accepted definition of sustainable development describes it as "development that meets the needs of the present without compromising the ability of future generations to meet their needs and aspirations" (WCED, 1987). This expression of sustainable development seeks to establish a development path that will enhance the quality of life of humans and ensure the viability of the natural systems on which that development depends. These principles have been incorporated in Agenda 21 (UNCED, 1992) and also form the central components of key international environmental conventions (UNCBD, 1992; UNECE, 1998).

In Africa, sustainable development initiatives focus on improving the social and economic equity of the poor majority, the rational management and use of natural resources, the eradication of pervasive poverty, developing the human population, and improving economic growth (SADC, 1996, 2001). Several African institutions have considered these issues in depth and they have now become firmly entrenched as the guiding principles of NEPAD. The basic processes of 'development' in its widest sense can be considered to occur in a cyclical fashion, as shown in Figure 1.

Figure 1: Diagrammatic sketch of the development process, showing the typical cyclical sets of changes that occur during the process of 'development', as the needs of individuals and communities are met. Figure modified from Ashton (2002b).



In this representation of the development process, the partnership between service delivery agents and the end users of these services promotes a strong sense of empowerment and ownership of the "final product", and the recipients are now able to articulate new sets of needs that must be satisfied. In this way, development is not a static process, but rather a continuous cyclical or spiral process.

The 1992 meeting in Abidjan on the African Common Position on the African Environment and Development Agenda clearly emphasised the need for strong political commitment from all African countries to ensure that development does not destroy the resource base on which it is based (UNECA, 1992). This would require countries to redefine their national development priorities to alleviate constraints imposed by natural circumstances, the prevailing international economic setting and their individual debt burden. These constraints are accentuated by inadequate access to technology and by worsening terms of international trade and indebtedness (Kakonge, 2002).

Prior to the Abidjan meeting, earlier initiatives came from the 1985 African Ministerial Conference on Environment in Cairo (AMCEN, 1985), the 1989 African Regional Conference on Environment and Sustainable Development

in Kampala (UNECA & UNEP, 1989), and the 1991 Pan-African Conference on Environment and Sustainable Development in Bamako (Chenje, 2000). The central theme emerging from these meetings was the recognition that sustainable development could only be achieved if African countries had sufficient capacity in terms of viable institutions, appropriate and relevant technology, as well as adequate human and financial resources (SARDC, 1996).

Global thinking and international experience have also contributed strongly to the debate around the need for, and goals of, sustainable development in Africa. There is now growing agreement on the close inter-relationship between socio-economic well being and a healthy biophysical environment, the importance of international collaboration and the vital role that citizens should play in environmental management, as well as the compelling linkage between poverty, consumption and resource degradation (Asmal, 1998). IUCN's World Conservation Strategy (IUCN, 1980), the Report of the World Commission on Environment and Development (WCED, 1987), the Rio Conference on Environment and Development (UNCED, 1992) and the Report of the World Commission on Dams (WCD, 2000), advocated increased attention and commitment to all of these issues.

The critical importance of sustainable development in Africa is further emphasized in the context of NEPAD and Africa's preparations to host the 2002 World Summit on Sustainable Development. Among the key questions being asked of African countries is the extent to which the provisions of Agenda 21 and the various environmental conventions have advanced Africa towards the goal of sustainable development (Tarr, 2002; Weaver, 2002). This focus of attention is pertinent because, despite its enormous natural resource potential, many African countries experience widespread poverty whilst having to support socio-economic conditions brought about by fluctuating terms of trade and external indebtedness. Insufficient institutional and legal frameworks, poor governance, a weak infrastructure base, and insufficient scientific, technical and educational capacity compound the continent's problems (Weaver, 2002). In combination, these pose enormous challenges to meeting the national and regional objectives of sustainable development.

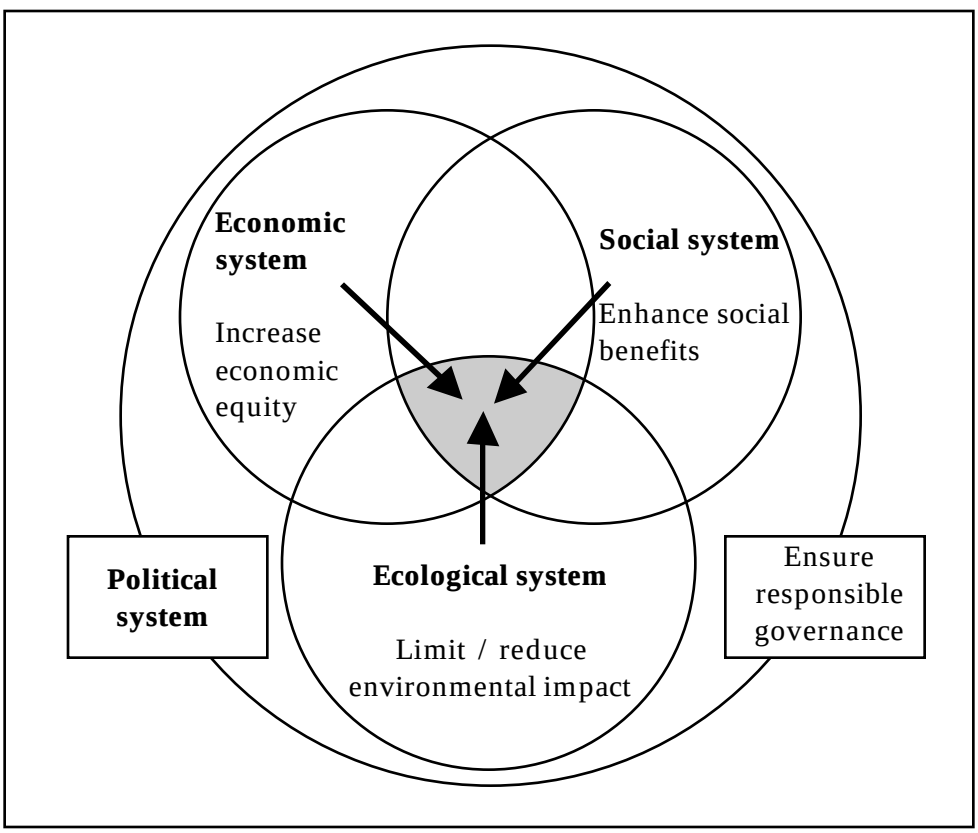
The relatively low levels of human development in southern Africa have prompted SADC to focus its goals for sustainable development on equity issues (SADC, 1996). In terms of the SADC vision for sustainable development, the region must:

- Accelerate economic growth with greater equity and self reliance,
- Improve the health, income and living conditions of the poor majority, and

- Ensure equitable and sustainable use of the environment and natural resources for the benefit of present and future generations.

A fourth dimension, namely governance, needs to be added to the three goals identified by SADC to ensure sustainable development (Figure 2 - Hounsome & Ashton, 2001; Weaver, 2002). The global frustration about lack of progress in the implementation of various global treaties and protocols is also experienced at company and local government level (Topfer, 2000). A future focus on implementation will depend on the creation of institutions of governance that can meet stated objectives. A key part of this process will require stakeholders to engage transparently to promote participation and form partnerships where they are also accountable for their actions and decisions (Ashton, 2002b).

Figure 2: Diagrammatic representation of the four interacting components or systems that comprise sustainable development (shaded). Figure redrawn from Hounsome and Ashton (2001).



THE PROBLEMS OF TRANS-BOUNDARY AND CUMULATIVE IMPACTS

Trans-boundary impacts

The management of large ecosystems (such as river basins) that span political (or other) boundaries requires a fundamental understanding of ecosystem components and their linking processes. Limits to the amount of change that ecosystems can tolerate and still remain productive are increasingly recognised. Sadly, this awareness is often based on observation of irreversible loss and change in ecosystems (Ashton & King, 2002). These occur when the effects of development activities exceed some threshold of tolerance or resilience. Specific boundaries between the sustainability and collapse of ecosystems are difficult to identify and even harder to quantify, making ecosystem management exceedingly challenging. Additional complexity is added by the extent of natural inter-annual and seasonal variability, as well as the uncertainty surrounding the potential implications of climate change. This becomes particularly challenging when considered in a trans-boundary context where it may be difficult to identify (or confirm) the original source of the problem (Ashton et al., 2001).

This dilemma has prompted widespread agreement that EIA should include the impact of proposals on ecological processes (as specified in the Convention on Biological Diversity; UNCBD, 1992). Unfortunately, most attempts to measure the overall "health" of ecosystems only present a partial view - traditionally, such studies develop indices or indicators describing the extent of ecosystems and include something about the variety and diversity of organisms comprising them, their production of essential goods and services and the (exploitation) pressures that they face. Few traditional indicators provide information on the capacity of ecosystems to continue to supply goods and services or their resilience to certain levels or patterns of exploitation (Ashton & King, 2002). Where such information is available, it is often only applicable to limited numbers of species or only valid for relatively small portions of ecosystems. In addition, the traditional, reactive, project-based EIA approaches have offered little in the way of useful information for management decisions, either because an overly narrow view has been taken of ecosystems and their natural dynamics, or the wide variety of temporal and spatial scales involved have been ignored (Ashton & King, 2002). Again, this problem is worsened when considered in the context of a trans-boundary impact.

The increased openness of international borders and a growing emphasis on poverty alleviation and socio-economic development pose direct challenges

to traditional patterns of resource management (Newson, 1992; Ohlsson, 1995). There are now important new dimensions to the production and management of public and private goods and services and some authors have argued that the failure of existing international institutions to provide public goods is directly responsible for many of the world's recurring crises (Halter, 1991). These include volatile financial markets, the prevalence of disease and environmental degradation, including the pollution and depletion of trans-boundary water resources (Delli Priscoli, 1998; GWP, 2000). Discussion of international public goods has emphasised the view that (effective) trans-boundary water management is accepted as an international public good (Turton & Warner, 2002).

Effective trans-boundary water resource management can be considered as a "global" public good in those cases where the benefits that accrue to a single shared river basin can be said to be almost universal in nature. The example used to support this assertion is that where conflict in a specific river basin can have global repercussions if the waters are highly contentious and poor management can increase the risk of conflict (Turton & Warner, 2002). The Jordan, Tigris and Nile rivers would appear to be suitable examples of this situation.

There is also a potential for conflict caused by poor management, pollution and inadequate attention to equitable water allocation issues (Falkenmark, 1999; Gleick, 1999). Here, discussions on 'water security' become relevant and are discussed frequently in international circles (Falkenmark, 1989). Typically, the water security debate hinges on national concerns around the fair and equitable sharing of water resources (Ashton, 2000a). Approximately 40% of the world's population lives in international river basins and trans-boundary water management affects their water security and, indeed, every aspect of their lives (Falkenmark, 1999).

The increasing global awareness of the importance of effective international management of the shared (trans-national) water resources does not translate into effective management at an international level. Indeed, it appears unlikely that there can be truly effective international management of a water resource despite the global nature of the hydrological cycle (Kakonge, 2002). Nevertheless, whilst there is a global need to provide water security for all, this can only be achieved through national and regional actions, supported by global and international institutions (WCD, 2000). Global efforts are therefore needed to support the provision of what is in effect a regional public good (FAO, 2000). This effort must address both the limits to national sovereignty over a resource such as water, and also the political constraints

that national sovereignty places on trans-boundary management institutions. In short, the institutional aspect of effective and balanced trans-boundary water management institutions can be defined as a regional, but not global, issue (Turton & Warner, 2002).

Effective trans-boundary water management institutions can be defined (Turton & Warner, 2002) as:

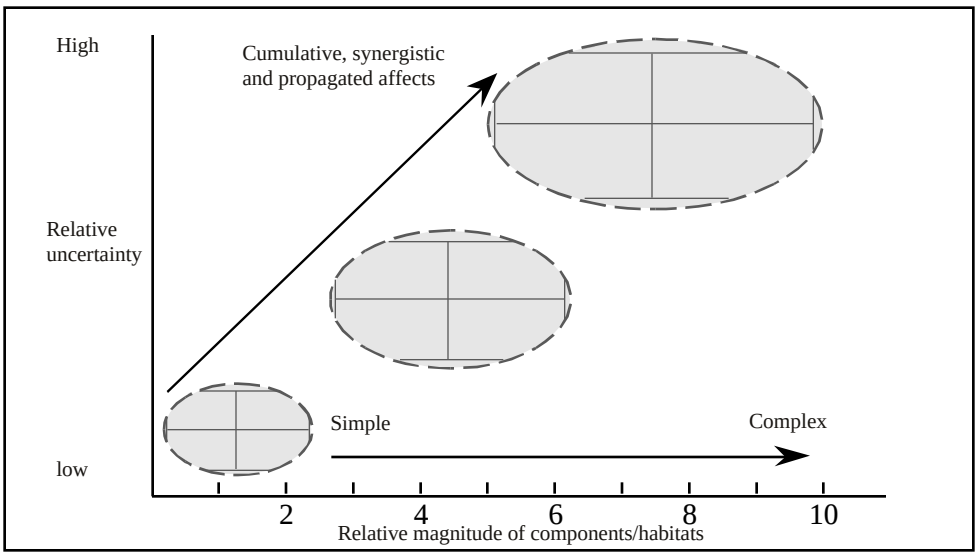
- Regional custodians of public goods rather than truly international institutions, because they affect a limited set of riparian countries,
- 'Club'-like in their operations, rather than purely public institutions, where the benefits depend on the countries that commit themselves to the institutional arrangements (or are omitted from the arrangements), and
- 'Means' focussed in that the (often unseen) output of effective and balanced trans-boundary water management institutions may be other goods, such as regional peace and security.

An important dimension of effective trans-boundary water resource management is that it represents the sum of the contributions of the riparian states involved. Therefore, it is vital to recognize that effectiveness reflects the degree of co-operation between riparian countries, as well as the national capacity of each individual state to manage its own water resources. The central concern with trans-boundary impacts therefore relates to the ability of the states concerned to reach an equitable agreement on their respective responsibilities and to demonstrate their capacity to abide by the terms of their agreement (Ashton, 2002a, b).

Cumulative impacts

A cumulative impact or effect is usually defined as the accumulation of impacts both from the project under review and from other human activities that have been and will likely be carried out at some point in the future. Consequently, cumulative effects can have an important role in EIA, particularly when decision makers need to assess the full or "true" impact to society of a proposed project or development, rather than the impacts caused by the single proposed project. Several reviews on the use of cumulative impact assessment in EIA have shown that very few studies have addressed this issue effectively (Sadler, 1996; Porter & Fittipaldi, 1998; Kakonge, 2002). An important characteristic of cumulative impacts is the fact that, as the complexity of habitats or diversity of biotic components increases, there is a trend of increasing uncertainty (or inaccuracy) in attempts to predict the potential cumulative impacts that might potentially occur as the result of a development project (Figure 3).

Figure 3: Diagrammatic sketch to illustrate that as the diversity or complexity of ecosystem components increase, this is accompanied by a trend of increasing uncertainty (and inaccuracy) when trying to predict potential impacts.



Another important aspect of cumulative impacts relates to the changes or impacts caused by unanticipated activities that are not related directly to the project under consideration (Chambers et al., 2000). A typical example here would be the cumulative adverse effects of inappropriate land-use practices undertaken by those communities that arise in the vicinity of a new development project. Often, people are attracted to the area by the promise of potential employment and economic opportunities offered by smaller peripheral activities that start up in the vicinity of a larger development project such as a new mining operation (Chenje, 2000). Over time, these communities become firmly established and the combined effect of their activities can increase to the point where they have a dramatic effect on the availability of natural resources such as water supplies, fuel and building materials.

Classic examples of this type of situation can be found in the numerous satellite communities that have sprung up around the mining towns of the Zambian Copperbelt (MMSD, 2001). The waste products discarded by these satellite communities accentuate the effects of effluents discharged by the different mines and towns and, collectively, this has led to a dramatic decline in water quality in the upper and middle reaches of the Kafue River (Chenje, 2000; Ashton et al., 2001).

Typical tools used to identify and assess cumulative impacts in EIA (Sadler, 1996; Porter & Fittipaldi, 1998; Petts, 1999), can be ranked by order of usefulness from most to least, and include:

- Professional judgement of experienced environmental professionals,
- Models that can combine and predict impacts from several sources,
- Case study examples of similar types of developments,
- Indices of impact evaluation and importance,
- Interaction matrix that can at least identify (if not quantify) the likely impacts,
- Detailed checklists,
- Network diagrams, and
- Simple checklists.

The prediction of cumulative environmental impacts usually requires comprehensive baseline data, as well as a sound understanding of the affected ecosystem components and their interrelationships. Any assessment of cumulative impacts becomes complicated when impacts occur over large (and variable) temporal and spatial scales (Chambers et al., 2000). Typical reasons given by EIA practitioners as to why cumulative impacts have not been extensively assessed in "traditional" EIA studies, included:

- Practical constraints related to time and money,
- Lack of expertise, and
- Lack of co-ordination between governmental departments

Additional reasons could also include:

- Uncertainty as to how far into the past or into the future additional impacts should be identified,
- Problems experienced in interacting with other EIA practitioners who may be conducting an EIA in the area,
- Difficulties experienced in sourcing information on a large number of activities from diverse sources, and
- Reluctance by project proponents (developers) to commission and pay for the additional work that may not be clearly and unequivocally linked to the specific project being evaluated in the EIA.

Understandably, addressing cumulative effects in an EIA is far more difficult than merely assessing the impacts of a single project (Sadler, 1996). The need to assess the effects of a specific development in combination with the effects of other past, present, and reasonably foreseeable future developments places enormous emphasis on the need to fully understand the natural and social systems that are affected by developments (Porter & Fittipaldi, 1998; Petts, 1999). An assessment of cumulative effects implies the need to assemble large amounts of information from a wide variety of sources, use this information appropriately to predict cumulative impacts, assess the greater variety of

impacts (than those caused by the specific project in isolation) and then to manage or mitigate the impacts meaningfully.

An additional array of complications is introduced when it becomes necessary to mitigate cumulative effects. In particular, this raises several questions regarding the "ownership" of cumulative impacts, as well as the roles and responsibilities of developers, local authorities and community members, particularly with regards to costs for the cleanup of historical impacts or the impacts of peripheral activities that are unrelated to the project in question (Ashton et al., 2001).

Traditional sectoral approaches present the biophysical environment as a set of discrete components, usually ignoring linkages between them. As a result, integration is limited (Petts, 1999; Ashton & King, 2002). Environmental impact assessment should seek to explicitly consider the linkages between components and feedbacks within and between them in an interlinked series of "cause - effect" relationships, to provide a comprehensive, integrated evaluation of overall consequences for ecosystem structure and functioning over time and space (Petts, 1999). Recent developments in "ecological footprinting" have dramatically enhanced our understanding of the extent and complexity of ecological linkages (Chambers et al., 2000). A typical example of sets of linkages would be provided by the transformation and transmission downstream of impacts associated with waste or liquid effluent discharge to a river.

Improved methods used in recent ecological impact assessment include versions of Pressure - State - Response models, which specifically consider linkages within a system as well as between systems (Petts, 1999). Examples of such approaches can be found in recent State of the Environment reports (Chenje, 2000). These provide explicit information on the capacity of ecosystems to continue to deliver goods and services against their sensitivity and vulnerability to external pressures and demands. Another important advance in environmental impact assessment has been to better model the distribution of costs and benefits across different levels of society (Falkenmark, 1999; Petts, 1999). This recognises those who gain benefits from ecosystem services are rarely those who bear the costs of their loss.

Improved understanding of ecosystem functioning enables us to make proactive recommendations on a system's "carrying capacity" and the likely cumulative effects of development options (Shela, 1996). This directly improves our ability to define precautionary options and guide society's transition towards sustainable development. Here, Strategic Environmental

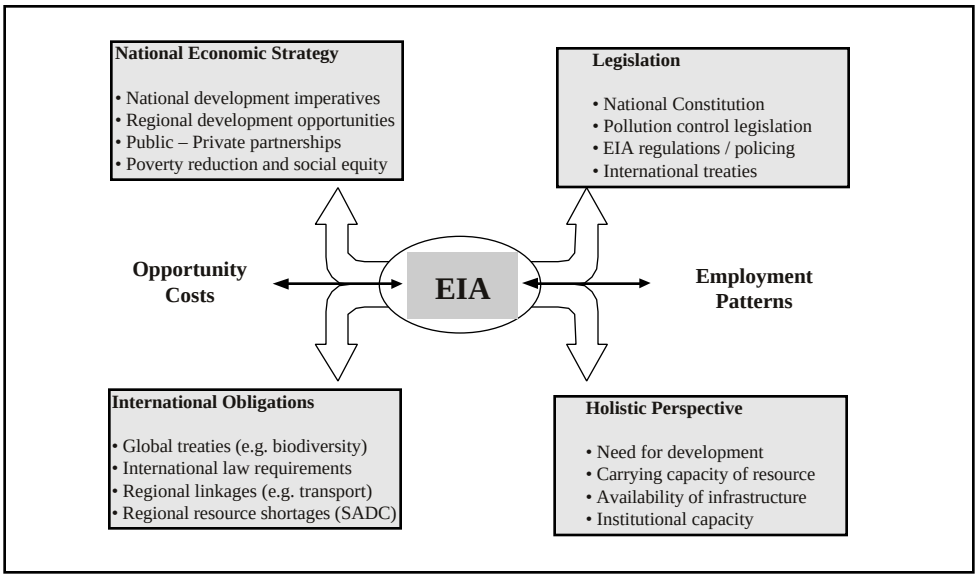
Assessment (SEA) can be used to consider the full range of space and time scales of ecological processes, including links that span the needs of current and future generations (Petts, 1999).

Finally, rapidly expanding initiatives to develop suitable indicators of ecosystem health, integrity and resilience, as well as measures of ecosystem change over time, provide extremely important inputs to the development of adaptive management strategies, such as those now used in the Kruger National Park in South Africa (WRC, 2000). These allow us to respond more rationally to the accumulated effects of several different activities and, where necessary, to develop and implement appropriate remedial strategies.

THE ROLE OF ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

Environmental Impact Assessment (EIA) is an analytical process with the ultimate objective of providing stakeholders and decision makers with balanced, objective and understandable information that clearly indicates the likely consequences of proposed actions (Chonguiça, 1995, Porter & Fittipaldi, 1998; Petts, 1999; Weaver, 2002). Perhaps the most important purpose of an EIA is to provide evaluations of alternative project (development) scenarios that fully reflect the environmental costs and benefits of each option. These are then used to facilitate decision-making as to whether or not to undertake the proposed development. Some of the diverse aspects that must be considered for each development option during an EIA are summarized in Figure 4.

Figure 4: Diagrammatic representation of the main aspects of each alternative that must be weighed up during an EIA in order to achieve an appropriate balance between meeting development needs and attaining resource conservation objectives.



Since the inception of EIA in 1970, over 120 countries worldwide had enacted some form of formal EIA system by 1998, though these varied greatly in terms of procedure and practice (Kakonge, 2002). In some countries, the requirement for an EIA takes the form of a formal regulation, other countries have EA guidelines, and yet others have systems that are either more ad hoc in nature or merely rely on the requirements stipulated by donor agencies (Weaver, 2002). Whatever the EIA system employed by a country, one of the major drawbacks seems to be the general lack of a system that can enforce the recommendations in practice.

The scope and methodologies of EIA have evolved and improved greatly during the past decade. Specific new advances include improved consideration of biodiversity impacts and climate change issues, as well as an increasing application of EIA principles to policies, plans and other strategic decisions, together with reviews of trade, privatisation and structural adjustment initiatives (Petts, 1999). Whilst several other tools are available to assist decision-makers, these do not have the legal or mandatory status of EIA, or are unable to adequately address issues of sustainability (Porter & Fittipaldi, 1998; Tarr, 2002; Weaver, 2002).

The factors that motivated the creation of environmental policies and programmes in developing countries differed from those in the West where

EIA originated. In the West, environmental policies and programs were typically "bottom-up" initiatives that resulted from demands by the general population. In contrast, environmental policies in developing countries have mainly been "top-down" initiatives by governments, often initiated in response to international pressures to deal with environmental problems (Weaver, 2002).

The international emergence of environmental concerns followed by EIA as a key decision-making tool in the early 1970s was closely linked to demands for public participation (Petts, 1999). Similar early attempts to introduce EIA in southern Africa were unsuccessful because conservative administrations and the oppressive nature of colonialism and apartheid historically discouraged public debate and action (Weaver, 2002).

In recent years, individual countries or groups of countries (e.g. SADC) affected by common problems have undertaken several joint environmental initiatives. However, whilst these initiatives are very welcome, the pace of change has been slow because many governments still maintain a virtual monopoly on policy-making (Weaver, 2002). A lack of capacity to implement policy is characteristic of many of the countries in the region and has further impeded uniform and effective implementation of EIA in the region (Kakonge, 2002). Nevertheless, good progress has been made towards implementing EIA within the region since the Earth Summit in 1992. To date, some SADC countries have promulgated framework legislation that makes allowance for EIA whilst others have specific legislation covering EIA (Weaver, 2002).

Professional practice has grown rapidly in southern Africa and a voluntary accreditation system for EIA practitioners has recently been established in South Africa (Tarr, 2002). The region also boasts several examples of excellent EIA practice that have been audited and stand up well against international best practice and there is also a growing realisation that trans-boundary impacts need to be considered (Weaver, 2002). Advanced tools such as Strategic Environmental Assessment are regularly used in South Africa to create a better framework within which EIA can be practised. Sophisticated predictive modelling techniques, health risk assessment, and social impact assessment are also used regularly in EIA processes. Public participation processes are particularly well developed in some countries (for example, Namibia and South Africa) and innovative methodologies such as participatory rural appraisal are regularly applied (Tarr, 2002).

EIA and a variety of other impact assessment tools have been applied internationally to determine whether or not proposed projects and actions

are economically viable, socially equitable and environmentally sustainable (Petts, 1999). The relatively well-developed legislative and policy framework in southern African countries, combined with the great challenges posed by sustainable development, create the opportunity for EIA to play a leading role in the development of the region and the continent as a whole (Tarr, 2002; Weaver, 2002).

However, for EIA to fulfil its real potential in southern Africa, the main needs are:

- Capacity building for administrators, practitioners as well as the public,
- Monitoring of compliance with EIA recommendations,
- Sharing of best practice across the region,
- Harmonising or aligning legislation within and across the region, and
- Strengthening the links between EIA, SEA, regional planning and other high level decision-making processes.

Importantly, there are still perceptions that EIA is an obstructive process that seeks to keep people in poverty, rather than one that ensures that future generations will enjoy resource security and a good quality of life (Petts, 1999). These perceptions need to be addressed as a matter of urgency.

THE NEED FOR REGIONAL HARMONIZATION OF EIA PROCESSES

Two key issues emerge when we analyse the effectiveness of environmental management laws in southern Africa. The first issue relates to the striking shortage of national capacity at all levels of government and society to implement comprehensive environmental management and ensure the implementation and enforcement of legal requirements (SARDC, 1996). The second issue relates to the need for countries and donor agencies to work closely together to align and harmonize EIA-related laws and regulations with those of neighbouring countries and with international technical and financial institutions (Tarr, 2002). National capacity building and alignment or harmonization of EIA policies and procedures would greatly facilitate the implementation of EIA requirements, particularly by investors and developers that need greater standardization to help them implement their project on time and within budget constraints (Kakonge, 2002).

Whilst the mere enactment of sound EIA legislation alone is not enough, it

does help to foster environmental protection and sustainable development. However, legislation is virtually useless if there is no national capacity to implement the EIA requirements (Kakonge, 2002). In practice, technical and administrative capacity is needed at every level where EIA is to be performed, reviewed, discussed, implemented and monitored, including central government, local government, decentralized agencies, private sector, NGOs and local communities (Tarr, 2002; Weaver et al., 2002). An additional need in Africa is for EIA processes to take closer account of the special values and needs that characterize the intimate interdependency between Africans and their natural resources.

At present, laws and regulations in most African countries consider EIA to be the mandate of central government and national environmental agencies (Kakonge, 2002). Every African statute in force recognizes that government ministries and agencies are responsible for the regulation and supervision of development activities. In addition, some countries such as Nigeria and South Africa have promoted local government involvement in development decision-making processes, including public participation (SARDC, 1996). Statutes in some other African countries mention or call for local government involvement in the public participation process. This type of decentralization or delegation is promoted in many African countries as a means to:

- Improve governance,
- Increase public awareness of the issues linked to development projects,
- Increase economic growth of the rural areas, and
- Promote institutional efficiency.

Therefore, it is appropriate to develop a regulatory framework that enables local governments to participate fully in the EIA implementation and review processes. The absence of specific legal provisions in existing statutes can be offset against the resulting enhancement of both environmental and decentralization legislation.

Outside government, participation in the EIA process helps to mobilize a whole range of social groups, ranging from small national groups of technical and scientific experts to a wide variety of grassroots organizations and their representatives (Weaver et al., 2002). As local governments and communities take on larger roles in planning and delivering basic development services, members of these groups should become more closely involved in the preparation, review and monitoring of EIA (Kakonge, 2002). Without this form of continuation, the opportunity to sustain the initial consensus that

was built during the EIA is lost. For these countries, the implications are (Kakonge, 2002) that:

- Rules, regulations and capacities should not be confined to the country capitals, but should be spread out as far as possible to the sites of development activities and the recipients involved,
- Training programmes should ideally include government staff, community representatives, and EIA specialists, and
- Technical and financial resources should be made available to these groups to enable them to implement their mandates and responsibilities.

An important component of virtually all EIA-related legislation in African countries is an explicit requirement for public participation (ADB, 1999). Whilst the responsibility for facilitating proper public participation invariably lies with the project developer, its stipulation in legislation represents formal recognition of the fact that public participation is an essential pre-requisite for transparency and good governance (Halter, 1991). However, it is critically important to understand that any attempt to achieve 'public participation' without appropriate levels of technical capacity at public level, and supported by adequate procedures, will result in what is commonly referred to as "promoting the illusion of inclusion" (Dr Ebenezario Chonguiça, IUCN-ROSA, personal communication). Far too many public participation processes are ineffective because no attempt is made to ensure that the participants have sufficient technical knowledge to understand the content of reports and presentations. Another common failing is an implicit assumption that everyone in an audience understands English, or at least understands the technical terminology and jargon used. In reality, there have been cases where over 90% of an audience were unable to understand the technical presentations that were made and could not grasp the potential consequences of a development proposal.

In many countries, the EIA review process is part of a comprehensive post-implementation monitoring and auditing process; however, in practice, several obstacles reduce or prevent adequate monitoring and auditing. This aspect needs to be incorporated into environmental laws and regulations in these countries (Tarr, 2002; Weaver, 2002). Further legal developments should specify the process and responsibility for monitoring and auditing to help enhance the credibility of regulatory agencies, project proponents and EIA practitioners.

A 1995 World Bank review paper highlighted the importance of harmonizing

EIA legislation and procedures within and between African countries and with donor agencies as a means of achieving significant cost savings (World Bank, 1995). If discrepancies between EIA procedures can be resolved, many African countries can reduce their own efforts and spending to develop sub-regional and regional co-operation, and facilitate development funding by donors instead (World bank, 2000). The compatibility and harmonization of national EIA procedures with those of international donor agencies would be designed to support and enhance funding investment initiatives (Kakonge, 2002). If the domestic (national) EIA procedures are fully compatible with those of the funding agency, this could help to avoid the unnecessary costs and delays of involving the funding agency in the EIA. Whilst this philosophy has several clear (mostly economic) advantages for African countries, it is important to recognize and understand the implications of two important underlying assumptions, namely that:

- The type and extent of the EIA processes practised and advocated by the international donor community are indeed comprehensive, effective and suitable for application in African situations, and
- These EIA processes deal effectively and compassionately with those African situations where development projects irrevocably alter or change the intimate relationship that exists between people and their natural resource base.

However, before efforts are directed towards re-drafting existing country policies or legislation with a view improved harmonization, it would be far more useful first to examine where these policies and laws complement each other and are aligned with the development imperatives of the countries concerned. New legislation and policies should only be drawn up when there is clear evidence that the existing policies and statutes are not fully complementary or are deficient in some other way.

Clearly, the urgent need for development across the entire African continent should be ample motivation to accelerate national and regional processes aimed at aligning and harmonizing EIA processes and legislation (World Bank, 2000). Importantly, the many political and judicial processes involved in any attempts at alignment should seek to ensure that the outcome reflects:

- Adoption of sensible and effective environmental standards that are based on consensus by all stakeholders,
- Development of suitable enforcement mechanisms that include effective judiciary control over EIA processes,
- Expansion of the numbers of appropriately trained technical and scientific personnel to undertake the required work, and

- Promotion of public participation as an effective way of strengthening sustainable development efforts by enhancing the empowerment of stakeholders and improving their level of ownership of project outcomes.

CHALLENGES FOR THE FUTURE

Alignment and harmonization of EIA policies and legislation between several different countries that may have differing social, political, economic, and judicial systems is not a trivial undertaking. Importantly, such a process would require each country and its environmental institutions to share similar sets of needs and goals with their counterparts in the countries they wish to become aligned with (Topfer, 2000; World Bank, 2000). The private sector and civil society would need to support the initiative because they would be most affected by any changes that occurred, whilst governments would be unlikely to achieve the required degree of compliance if they worked in isolation from their constituents. Despite the fact that this represents a daunting challenge that will be difficult to achieve, the potential benefits that could accrue to each country would seem to outweigh the potential difficulties in realizing this objective. Importantly, we must acknowledge that despite the differences outlined above for many African countries, the SADC countries in particular share several features that reflect their common adoption of sustainable development principles and recognition of the urgent need for regional economic integration. These are clearly demonstrated by the number of regional protocols that the countries have jointly ratified (e.g. SADC, 1995, 1996, 2001).

Several key steps or processes can be identified where African countries need to reach agreement so that the necessary alignment and harmonization of policies and legislation can be achieved. These steps are:

- Creating a shared vision for the future,
- Aligning environmental policies and legislative frameworks,
- Rationalizing the EIA process, where required, to include post-approval project implementation and monitoring phases,
- Creating sufficient professional capacity,
- Creating appropriate institutions of governance,
- Developing and applying appropriate techniques to assess trans-boundary effects and cumulative impacts, and
- Designing processes for conflict prevention, mediation and compensation

Each of these steps is briefly reviewed and discussed, below.

CREATING A SHARED VISION FOR THE FUTURE

The recent launch of the African Union and the NEPAD strategy is clear evidence that Africa's leaders can create and share a broad vision for the future development of the continent (Tarr, 2001; Weaver et al., 2002). In particular, NEPAD represents a firm commitment by the Heads of State of every African country to work together to reduce poverty and ensure social and economic upliftment of the continent's peoples, whilst simultaneously ensuring that the continent's natural resources continue to meet the needs of society in perpetuity. Clearly, these guiding principles are founded on a shared realization that regional integration is an essential requirement for sustainable development (SADC, 2000; Tarr, 2001).

This strong emphasis on regional integration and the principles of sustainability is essential if African countries are to achieve meaningful levels of self-reliance (Tarr, 2001). Relief from the pervasive problems associated with poor or inadequate governance, a weak infrastructure base, and insufficient scientific, technical and educational capacity, pose enormous challenges to meeting the objectives of sustainable development (Shela, 1996). Notwithstanding these problems, the shared vision that underpins the NEPAD strategy is proof that African countries can overcome their social, economic and political differences to develop a shared vision (Tarr, 2001, 2002). Therefore, it should be a relatively straightforward process for these same countries to develop a shared vision to align and, if necessary, harmonize their environmental management policies and legislation.

Aligning environmental policies and legislative frameworks

The environmental policies and legislative frameworks in many African countries that share trans-boundary resources, such as the water in a river basin, exhibit several differences in the ways that they are structured or implemented (Heyns, 1995, 2002; Pallett, 1997; Tarr, 2001). These disparities often make it difficult for the respective country authorities or agencies to achieve the same levels of management efficiency and control over the resources available. However, it is important to note that in almost every case, the central components of the policy and legislative frameworks in each country are very similar, having been drawn up from identical or very similar principles (SADC, 1996). Where there are differences, these are associated mainly with the availability of competent technical personnel and the specific

ways in which decisions are taken and management options are deployed. The existing degree of alignment suggests that the countries already share several similar values and development objectives, and it would therefore be possible to achieve this for environmental management policies and legislation as well.

Clearly, the above statement does not take into account the extensive discussions and accords that would be needed for each country to reach agreement on the precise mechanisms whereby alignment of policies and legislative requirements could be achieved (Tarr, 2001, 2002). Nevertheless, based on a shared understanding of the specific changes that would be needed, and the ensuing benefits in terms of achieving regional and national development objectives, each country could be motivated to mobilize the technical and legal resources required to accomplish this objective.

Rationalizing the EIA process where needed

The development and application of the EIA process in southern Africa, as well as other African countries, has frequently been guided by the requirements of different donor aid agencies or countries (World Bank, 2000; Kakonge, 2002). As a result, the specific steps in the EIA process adopted by an African country often mirror the EIA process of a particular donor country or organization. Whilst this procedure may allow the country concerned to accelerate its policy formulation and legislation processes, it can promote fragmented national and sectoral attitudes to environmental management (Kakonge, 2002). Thus, whatever advantages a country may achieve in terms of formalizing its requirements for EIA, these are sometimes offset by differences in the application and implementation of EIA in neighbouring countries that share responsibility for management of a trans-boundary resource.

This situation can be resolved by a careful analysis of the specific stages or steps in the EIA process required by those countries that share a particular resource such as a river basin (Pallett, 1997). The countries concerned can then reach agreement on the process to be followed when any contradictions or inconsistencies are identified and need to be amended to improve alignment with each other. Here, particular attention needs to be paid to aligning the EIA process with the full life cycle of development projects, including post-approval management of construction and operation phases (Weaver et al., 2002). It is important to remember that EIA is not intended merely to ensure compliance with legal requirements, but its primary objective is to ensure that projects are implemented in line with the principles of sustainable development (Weaver, 2002).

This is in accord with the specific recommendations contained in the SADC Policy and Strategy for Environment and Sustainable Development (SADC, 1996), which calls for "a breakaway from fragmented sectoral approaches to environmental management" and to pursue "a single agenda and strategy" to achieve greater consistency in decision-making. Most SADC countries have already promulgated framework legislation that makes specific allowances for EIA to be included in decision-making, whilst the remaining SADC countries are in the process of doing so (SADC, 2000; Tarr, 2001, 2002; Weaver et al., 2002).

Creating sufficient professional capacity

Efforts directed towards a clearer understanding of the specific differences in EIA policies and legislation between different southern African states, or towards improved alignment and harmonization of these instruments, represent an important step forward. However, these efforts will be futile if they are not supported by adequate numbers of suitably trained and experienced technical, scientific and management personnel (GWP, 2000; Kakonge, 2002). This capacity is needed at all levels where EIA is to be practiced, reviewed, implemented and monitored, and includes all levels of government, the private sector, NGOs and local communities (Tarr, 2002; Weaver, 2002).

The chronic shortage of trained technical and scientific personnel is a perennial problem for resource management institutions throughout Africa, and is not confined to southern Africa alone (GWP, 2000; Kakonge, 2002). However, the devastating effects of the HIV / Aids pandemic are particularly visible in southern Africa where up to 35% of adults may be HIV+ in some countries (Ashton & Ramasar, 2002). This has enormous implications for all capacity building efforts and represents a serious constraint to the development and expansion of national and regional efforts designed to address trans-boundary resource management issues. Nevertheless, the need for trained and experienced personnel remains acute and this issue must be addressed urgently.

In recent years, some university curricula have begun to include formal graduate and post-graduate courses in EIA, as well as training courses for EIA practitioners (Weaver et al., 2002). There is a growing cadre of professional EIA practitioners in southern Africa, and South Africa has recently established a voluntary accreditation system for EIA practitioners (Tarr, 2002; Weaver, 2002). Elsewhere in southern Africa, the acute need for improved training programmes and other forms of capacity building remains unfulfilled and represents an extremely serious impediment to effective implementation of EIA policies and legislation at all levels.

Creating appropriate institutions of governance

The effective, efficient and integrated management of a particular resource (such as water) that is shared by several countries requires a high degree of trust between the countries, as well as a firm commitment to inter-state collaboration and co-operation (GWP, 2000; Lundqvist, 2000; Ashton, 2002a). None of these responsibilities are easily incorporated into existing institutional (government) structures within participating countries and many of the policies, priorities and strategies that are needed extend well beyond the line function boundaries of conventional government departments (Wolf, 1999).

Experience gained elsewhere in the World has shown that the greatest likelihood of success in such cases is achieved when an independent organization (such as a river basin organization, or RBO) can be established to represent the interests of all countries sharing the basin in question (Lundqvist, 2000; van der Zaag & Savenije, 2000; van der Zaag et al., 2000). However, experience has also shown that most RBOs tend to regard water development purely as a hydrological problem. Indeed, the staff complement of most RBOs comprises technical experts from the water sector, with little or no representation from agriculture, mining, forestry, finance and planning sectors. This hampers appropriate consideration of the multi-faceted, cross-sectoral approaches that are needed because water resource management transcends traditional administrative boundaries. Unless the specific institutional arrangement makes provision for the integration of all these disciplines, it will not be able to demonstrate an appropriate system of corporate and public governance that meets the needs of all participants.

The creation of such a 'trans-boundary institution' requires each state within the river basin or management unit to acknowledge and accept the roles and responsibilities of its partner countries, whilst committing itself to the maintenance of a spirit of harmony and good will amongst its partners (Halter, 1991; OKACOM, 1994; Pallett, 1997; GWP, 2000; Lundqvist, 2000; van der Zaag et al., 2000). An important element of any such international partnership is the realization that the rights and obligations of each party are mutual and reciprocal, rather than unilateral (Wolf, 1999; van der Zaag and Savenije, 2000). In the specific case of an RBO, the basis for any agreement on the quantities of water required by a country will depend on the ability of each country to demonstrate its capability to manage the water resources available in a fair and equitable manner (Ashton, 2000a, b, 2002a).

There are several good examples of inter-state co-operation amongst southern African countries. Perhaps the best known of these is the SADC Protocol on Shared Watercourse Systems in the SADC Region (SADC, 1995) and its recent

revision (SADC, 2001), whose provisions are very similar to those contained in the United Nations Convention on the Law of Non-Navigational Uses of International Watercourses (UNCSW, 1997). The Revised Protocol on Shared Watercourse Systems in the SADC Region entitles SADC countries to develop water systems that flow within the boundaries their sovereign territories. However, the Protocol also requires each State to inform its neighbours of any plans to develop or modify a shared river system, to work together to ensure that each State shares in the benefits of such plans, and to ensure that environmental degradation is avoided or minimized (GWP, 2000). This approach caters for the territorial sovereignty concerns of individual states whilst also promoting inter-state co-operation and collaboration.

In effect, therefore, the SADC Protocol represents a useful example that can be emulated in other situations. However, it is important to remember that the success of any institutional arrangement depends on the availability of suitably trained technical and scientific staff, appropriate management structures, and the political will to implement policies and procedures that stakeholders have agreed to.

Developing and applying appropriate techniques to assess trans-boundary effects and cumulative impacts

Given the diversity of techniques and approaches used to assess trans-boundary effects and cumulative impacts, and the heavy reliance on professional judgement and experience, it is difficult to recommend a single optimum strategy to follow (Porter & Fittipaldi, 1998; Petts, 1999). Instead, a more practical option would be for the different agencies and institutions involved to convene a suitable meeting where EIA practitioners and agency personnel could reach agreement on which techniques or methods are most suitable. These procedures could then be specified for use by the relevant agencies and all EIAs conducted on development projects and / or trans-boundary projects would need to comply with these specifications.

Regular exchanges of information and reviews of progress would help to ensure consistent application of the selected approaches, and would also assist with national and institutional capacity building efforts. Ultimately, this would lead to improved decision-making and enhanced management of shared natural resources.

Designing processes for conflict prevention, mediation and compensation

To many stakeholders, the most controversial aspect of EIA policies and legislation is the seeming inevitability with which government approval is

granted for development projects to proceed whilst local communities and individuals feel that they are the ones who bear the real 'costs' in terms of lost access to resources. Part of this problem centres on the fact that the natural resource base of a country is usually regarded as a 'public good', for which the government must act as custodian (Christie & Hanlon, 2001). This is particularly true of scarce natural resources such as water or arable land, where some countries have replaced private ownership of the resource with the right of equitable use of the resource (Asmal, 1998).

Nevertheless, public perceptions persist that national or regional development projects often lead to the 'loss of ownership' or 'prevention of access' to local natural resources. Clearly, these perceptions need to be addressed very carefully and where real loss of access or use has occurred, there may be good grounds on which to consider some form of compensation. Typically, the processes of identifying and eliciting these concerns, and helping to prevent possible conflict, will require the inputs of skilled mediators and facilitators. It is this public participation procedure that forms the core of effective EIA processes (Petts, 1999).

Most effective EIA processes include a formal requirement for comprehensive public participation or consultation. However, these requirements vary from country to country, and also differ in the timing or point in the EIA process when public participation or consultation takes place (Kakonge, 2002). These differences represent an important opportunity for SADC countries to reach an agreement to standardize on the most appropriate form for public participation and consultation. Ultimately, this will help to align EIA processes in the different countries and will lead to greater consensus amongst stakeholders.

CHARTING A WAY FORWARD

The recent 'replacement' of the Organisation for African Unity (OAU) by the new African Union (AU) and the declaration that NEPAD will form the metaphorical vehicle for Africa's future development trajectory is an exciting opportunity to lay a solid foundation for future regional-scale and continental-scale collaboration when dealing with the trans-boundary effects and cumulative impacts of development projects. Efforts to realize the objectives of NEPAD will rely on the individual and collaborative efforts of all African states and it is here that the SADC countries can provide real assistance to their northern neighbours through sharing their collective experience with EIA. This will be particularly important in situations, such as the management

of shared river basins, where cross-sectoral approaches are needed (Asmal, 1998).

The growing awareness of the urgent need for sustainable development throughout Africa provides the greatest stimulus for national governments to work together to develop shared, regional approaches (GWP, 2000). Whilst many African countries already require EIAs to be conducted for development projects and have promulgated appropriate environmental legislation, several other states lag far behind. One of the first priorities should be to identify those specific technical areas where the available expertise in SADC countries can be mobilized. More specifically, the SADC experience in dealing with trans-boundary patterns of resource use and the application of EIA processes to large and small development projects (e.g. Ashton et al., 2001; MMSD, 2001), offers an important opportunity to transfer knowledge and skills to other participants.

There are also important lessons to be learnt from the European experience in applying the United Nations Convention on Environmental Impact Assessment in a Trans-boundary Context (UNECE, 1998). In particular, the knowledge gained in the development and staffing of appropriate institutional structures will be invaluable. However, it is important to remember that many of Africa's problems have unique characteristics that may prevent or hinder the direct 'transplantation' of a solution generated elsewhere (Ashton, 2002a, b; Heyns, 2002). In these cases, it will be essential to fully understand the characteristics and needs of the African situation to ensure that whatever solution is proposed, it is able to meet these requirements.

The critical need for skilled personnel underlies all the concerns around dealing with trans-boundary effects and the cumulative impacts of development projects. This problem can only be addressed effectively through the concerted and collaborative efforts of all the states in the region (GWP, 2000). A closely related issue is the need for appropriate institutional structures that are able to effectively manage trans-boundary resources on behalf of the states concerned (Pallett, 1997; Heyns, 2002). This would help to demonstrate good corporate and public governance practices, promote genuine trans-boundary and regional co-operation amongst the states concerned, and help to enhance the social and economic development of the region and the continent as a whole.

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Case Studies

Chapter 3: The Lubombo Spatial Development Initiative

Chapter 4: The Lesotho Highlands Water Project

Chapter 5: The Sugarcane Irrigation Scheme Downstream of Mnjoli Dam in Swaziland

PART II

Chapter Three

THE LUBOMBO SPATIAL DEVELOPMENT INITIATIVE

by Janet Bodenstein and Richard Fuggle

SUMMARY

This report documents the result of the review of the Lubombo Spatial Development Initiative (LSDI).

The research was undertaken between November 2001 and February 2002. The research was carried out at a broad scoping level and is based on the findings of review of two LSDI documents i.e. the draft Integrated Development Management Plan of the Greater St Lucia Wetland Park and a series of Scoping reports undertaken for supply of infrastructure to the Park. Where possible, people involved in compiling reports for, or otherwise involved in the LSDI were consulted with regard to environmental assessment processes being followed within the LSDI.

The key conclusions and findings of the review are given below.

Conclusions

- Although several policies in the affected countries support an integrated approach to addressing environmental concerns, there is a lack of procedures for translating policies and law into practice, particularly with regard to cumulative and trans boundary issues. In addition, the policies and laws reviewed place a heavy emphasis on application of EIA, which has significant benefits if correctly and timeously applied. However, EIA has limitations when applied at a regional, programme and large scale development initiative level. Other environmental tools such as Strategic Environmental Assessments, Sectoral Assessments, Regional Assessments or Environmental Overviews need to be used as well, particularly at the strategic planning and conceptual stages of projects or programmes.

- Although there have been good intentions with regard to incorporation of environmental considerations into the planning process, a lack of an agreed approach to addressing environmental issues in the LSDI or

possibly, the inability to implement the proposed SEA approach, may be contributing to a breakdown in the consideration and assessment of cumulative and trans boundary issues in LSDI projects. Weaknesses in institutional and administrative structures and communications may also be contributing to inadequate consideration of the wider implications of large scale initiatives. A poor understanding of the capabilities of various environmental tools which can assist in cumulative and transboundary effects analysis may be making the situation worse. There is also no law requiring that tools such as SEA, (which has been designed to address regional large scale programme level activities) be utilised. However, methods for applying SEA are not well developed and there is a need for increasing capacity in this field. Other planning initiatives (such as the development of regional Integrated Development Plans) may play a role in improving consideration of cumulative and transboundary effects. This warrants further research.

- At project level, cumulative impacts are being identified, but not sufficiently addressed. Cumulative and trans boundary issues tend to be 'referred up' to higher decision making authorities or are simply left unaddressed. Responsibility for identifying, tracking and addressing cumulative and trans boundary issues is not clearly enough specified in programme or project design as well as the Terms of Reference for studies to be undertaken. Inadequate effort is being made in the LSDI documents reviewed, to clearly state the implications of cumulative impacts on the project design, decision making and implementation processes and the overall implications of the initiative.

- Although there is a significant database of information available for the LSDI area, human resource and capacity issues, combined with insufficient communications appears to be leading to inefficiencies with regard to report commissioning, production and accessability. Confidentiality factors are hindering access to reports. These factors, in combination, are likely to reduce the chances of integrated holistic environmental assessment processes.

- The mechanisms for communication and co-ordination amongst and within environmentally responsible departments across countries (if any) do not appear to be functioning well. It is not clear what mechanisms are in operation.

Recommendations

- Administrative procedures for conducting EIAs which are likely to have trans boundary or cumulative impacts should be reviewed in order to take cognizance of such impacts. In addition, provision should be made for a wider variety of environmental tools to be used at the appropriate project stages in regional large scale initiatives (including Strategic Environmental Assessments , Environmental Overviews, Sectoral and Regional assessments). Guidelines on the strengths and weaknesses of different tools, and how they should be applied need to be further developed and communicated to key authorities and planners involved in the environmental management process. It is also important that governments recognize that they should be responsible for funding SEAs (or similar processes) as these are undertaken in the regional or national interest.

- A harmonized, practical, implementable, and agreed on approach to address cumulative and trans boundary impacts needs to be developed amongst SADC countries. In particular, effective communications and administrative structures must be set up. This must be accompanied by effective and ongoing briefing of key stakeholders and decision makers of the processes and tools being used (capabilities and status). In addition, significant capacity building and training in sustainability concepts and application and in particular, the various tools and methods that can be used to help identify cumulative and trans boundary impacts is needed. This should be supported by development of guidelines on methods for undertaking SEAs and the other similar tools. Training should initially be directed at the key institutions and authorities involved in environmental assessment and management functions. Further research into the role of Integrated Development Plans (IDP) in assisting in cumulative and trans boundary impact identification and assessment is warranted.

- Where relevant, terms of reference for environmental assessments of large projects or initiatives must clearly specify the requirement for cumulative and trans boundary impact identification and assessment. In addition, the Scoping process must be sufficiently comprehensive to ensure that cumulative and trans boundary issues are identified. This requires that Scoping procedures must cross boundaries when necessary. Key authorities, who are responsible for looking after scarce resources must be consulted in the Scoping Process (when relevant). Responsibility for identifying, tracking and addressing cumulative and

trans boundary impacts must be identified and agreed upon early in the environmental impact assessment process (irrespective of which environmental tools are being used). Public involvement must be sufficiently broad to ensure that potential trans boundary impacts are identified. Environmental consultants and planners must take greater responsibility for alerting key decision makers and authorities about the implications of cumulative and trans boundary effects.

- A means to improve identification of and access to key reports that will inform planning and environmental assessment in the area is recommended, together with creation of communication and co-ordination mechanisms that will facilitate information exchange.

Finally, further work needs to be done on developing regional approaches to environmental assessment, particularly with regard to political, administrative, and institutional collaboration between the affected countries. The recommendations made by Dr H Spaling, director of Environmental Studies at Kings University College in Alberta, are relevant. He states that :…..a management system that operates across projects and among stakeholders for determining regional environmental capacity and acceptable thresholds for cumulative effects, coordinating stakeholder participation in multiple projects and enabling a more efficient regulatory review and approval process for multiple projects needs to be established. This can be done by

- improving access to databases for available environmental data and project information;
- providing a coordinating mechanism for regional cumulative (and trans boundary) effects assessment and management that can co-ordinate the environmental input relevant to planning of multiple development projects proposed in a region and help co-ordinate regulatory reviews of multiple project proposals, as well as facilitate cooperative monitoring systems or management programs;
- setting regional environmental quality objectives or capacity targets or limits that are
    - specific to each valued environmental component or process, including levels of capacity (e.g. acceptable, critical, maximum) unique to that component or process
    - determined using the best available scientific and traditional knowledge
    - acceptable to the stakeholders
    - reviewed from time to time in light of monitoring and new advances in science, technology or management.

- Specify management options for meeting the regional objectives or capacity targets or limits that are
    - Actions for managing cumulative (and trans boundary) effects (e.g. technology, economic instruments, monitoring)
    - Part of a coordinated response to regional management among stakeholders.

STUDY APPROACH AND LIMITATIONS

Study approach

The overall approach to the study has been as outlined in the summary paper presented in the introductory section, part one chapter one. The key steps undertaken for this particular component of the case studies were as follows:

- Contact was made with the Lubombo Spatial Development Initiative (LSDI) project manager to obtain consent for the review and the LSDI offices to obtain relevant documentation for review. The LSDI web site was scanned for information. Other web sites and literature sources were used to obtain information on the relevant law, policy and protocols. In addition, contact was made with key environmental consultant to whom the project manager referred the Environmental Evaluation Unit (EEU). The Environmental Scan report was made available to the EEU.
- Additional search of basic information was conducted in Department of Environmental Affairs and Tourism and they made available the draft Integrated Environmental Management Plan for the Greater St Lucia Wetland Park (GSLWP) and a series of Scoping Reports for the supply of infrastructure to the GSLWP.
- The above reports were reviewed to determine the extent to which trans boundary and cumulative effects were addressed and the methods applied. At the same time, existing legislation and policy documents were reviewed to determine to what extent trans boundary and cumulative impacts are taken into account in these regulatory instruments.
- A variety of telephonic queries were made to people directly or indirectly involved with the LSDI to determine whether there were other Environmental Assessment reports that could be reviewed and to try to obtain more information on the environmental processes being followed in the LSDI initiative.

Time limitations

The EEU was appointed to undertake this research in mid-November 2001. The work was to be undertaken in a period of about 11 weeks, including the period over the December January vacation. This is a relatively short time, particularly in view of the fact that the EEU were unable to access key documentation before the holiday period due to a variety of factors (listed below). As such the review should be regarded as preliminary, having been undertaken at a broad based scanning or scoping level.

Difficulty in accessing key persons within the LSDI as well as in identifying and obtaining the relevant documentation.

Due to information supplied in an early LSDI document, the EEU were under the impression that a Strategic Environmental Assessment for the SDI had been undertaken and it took considerable investigation before it became clear that no SEA had been done. In addition, staff at the SDI office in Durban were unable to assist the EEU in obtaining documentation. A wide variety of alternative sources of information had to be contacted for assistance.

Lack of large trans-boundary projects to evaluate

In the time available and with the confidentiality constraints imposed, the EEU were only able to source two documents to review, i.e. the draft Integrated Development Management Plan for the GSLWP and some Scoping reports for infrastructure supply to the GSLWP. No EIAs for large trans boundary projects were available. This means that the evaluation of the extent to which trans-boundary and cumulative impacts are being identified and addressed had to be done at a relatively local scale. This also means that there has been greater emphasis on cumulative, rather than trans boundary effects.

In addition, there were no environmental impact assessments available for agricultural projects available. A scoping process for a cotton estate is to be initiated shortly. Should it be desirable, the Scoping Report can be reviewed at a later date.

BACKGROUND TO THE LUBOMBO SPATIAL DEVELOPMENT INITIATVE

The Lubombo Spatial Development Initiative is a tri-national initiative between the governments of South Africa, Mozambique and Swaziland, focused on the economic and social upliftment of communities in southern

Mozambique, eastern Swaziland and the area of north eastern Kwa-Zulu-Natal, known as Maputoland, which broadly corresponds to the area of the Umkhanyakude District. The objectives of the initiative are to:

- Generate economic growth;
- Maximise job creation by ensuring that new industries being stimulated are competitive and have a long term future in the region;
- Broaden ownership patterns of the regional economy;
- Encourage the formation of Small and Medium enterprises and joint ventures between external investors and local entrepreneurs;
- Ensure co-operation between all levels of the three governments in order that the development strategy be implemented with extreme speed and urgency.

The LSDI has initiated the injection of capital into the district to assist in the development of the tourism industry. These initiatives include the development of the Lubombo SDI Road, extending from Hluhluwe to the Kosi Bay border post, the signing of the Malaria protocol aimed at reducing the impact of malaria on the region, the reinstatement of the Durban - Maputo train route, the packaging of tourism projects aimed at attracting investors into the region, the development of the Greater St Lucia Wetland Park into a 'big 5' game reserve, the implementation of a local craft and social development programme, the development of bulk infrastructure in the region, investment promotion and the development of marketing programmes (draft IDP for Umkhanyakude District, March 2002).

KEY FINDINGS

Policy and legislative context including relevant international and regional policies and agreements

Various policies and legislation in South Africa, Mozambique and Swaziland are in place to ensure that environmental effects of different activities are considered before decisions are made regarding their implementation. These policies and legislation however, vary from country to country, in terms of procedures for assessing environmental impacts. With the exception of Mozambique, procedures for EIA in South Africa and Swaziland are not explicit with regards to assessment of trans boundary and cumulative impacts. Inadequate institutional capacity regarding management of environmental assessments further compromises the value and effectiveness of EIA as a tool in promoting progress towards sustainable development (Tarr, 2001). This section will only review those policies and legislation directly relevant to the procedures for environmental impact assessment in South Africa,

Mozambique and Swaziland. Some of the important policies and legislation and international agreements relevant to the Lubombo SDI will be highlighted.

Environmental impact assessment in South Africa

The Constitution of the Republic of South Africa, adopted in 1996, provides the overarching framework for environmental management in the country. The principle that EIAs should contribute towards sustainable development has been incorporated into the Bill of Rights, Chapter 2 of the Constitution. The Bill of Rights provides for amongst other factors, the basic human right to a healthy environment. Section 24 states that: "Everyone has a right to an environment that is not harmful to their health or well-being". Sections 24 to 26 further note that:

- Through laws and other measures, the environment should be protected from ecological degradation for the benefit of present and future generations;
- Development and use of natural resources should be carried out in a manner that is sustainable for ecosystems.

The White Paper on Environmental Management Policy of 1998 sets out a series of principles for environmental management. The policy forms the framework into which other sectoral policies have to fit in terms of the vision and principles regarding environmental management, and applies to all government institutions and activities that impact on the environment.

The National Environmental Management Act (NEMA) of 1998 further translates the principles of the White Paper on Environmental Management policy into law. The NEMA as a framework legislation provides an umbrella for integrating environmental management into all development activities (Urquhart, 2001). The NEMA encompasses a set of principles that show how government should act. These include sustainable use of natural and cultural resources; taking a risk-averse and cautious approach; and environmental equity and justice. The Act provides for application of environmental management tools in order to ensure the integrated environmental management of activities. It makes provision for the development of assessment procedures that aim at ensuring that the environmental consequences of policies, plans and programmes are considered. In Chapter 5, section 24 (7b), it makes specific reference to putting in place procedures for "the investigations of the potential impacts, including cumulative effects of the activity and its alternatives on the environment…and the significance of that potential impact". The Act also stipulates South Africa's commitments to its international obligations and agreements on environmental management.

The Environment Conservation Act of 1989 (sections 21, 22 and 26) is a key piece of legislation that regulates EIA in South Africa. According to section 21 of the Act, activities that may have a substantial detrimental effect on the environment are identified and listed in Schedule 1 of the Regulations No. 18261 of 5 September 1997. These activities range from construction or upgrading of different facilities to change of land use from agriculture and nature conservation to any other land use. In the event that an EIA has to be undertaken, a plan of study for an EIA must include the following:

Box 1: Contents of an EIA study in South Africa

- A description of the environmental issues identified during scoping that may require further investigation and assessment
- A description of the feasible alternatives identified during scoping that may be further investigated
- An indication of additional information required to determine the potential impacts of the proposed activity on the environment
- A description of the proposed method of identifying the impacts
- A description of the proposed method of assessing the significance of the impacts. In the assessment, the following issues have to be considered: the spatial extent of the impact, that is whether it is local, regional, national or international; the intensity of the impact; the potential duration and the probability of the impact. Potential mitigation measures should be identified.

After a plan of study for the EIA has been accepted, the applicant must submit an environmental impact report to the relevant authority for consideration. On the basis of the report, the relevant authority will issue a record of decision. The report must contain:

- A description of each alternative including particulars on the extent and significance of each identified impact and the possibility of each impact
- A comparative assessment of all alternatives
- Appendices containing descriptions of the environment concerned; the activity to be undertaken; the public participation process followed including a list of interested and affected parties; media coverage given to the proposed activity and any other information included in the accepted plan of study.

A weakness in the legislation is that after the report is submitted, there is no requirement that the report be placed in a central repository which is accessible to interested and affected parties (including those in neighbouring countries).

In addition, there is no obligation on the minister to accept the most environmentally acceptable alternative(s).

A more progressive approach that provides an opportunity to take into account cumulative and trans boundary impacts has been adopted in the National Water Act of 1998. The Act provides the framework within which water will be managed at regional or catchment level, in defined water management areas. Water management powers have been delegated to institutions at regional and catchment level. Catchment management strategies must be established for the water resources within a particular water management area. A catchment management strategy must for example, take into account the class of water resources and resource quality objectives, the requirements of the Reserve and, where applicable, international obligations. It must set out strategies, objectives, plans, guidelines and procedures of the catchment management agency for the protection, use, development, conservation, management and control of water resources within its water management area.

Several other national and provincial policies and laws exist that are relevant to the development initiatives in the Lubombo SDI. While not directly relevant to the regulation of EIA, these policies and laws establish a number of principles that strive at achieving environmental sustainability and sustainable development. The following are some of the key policies and laws:

- White Paper on Integrated Pollution Control and Waste Management
- White Paper on Conservation and Sustainable Use of South Africa's Biological Diversity
- White Paper on Sustainable Forest Development in South Africa
- The Development Facilitation Act of 1995
- The KwaZulu-Natal Planning and Development Act of 1998
- The Subdivision of Agricultural Act of 1970 and
- The National Heritage Resources Act of 1999
- The White Paper on Sustainable Coastal Development (2000)
- The Municipal Systems Act (2000).

Environmental impact assessment in Mozambique

The right for every citizen to live in a healthy environment as well as the duty to defend this right is embedded in the Constitution of the Republic of Mozambique adopted in 1990. According to Article 37 of the Constitution, it is the State's responsibility to guarantee ecological equilibrium and the preservation and conservation of the environment with the aim of improving the quality of life and living standards of all the citizens (Meneses and Cunha, 1998).

Based on this fundamental right, the Environmental Law adopted in 1997 creates a set of principles that guide environmental management in the country. These principles include:

- Precaution, on the basis of which management of the environment shall prioritise establishment of system to prevent acts which are harmful to the environment in such a way as to avoid the occurrence of negative environmental impacts which are material or irreversible;
- A global, integrated vision of the environment as a grouping of interdependent ecosystems which may be naturally occurring and which must be managed in such a way as to maintain their functional limits; and
- International co-operation, to obtain harmonious solutions to environmental problems, the cross-border and global dimensions of these problems are recognised (Republic of Mozambique, 1997).

Article 13 of the Environmental Law establishes Environment Protection Zones. Any activities or projects that may cause damage to the environment, if situated in protection zones including coastal and marine grounds shall be subject to environmental impact assessments (Meneses and Cunha, 1998). The EIA regulations formulated in terms of Article 33 of the Law provide for the scope, content and consideration of environmental impact studies. The regulations apply to all public and private activities that may have a direct or indirect influence on the components of the environment. The activities include programmes and projects for intensive livestock and agricultural development, covering individual or cumulative areas greater than 350 hectares and clearing, dividing and exploiting the native vegetation cover of individual or cumulative areas greater than 100 hectares.

The proponent is solely responsible for undertaking an environmental impact study. The study, which is to be submitted to the Ministry for Co-ordination of Environmental Affairs must contain the following:

Box 2: Contents of the environmental impact study in Mozambique

- The delimitation and geographical representation of the area of influence of the activity
- The description of the activity and its alternatives, in the planning, construction, operation and in the case of a temporary activity, the de-activation stages
- The comparison of alternatives considered and forecast of the future environmental situation of the area of influence in the event of adopting each alternative
- The identification and assessment of mitigating measures
- The undertaking of an environmental management programme, including the monitoring of impacts and accident prevention and contingency plans
- The identification of the team that drew up the study
- A non-technical summary covering the main questions dealt with and the conclusions of public consultation

Assessment of the proposed activities is to be determined on the basis of the following factors:

- the number of persons and communities affected;
- the ecosystems, plants and animals affected;
- the location and size of the area affected;
- the duration and intensity of the impact;
- the direct, indirect, potential, overall and cumulative effects of the impacts; and
- the reversibility of the impact.

Once the study has been reviewed by the Ministry for Environmental Co-ordination and complies with the regulations, a decision is taken on the environmental viability of the proposed activity. If approved, a licence will be issued.

While other legislation relevant to the SDI, including the Land Act, Forestry and Wildlife Act and other laws are being reviewed, all development within the country has to take place in accordance with the environmental principles outlined in the Constitution (Meneses and Cunha, 1998). The Investment Act specifically requires that relevant studies and evaluations of the

environmental impact that may result from any investments activities should be undertaken. Such impacts may be within their area of concession or close to the peripheries (Ibid).

Environmental impact assessment in Swaziland

The Swaziland Environment Management Bill of 2001 articulates Swaziland's commitments to environmental management. For example, the Bill provides for cooperation with other governments, and with domestic and international organisations in order to protect the regional and global environment. The procedure for EIA is regulated in the Environmental Audit, Assessment and Review Regulations provided under the Swaziland Environment Authority Act of 1992, Section 18. The regulations establish the following classifications for projects, based on their likelihood to have significant impacts:

- Category 1 are defined as those projects whose environmental impacts may be easily determined, and for which appropriate measures may be taken.
- Category 2 projects are likely to cause environmental impacts, some of which may be significant, unless mitigation measures are taken.
- Category 3 projects are likely to have significant adverse impacts whose scale; extent and significance cannot be determined without in-depth study.

Environmental compliance certificates have to be obtained by all proponents whose projects might have environmental effects. An Initial Environmental Evaluation (IEE) is to be prepared for category 2 projects and an EIA for category 3 projects. An Environmental Audit Report (EAR) and a Comprehensive Mitigation Plan (CMP) have to be prepared by the proponent for categories 2 and 3 projects, and submitted to the Swaziland Environmental Authority. For projects in category 3, where an EIA has to be undertaken, an EIA report must include the following:

Box 3: Contents of an EIA report in Swaziland

- Executive summary of not more than 10 pages with emphasis on key environmental issues
- Introduction that provides the purpose of the EIA, boundary of the study area and time horizon for which impacts will be predicted.
- Description of the project and reasonable alternatives. Location, size, construction or operation of activities, workforce, schedule for implementation and description of any associated project
- Description of the environment within the study area and expected changes to the environment before implementation of the project subject to an EIA

- Prediction and evaluation of impacts and for all alternatives distinguish between adverse and beneficial impacts; identify irreversible impacts; allocate significance against international and or national regulations, standards and quality objectives; identify significant data deficiencies and assumptions made; determine spatial and temporal distribution of impacts and identify mitigating measures
- Analysis of alternatives and selection of preferred option
- Impact mitigation plan for preferred alternative and
- Results of any consultations held with government agencies, NGOs and the public during EIA work. The results must be contained in an EIA report and a Comprehensive Mitigation Plan.

Other relevant legislation to the SDI

- The Swaziland Tourism Authority of 2001
- The Flora Protection Act of 2000 makes special provision for undertaking of EIA and mitigation plans for any activities that would impact on the indigenous flora. Such EIAs and mitigation measures are to be undertaken in accordance with the provisions of the Swaziland Environmental Authority Act of 1992.

Regional and international policies and agreements

The Southern African Development Community (SADC) Policy and Strategy for sustainable development adopted in 1996, recognises that unsustainable development in the region has been driven by economic and sectoral policies that are narrowly focused, particularly neglecting the poor majority and the environment (SADC, 1996). To move towards sustainability, the Policy and Strategy emphasises the role of EIA as a key tool in promoting sustainable development. Simultaneously, most SADC countries including South Africa, Swaziland and Mozambique are Parties to different international and regional agreements (Tarr, 2001). While recognising the sovereignty of States, these agreements impose certain obligations to Parties. More significantly, a number of post-Rio international environmental conventions, such as the Biodiversity and Desertification conventions, identify EIA as a fundamental tool in environmental management and urge governments to effectively institute an efficient EIA system as part of their implementation strategy to the conventions.

The SADC Protocol on Shared Water Courses provides for institutional collaboration to foster closer co-operation for judicious, sustainable and co-ordinated management, protection and utilisation of shared water resources. The Protocol further states that Parties shall pursue and establish close co-operation with regard to the study and execution of all projects likely to have an effect on the regime of the shared watercourses. Article 4 of the Protocol

recommends that EIAs should be undertaken to evaluate possible impacts of measures that are likely to have adverse environmental effects.

Some of the important international agreements relevant to the Lubombo SDI are listed below:

- United Nations Convention on Biological Diversity
- The Ramsar Convention
- World Heritage Convention
- Convention on Desertification
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- United Nations Convention on the Law of the Sea
- Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region.

Transfrontier Conservation and Resource Area Protocols (TCRPs)

A number of TCRPs have been drawn up to'create an enabling framework that will facilitate improved trans frontier resource management'. Draft copies of the protocols for the

- Lubombo-Ndumo-Tembe-Futi Transfrontier Conservation and Resource Area
- Lubombo Conservancy - Goba Transfrontier Conservation and Resource Area
- Lubombo, Ponto-do Ouro, Kosi Bay Marine and Coastal Conservation and Resource Area

were scanned to see whether cumulative issues were considered in the protocols. In addition a draft funding proposal for trans frontier conservation and resource area protocols and implementation programmes was scanned.

The draft protocols and the funding proposal are strongly conservation oriented and recognize the need to address direct and indirect impacts as well as cross boundary effects. The need to address cumulative impacts is not, however, explicitly mentioned although one could assume that the collaborative trans boundary ecological planning and management that are proposed in the protocols and which are aimed at sustainable resource use and development would facilitate the identification of cumulative impacts. In addition, the proposed establishment of joint management structures or mechanisms for co-operative ecological planning and management should contribute to impact identification and mitigation at all levels, providing the communication structures work well. The protocols also mention the need for harmonization of legislation and regulations and complimentary research

and monitoring. Some of the steps needed to identify (and possibly address) trans boundary and cumulative effects are therefore identified in the protocols. The practical implementation of the protocol principles and guidelines and the extent to which they are influencing environmental assessment and management processes would be worthy of further research.

Analysis of findings

Environmental policies and legislation in the countries affected by the Lubombo SDI are founded on some of the fundamental principles of sustainable development and integrated environmental management. These include integrated vision of the environment as a grouping of interdependent ecosystems which may be naturally occurring and which must be managed in such a way as to maintain their functional limits and international co-operation, to obtain harmonious solutions to environmental problems. Despite this clear articulation of environmental management principles in policies and legislation, appropriate tools to effectively translate these principles into practice are either inadequate or possibly misapplied. Although the EIA procedures in the different countries are basically sound, their application appears to fall short of good professional practice, particularly with regard to consideration of trans boundary and cumulative impacts, thereby, undermining the principles on which the policies and legislation are founded.

The emphasis on ecosystems in the policies (rather than both natural and social systems) may also be resulting in some imbalance, with too much focus being placed on ecosystems. In addition, the significant emphasis on environmental impact assessment as an evaluative tool (as opposed to a wider variety of tools appropriate to the stage of the project or programme) may also be contributing to inappropriate application of the environmental impact assessment procedure.

Further weaknesses are that the legislation does not appear to require that environmental reports be placed in a central accessible repository (which would facilitate information exchange and therefore identification of cumulative impacts) or that the decision making authorities accept the most environmentally benign alternative.

While South Africa, Mozambique and Swaziland have put in place environmental impact assessment laws, EIA procedures still vary from one country to another. Assessment of trans boundary impacts is not explicitly provided in relevant legislation in all 3 countries. With the exception of Mozambique, EIA procedures in South Africa and Swaziland do not explicitly include assessment of cumulative impacts. Although the NEMA of 1998 of

the Republic of South Africa specifically refers to putting in place procedures for investigations of potential impacts, including cumulative effects of the activity, such procedures are not in place. There does not appear to be any attempt to establish mechanisms to identify and address cumulative and trans boundary impacts. In addition, methods for undertaking cumulative assessment are not well known or developed in these countries. Furthermore, cumulative assessments may require technical expertise (e.g. scenario planning, mathematical modeling) i.e. skills that may be lacking or need development. Whilst environmental practitioners are increasingly recognising that trans boundary and cumulative impacts are important, practical implementation of the consideration of cumulative impacts has been found difficult to undertake and remains a challenge for EIA practitioners (de Villiers Brownlie Associates and the EEU, 2000).

While the social impacts of the SDI, particularly on the communities whose livelihoods depend on the natural resources in the area, extend beyond national boundaries, the provision for public participation in the EIA processes in all 3 countries is limited to interested and affected parties within the jurisdictional boundaries in which the projects are being implemented. There is no apparent requirement for cross boundary scoping where necessary. This limited public participation undermines the fundamental principle of co-operation for judicious, sustainable and coordinated management of shared resources as contained in some of the national laws and regional protocols.

The 3 countries affected by the Lubombo SDI are parties to different regional and international agreements. The regional polices and protocols including the SADC Policy and Strategy for Environment and Sustainable Development and the Protocol on Shared Watercourses emphasize the importance of EIA as a tool for promoting environmental management and sustainability in the region. Although project EIA is an important tool in ensuring that potential impacts associated with projects are foreseen at an early stage in planning and design of the project, it may fail to take cognisance of cumulative and large-scale effects that build up incrementally over time (Barbour, 2001). The developments envisaged for the Lubombo SDI warrant the use of other environmental management tools that would ensure that environmental considerations are considered at an early strategic planning stage, as well as at individual project implementation stage.

Recommendations with regard to law and policy

Administrative procedures for EIAs in the different countries should be reviewed and modified in order to take cognisance of trans boundary and cumulative impacts. SADC/ELMS and other relevant regional institutions

should facilitate the process of review and development of a harmonised regional approach to administration of EIA that will include consideration of trans boundary and cumulative impacts when appropriate. Simultaneously, public participation for projects that have potential trans boundary impacts must be broadened to include interested and affected parties from all the affected countries. Mechanisms for processing and assessing this information need to be put in place.

While EIA is an important tool in ensuring that potential problems associated with projects are foreseen and addressed at an early stage in the planning and design of the project, it has become apparent that EIAs are constrained by certain limitations and weaknesses (Barbour, 2001). These weaknesses include the relatively late stage in which they are incorporated into the planning process. Questions of where, and what type of development should take place have usually been decided by earlier plan making processes (Ibid). It is therefore pertinent that consideration is given to review legislation in the countries affected by the SDI and the SADC region, to include the use of other appropriate tools such as the Strategic Environmental Assessment (SEA), Regional or Sectoral Assessments or Environmental Overviews (see boxes for definitions) in order to ensure that environmental consequences and resource opportunities and constraints of proposed plans, policies and programmes are addressed at an early stage. Furthermore, relevant regional policies and protocols must be reviewed with the aim of including the use of other appropriate environmental management tools to complement project specific EIA.

In response to new legislative requirements and application of new tools for environmental management, there is need to build capacity of individuals and institutions responsible for management of environmental assessments. Regional institutions that have expertise and experience in training and capacity building on application of environmental management tools must be identified and given the responsibility to develop appropriate training and capacity building programmes. SADC/ELMS together with other relevant regional organisations should facilitate this capacity-building process in order to assist the region in achieving its goals.

In order to minimise potential institutional conflicts over projects to be implemented in the SDI, there is a need to put in place an effective institutional framework that will co-ordinate all developments within the SDI. There is a need for mechanisms for communications within and amongst relevant departments across participating and affected countries. Any inconsistencies in policies and laws regarding environmental management must be identified

and discussed by all relevant role players prior to implementation of projects.

It is also recommended that means to ensure that environmental reports are deposited in a central and accessible repository are put in place. Furthermore, when projects which have cross boundary effects on neighbouring countries are evaluated, a single environmental report should be produced, which meets the legislative and administrative requirements of all the countries affected. Language barriers should also be overcome by translating, the executive summary into the most common language (or as many languages as is necessary).

Boxes 4: Definitions of strategic environmental assessment, environmental overviews and sectoral and regional assessments

Strategic Environmental Assessment (SEA) is a systematic process of evaluating the environmental consequences of proposed policy, plan and programme initiatives in order to ensure that the environmental concerns are addressed at the earliest stage of the decision-making process together with economic and social considerations (Sadler and Verheem, 1996). The reasons for introducing SEA to the decision making process are to:

- strengthen project level EIA;
- assist in identifying and addressing cumulative large scale environmental effects; and
- incorporate sustainability considerations into high-level decision-making (Sadler and Verheem, 1996).

Environmental Overview (EO) is a participatory process used in the formulation stages of development activities which leads to early identification of environmental and social impacts, alternative approaches to those programmes, and direct feedback into programme redesign (Brown, 1996). Environmental overviews should:

- identify the main environmental opportunities and constraints that the implementation of the project could bring about;
- suggest alternatives to the programme / project design that would take better advantage of potential environmental opportunities and / or miti gate likely environmental disturbances associated with the programme / project; and
- identify areas of uncertainty regarding modifications to the environment, as well as those potential social and economic conflicts that might arise if environmental changes are introduced in the programme / project area

(UNDP, 1992).

Sectoral Environmental Assessment is a much needed complement to project specific environmental assessments (EAs) in development planning. Where project EAs focus on the impacts of specific investments and often treat sector strategic planning as a given, Sectoral Environmental Assessments offer an opportunity for sector wide environmental analysis before investment priorities have been determined. It also supports integration of environmental concerns into long term development and investment planning. Sectoral assessment is most commonly applied in the context of sector investment programs involving multiple sub-projects. It can also be applied in conjunction with sector-oriented time-slice and line-of-credit projects and even with sector adjustment operations or in evaluation of sector policies. (World Bank Environmental Assessment Sourcebook update number 4)

Regional Environmental Assessment (REA) is a tool to help development planners design investment strategies, programs and projects that are environmentally sustainable for a region as a whole. REAs take into account the opportunities and limitations represented by the environment of a region and assesses ongoing and planned activities from a regional perspective. (World Bank Environmental Assessment Sourcebook update number 15)

CONSIDERATION OF CUMULATIVE AND TRANSBOUNDARY IMPACTS IN THE DRAFT IDMP FOR THE GREATER ST LUCIA WETLAND PARK AND SCOPING REPORTS FOR SUPPLY OF INFRASTRUCTURE TO THE PARK

Overall impact environmental assessment processes and tools used in the LSDI initiative

As shown above, while consideration of environmental issues is required by the three different countries involved in the LSDI, examination of the EA procedures in South Africa, Swaziland and Mozambique don't uniformly or explicitly require the investigation of cumulative and trans boundary effects, nor are there guidelines on how to conduct such assessments. Only, Mozambique's environmental law (1997) specifically identifies a requirement to address cumulative impacts. In addition, there are differences between the environmental processes followed in each country.

However, when the LSDI was launched, there was recognition that there might be cumulative effects which might need to be addressed. In an early publication (1998) it is stated that *...the SDI will insist that environmental safeguards are built into the tourism and agricultural ventures it promotes.*

What follows in the document, is a brief description of the environmental processes followed in each country. There is, however, no indication as to how the differences in the environmental procedures that are followed in each country will be harmonized should there be cross boundary projects. However, the document does indicate that *...' a Strategic Environmental Assessment' (SEA) of the whole area, considering the cumulative impact of individual action is being carried out'.*

There is also mention of a variety of other reports which have been done (e.g. detailed socio-economic appraisals of the regions of Swaziland and Mozambique that fall within the LSDI area, and detailed sectoral analyses of tourism, land and agriculture in each of the three countries). There is no indication of whether there is an overarching authority to draw all these reports together.

Based on the above information, the EEU endevoured to obtain a copy of the SEA. However, after extensive enquiries, it appeared that no SEA had been done, and it was not clear what environmental tools were being used to assess cumulative impacts. It has not, as yet, been possible to determine what happened to the proposed SEA. Due to the difficulty in obtaining any of the LSDI documents, it has also not been possible to determine to what extent the stated sectoral and baseline reports (mentioned above) address environmental concerns. This could possibly be followed up in a later study.

Further enquiries made to a variety of people directly or indirectly involved in the LSDI (see Appendix 2) and a brief review of an 'Environmental Scan' report by P Holden (1998), revealed that many reports have been commissioned from a wide variety of consultants to provide information for the LSDI. There appears to have been little co-ordination or integration of these reports, but they would seem to provide a significant data base which could be used by planners and environmental consultants, if they were easily accessible. One of the reasons given by the SDI office that environmental reports could not be made available to the EEU, was that much of the information is confidential. It is not known whether this confidentiality factor hinders the accessibility of key information to others involved in planning and environmental assessment in the area. If so, the chances of holistic, integrated planning, in which trans boundary and cumulative effects are

considered, are being significantly compromised. It is also questioned whether the confidentiality of the documents is appropriate in the light of South Africa's constitution, which promotes transparency, accountability and public access to documentation.

Approximately two years after the LSDI document (which identified that a SEA was underway), a brochure issued by the Department of Environmental Affairs and Tourism (April 2000) describes the formation of a Strategic Environmental Management Framework (SEMF) for the LSDI area. The SEMF is an extension of the ENPAT (Environmental Potential Atlas) developed by the Department of Environmental Affairs and Tourism (DEAT). The atlas is essentially a GIS (Geographic Information System) based decision support tool, which identifies sensitive environments and provides spatial and environmental data.

The brochure states that the SEMF has been *'formulated to ensure the efficient and effective integration of environmental, social and economic requirements into the decision making process'*. In addition it is stated that the SEMF *'provides a management framework in which specific management-based objectives can be met'*. The SEMF *'consists of a spatial framework delineating different management zones and providing parameters for development. They facilitate a holistic approach and allow environmental and socio-economic considerations to constitute structured inputs. They are intended to permit both individual and cumulative impacts* (own emphasis) *to be incorporated into the strategic approach to the SDI and development in general'*.

It was intended that the Uthungulu Regional Council house the SEMF (this was indeed the case) and be responsible for supplying new information to DEAT who would update the SEMF. Enquiries made into the use of this tool revealed that it had not been updated, has some errors, and was not being used to any significant extent. The staff member within DEAT responsible for LSDI project evaluation did not seem to be aware of the SEMF, and the DEAT staff member responsible for the ENPAT, indicated they had not received any new information for the SEMF for about two years. Consultants who are currently setting up the new Umkhanyakude District Municipality were also not aware of the existence of the SEMF. (The Umkhanyakude District Municipality will be the new authority involved in projects within the LSDI as a result of the new boundaries formed through the demarcation process).

It appears that problems with use of the SEMF have been experienced from its inception. P Holden states in her Analytical Scan report (1998) that *'while the SEMF and other EMF's countrywide are a definite step forward in terms of envi-*

ronmental management and streamlining of the development process, there are still a number of outstanding issues that need to be addressed if it is to be developed to its full potential. It has not yet achieved much of what was promised, and it is strongly recommended that consideration be given to its further development' (own emphasis). Ms Holden goes on to describe key issues that need to be addressed.

Despite the apparent lack of an SEA and the very limited use of the SEMF, the environmental regulations are ensuring that impact assessments are being carried out at project level. Environmental consultants therefore have a significant responsibility to identify possible cumulative and trans boundary impacts. In addition, new initiatives, such as the recently formulated Integrated Development Plans (currently out for public comment) may play a significant role in helping to ensure that the larger scale regional impacts are identified. This aspect needs follow up investigation.

Preliminary conclusions about environmental processes within the LSDI project

From the above information the EEU has concluded that:

- There have been good intentions with regard to addressing environmental factors in LSDI projects, but both the proposed tools that could be used to assist in identifying cumulative and trans boundary impacts (the proposed SEA and the SEMF) appear to have failed in this task. Reasons for the SEA not being done are still to be determined. The limited usefulness of the SEMF has probably been due to a variety of factors such as too much being expected from what is essentially a GIS based spatial planning tool, insufficient resources and institutional capacity to improve the tool and keep it updated, and also the inevitable ructions associated with the demarcation process. There has therefore been an apparent breakdown in the proposed environmental processes for addressing cumulative and trans boundary impacts. However, at project level, Environmental Assessments are being done and at a local and regional level, potential cumulative effects are, to some extent, being identified.

- There appears to be an extensive body of information that can be used by planners and environmental consultants to help identify cumulative and trans boundary impacts, but it is difficult to identify and obtain all the relevant information as there does not appear to be a central repository. Communications networks also appear to be not working as well as required. Inadequate human resources as well as rapid staff turnover seem to be contributing to communication breakdowns. This is further complicated by institutional changes. In addition, the confidentiality of some of the LSDI reports may be compromising information exchange.

- In reports which are relevant to more than one country, language barriers may be compromising information exchange.

- New initiatives, such as the local and regional Integrated Development Plans that have just been formulated, may assist in the process of bringing environmental issues more comprehensively into the planning process. This aspect requires further research.

CONSIDERATION OF TRANS BOUNDARY AND CUMULATIVE EFFECTS IN THE LSDI INITIATIVE

Study approach

The only reports that could be formally reviewed were the draft Integrated Management Plan (IDMP) for the Greater St Lucia Wetland Park and a series of Scoping Reports for supply of infrastructure to the park. In addition, the Environmental Scan report, produced by P Holden for DEAT was reviewed for background information. Some comment is made on consideration of cumulative and trans boundary issues in this report as well.

In the review of the draft IDMP and the infrastructure supply Scoping Reports, the approach taken was to:

- look generally for information that would assist in the identification of cumulative and trans boundary impacts;
- look specifically for identification of individual cumulative impacts and see to what extent they are addressed;
- identify to what extent a specific identified cumulative impact is addressed in all relevant sections of the IDMP and the Scoping Reports. In this particular case, the cumulative effects of increased water abstraction on supply sources (e.g. Lake Bhangazi and the Umfolozi River) is tracked through the IDMP and Scoping Reports.

Some comments on the Analytical Scan Report by P Holden (1998)

This document was commissioned by the LSDI. Its objective was to provide information to the SEMF. It is one of the few documents that clearly alerts decision makers to cumulative issues. The following paragraph illustrates this. *'Although it has been asserted that Maputoland is one of the most intensively researched regions in the country, there has until now been a notable lack of a coherent regional development plan being implemented and a lack of policy guidelines to guide future development. Contemporary developments in the region are rather ad hoc in nature and although they may or may not impact negatively on the environment*

when assessed on an individual basis, their cumulative impact is potentially problematic (own emphasis). *It has therefore been considered necessary for a macro-planning exercise to be undertaken that integrates different factors providing a coherent regional viewpoint that facilitates decision making at a regional and local level'*. This realization led to the development of the Strategic Environmental Management Framework. It was intended that the SEMF anticipate the cumulative environmental impacts from secondary and downstream developments. *'It will 'red flag' issues of critical importance and ..... direct the establishment of minimum conditions under which an activity can be allowed in a specific environmental setting'*. There were high expectations from the SEMF, but its possible limitations were also recognized in this report, i.e. *'However, the SEMF should be used in a responsible manner, the limitations of the tool being kept in mind, these being the possible information gaps and the relatively large scale used. It was pointed out that it would be essential 'that an accompanying institutional framework be developed to administer the SEMF'*. It was also pointed out that '*it is of prime importance that open and efficient channels of communication are established between interested and affected parties, that the decision making process is both democratic and accountable and that an effective mechanism for dispute resolution be in place'*. Thus many of the potential problems and means to address them were identified in this document. Throughout the rest of the document, potential areas where cumulative impacts could arise are identified. However, they are briefly identified within the general text and substantial reading has to be done to locate them. Typical cumulative impact areas that have been identified include:

- Lead projects resulting in increased population densities and concomitant solid waste requiring disposal, which in turn means that there may be a demand for additional waste disposal sites. The development of tourism projects and provision of bulk infrastructure will also generate waste requiring disposal.
- Tourism development leading to influx of people in potentially ecologically sensitive areas with associated ripple effects.
- Problems with badly planned water supply and irrigation schemes leading to increased occurrence of malaria.
- Increase in size of urban settlements, combined with inadequate infrastructure, leading to increased pollution and environmental deterioration on site and downstream of development areas.
- Increased water abstraction, leading to a decrease in the water table and an associated species change in ecosystem types such as grassland.

The identification of potential cumulative impacts is not exhaustive, but gives an indication of areas that need careful consideration.

The report also points out that it is necessary to:

- Account for the cumulative impacts of development in a particular ecosystem and the potential effects of this on ecosystem functioning;
- Set standards, carrying capacities, critical levels and thresholds for key environments;
- Characterise key ecological processes and the threats to them;
- Identify and establish biological corridors;
- Undertake effective monitoring and evaluation. It is pointed out that monitoring systems in Maputoland seem to have broken down (with particular reference to the catchment monitoring programme that is supposed to be run by the Department of Water Affairs and Forestry);
- Identify sensitive and threatened areas (for example pans close to Ndumo Game reserve which could be threatened by upstream cotton activities);
- Use tools such as cost / benefit analysis to help identify appropriate time frames for delivery of projects;
- Identify high risk areas (e.g. high population pressure areas which are close to sensitive ecosystems);
- Integrate new and existing information into a single decision support system and setting of parameters to activities and determining critical limits with respect to ecosystem structure and function;
- Initiate appropriate monitoring and evaluation processes to ensure compliance of developments with guidelines and conditions and also initiation of strategic research programmes to understand key systems, such as the geo-hydrology of the area and the impacts of increased water abstraction;
- Initiate a screening process at a broad level so that only projects that are commensurate with the vision of the area and the broad environmental parameters progress to the level of detailed assessment.

It was anticipated that the SEMF would play a key role in the above-mentioned screening process, as well as identification of cumulative effects.

As part of the development of the SEMF, an analytical scan was carried out to help identify issues relevant to the Lubombo SDI. The scan covered areas such as policy and legislation, planning, institutional arrangements, land tenure and land claims, infrastructure, socio-economic and development factors,

environment, conservation, agriculture, forestry and fisheries. In each case, a brief description of the status quo was given, followed by a description of what was in progress at the time (e.g. initiatives or policies being formulated) and then what needed to be done. The recommendations on what needed to be done include steps to be taken that would assist in a more integrated planning and development process. Some of the key recommendations include:

- Rationalization of existing legislation and highlighting links and overlaps between different legislation as well as better regulation and enforcement;
- Rationalization of past and present planning initiatives and tight co-ordination between the SEMF and IDP processes;
- Clarification of areas of jurisdiction, line functions and process as well as lines of responsibility and accountability;
- Improvement of communication and co-ordination mechanisms.

Implementation of the above recommendations would help to ensure a more integrated approach to environmental assessment.

CONSIDERATION OF CUMULATIVE AND TRANS BOUNDARY ISSUES IN THE DRAFT IDMP FOR THE GREATER ST LUCIA WETLAND PARK

Background to the IDMP

The draft IDMP (Interdepartmental Discussion Draft, August 2000) has been out for comment and is currently being revised. The review comments below are based on the draft IDMP. It may be worthwhile to revisit these review comments once the final IDMP is available.

The draft Integrated Development Management Plan for the Greater St Lucia Wetland Park (GSLWP) was developed within the framework set by the World Heritage Convention Act of 1999. The Act incorporates the World Heritage Convention into South African domestic law, thereby setting the broad parameters for the management and development of the GSLWP (which encompasses the St Lucia Wetlands World Heritage Site).
In summary, the Plan is structured as follows:

Chapter 1: gives an overview of the GSLWP and surrounding region (descriptive status quo);
Chapter 2: provides the background to strategic and other recommendations that follow in the document. It is analytical in that it focuses on the signifi-

cance of the GSLWP as a natural and tourism asset, examining the threats and opportunities facing the Park.

Chapter 3: presents a strategic framework for the removal of key obstacles to the continued conservation and optimal tourism development of the GSLWP. It presents the vision, objectives, principles and values that will underpin the development and management of the Park.

Chapter 4: provides a guiding framework for ensuring that development and visitor activities and the GSLWP are managed in such a way that the integrity of the World Heritage Site is not compromised and visitor expectations are satisfied. It presents a suggested phasing of developments over an initial ten year period.

Chapter 5: identifies and describes potential tourism development sites in the GSLWP and the infrastructure and facilities needed to support these sites.

Chapter 6: expands on issues covered in the previous chapters by providing a more detailed overview, strategic analysis and guidelines for Development Block A.

The findings and associated recommendations of the review of the draft IDMP with regard to consideration of cumulative and transboundary impacts are summarized in the table below.

Findings IDMP

1. The first chapter, which describes the status quo in the GSLWP does take a holistic and ecological approach in that processes and linkages are described as well as the individual components of the system. The potential therefore exists to identify cumulative and trans boundary impacts. The descriptions of the area are, however, largely limited to the GSLWP area and cross border linkages and issues have not received explicit attention.

Recommendation

As has been done in this report, a good understanding of the current environment (in its widest sense) and how it functions is needed before one can identify cumulative and trans boundary impacts. Greater attention however, needs to be paid to cross border linkages and issues

Findings IDMP

2. The major differences in levels of development between different areas of the former Natal and Kwazulu are recognized (i.e. the potential for 'internal' cross boundary effects is recognized, for instance between the deprived areas outside the parks and the strong conservation areas within park boundaries).

Recommendation

Cross boundary effects need to be considered both within and between countries (i.e. there are many types of 'boundary' - not all conventional in definition, and thus cumulative and trans boundary effects analysis needs to take all these types of boundary into account).

Findings IDMP

3. In the status quo description, there is recognition that water resources serving the Maputoland region are limited and existing sources are believed not to have the capacity to handle future water demand. There is also recognition that the catchment of the GSLWP extends far beyond its boundaries. However, in the section on constraints to tourism (chapter 2), lack of fresh water does not seem to be mentioned.

Recommendation

In compiling Integrated Management Plans (or other similar reports) one needs to ensure that there is consistency between different chapters in the report in order that key issues are not 'lost'. It is important to review IDMPs (or other such reports) to ensure that key issues are addressed in all sections of the report. EIA tools such as checklists and matrices can also be used as 'mind joggers'

Findings IDMP

4. In chapter 3 of the IDMP, a strategic framework for conservation and development of the GSLWP is proposed. Water issues are recognized in that there is mention of 'planning limits for visitor use based on accepted carrying capacity guidelines, that should only be adjusted when an adaptive management system is in place'. In discussing the ecological systems, the limit of water that can be extracted from a system is mentioned. Also, research is proposed to determine the water conservation reserve for Lake St Lucia, and to determine the effect of commercial afforestation on the eastern and western shores. It is not clear as to when the proposed research should be undertaken and how the results should be used in the planning and development of the park. There is also no specific mention of research on likely water demand from tourist facilities and how this should be addressed.

Recommendation

In looking at integrative planning documents or EIAs one needs to ensure that actions to address key problem areas (e.g. the cumulative effects of several projects on a key resource such as water) are identified, prioritized and the full implications for decision making with regard to the projects clearly specified. For instance, can one approve a whole series of small projects which in themselves are environmentally acceptable, but cumulatively potentially unacceptable, without the necessary research information? A 'decision risk analysis' can be helpful in these situations. In such an analysis, the risks and

consequences of making far reaching decisions (e.g. to construct 5 resorts) are evaluated in the light of the available information. Decision makers may then be in a better position to decide whether the risks of taking a decision without sufficient information [e.g. on regional water supply availability and the costs (social and natural) of increased water abstraction] are acceptable or not. In addition it would also be important to do predictive modeling on key resources, such as water. Modeling of potential waste volumes would also assist in identifying required management strategies.

Findings IDMP

5. In chapter 4, which provides guidelines for development and visitor management, there is mention of cumulative impacts in relation to zoning for different activities. Cumulative impacts are therefore recognized. It is suggested that a 'flexible adaptive management process' necessitating a phased approach to development be adopted. This is intended to allow for long enough intervening periods for monitoring and evaluation loops to operate. Each project phase would need to be assessed in terms of the impact of each development in its own right as well as the cumulative impacts of all development.

Recommendation

The proposed flexible adaptive management process, with iterative and ongoing monitoring and evaluation, seems a reasonable approach to determining and monitoring cumulative impacts, particularly in the case of tourist facilities where concepts such as carrying capacity need to be periodically reviewed and checked. However, it would have been advisable to go into more detail on the key aspects to be monitored - particularly those which have cumulative and trans boundary effects - for example,

a) the impacts of increased water abstraction
b) the impacts of increased visitor numbers on visitor experience (particularly for those wishing for a wilderness type experience)
c) the impacts of waste generation and disposal

Findings IDMP

6. In chapter 5, where specific proposals are made for tourism development sites and park infrastructure, it is mentioned that pipelines and boreholes will be needed. It is also indicated that there is 'some doubt' as to whether regional potable water supplies have the capacity to accommodate the western shores requirements. However there is no mention as to how this doubt should be resolved / addressed and what the implications are for development. It

therefore appears that bigger regional issues are being left for unnamed others to address. Although possible problem areas are being flagged, not enough is being done to identify the implications for decision making.

Recommendation

Key national authorities, such as the Department of Water Affairs need to be integral partners in developing the Integrated Management Plan. They need to propose and implement the necessary studies to support decision making. This recommendation would apply to any authorities responsible for key resources in (and across) countries. Environmental consultants and planners need to take greater responsibility for alerting regional and / or national authorities with regard to cumulative or trans boundary issues that need their attention.

Findings with regard to consideration of cumulative and trans boundary impacts in Scoping Reports for infrastructure supply to the GSLWP

Background to the Scoping Reports

Scoping reports need to be done for listed activities identified in the regulations under section 21 of the Environmental Conservation Act (Act 73 of 1989). As the proposed phase 1 infrastructure includes listed activities (such as road and bulk water supply infrastructure), environmental authorization was required. The Scoping reports evaluate the effects of eight infrastructure supply or tourist facility upgrading projects on the Eastern Shores of the GSLWP. The Scoping process and reports were undertaken by ACER Africa who are independent environmental consultants. Each Scoping report is intended to be a stand alone report and was done in such a way that decisions on each of the eight projects could be taken independently by the environmental authorities. The Scoping reports were compiled using information from both technical investigations and a public participation process. In understanding the key issues, consideration was given to a range of perspectives, named as ecology, hydrology, geology and geo-hydrology, social and socio-economic, tourism, engineering, transport, traffic and road safety. Each identified impact was assessed with and without mitigation / management.

At the conclusion of the studies it was found that none of the eight projects have negative impacts which can be classified as fatal flaws or which are of sufficiently high significance to block the project providing the recommended mitigation measures are undertaken. It was recommended the DEAT

authorize all the projects on the strength of the Scoping Reports alone, subject to two general conditions. These were the compilation of a formal Environmental Management Plan (EMP) which should be inserted into the Project Specifications as part of the legal contract documents. The mitigation / management actions recommended in the Scoping Reports would form the basis of the EMP, together with a compliance monitoring process. In addition, the implementation of an environmental awareness and training program for the engineer, contractor and all construction related staff was recommended.

The above process, although meeting regulatory requirements, does not allow for sufficient consideration of the cumulative impacts of all eight projects at a regional and / or cross boundary level. It is not clear who is supposed to identify, assess and address the cumulative and trans boundary impacts.

Findings with regard to identification and addressing of cumulative and trans boundary impacts in three of the eight Scoping reports.

Three randomly selected infrastructure supply projects were reviewed. These were

- A new tar road (7km) and rehabilitation of an existing section of the Cape Vidal Road through the Mfabeni Swamp;
- An in situ upgrade and partial new alignment of an existing track to a gravel road (1 km), picnic site, board walk, small parking area and ablutions;
- A bulk water pipeline (20 km), bulk reservoir and pump station, pipeline link to Perriers rocks and storage reservoir, pipeline link to Mission Rocks and Conservator Eastern shores Complex and storage reservoir.

The approach taken was to see to what extent a cumulative impact identified early in the report (limited water supply) was addressed in the above projects.

It should be noted that it is intended to use water from Lake Bhangazi for most of the construction processes. Water for tourist facilities would be piped from St Lucia Village, the primary source being the Umfolozi River. The intention would be to reduce the abstraction of water from Lake Bhangazi South.

The key findings and the associated recommendations are summarized in the table below:

Findings: Scoping Reports (SRs) for infrastructure supply.

1. a) Cumulative impacts are mentioned in the SRs for the infrastructural projects. The lack of fresh water resources is one issue which comes up in each case. Other cumulative issues are identified but are considered to be relevant to the operation phase only and are stated to be beyond the scope of the current study. These cumulative effects are identified as being related to economic development, empowerment, regional waste management, regional water supply, carrying capacities and safety and security. It is stated that they are addressed in the IDMP (see next point).

b) With regard to lack of fresh water for the construction process, it is recommended that the levels in Lake Bhangazi be carefully monitored. With regard to lack of water for the actual tourist facilities, it is stated that there is enough for current needs, but no mention is made of the future situation. The Scoping Reports also state that the cumulative impacts are dealt with in the IDMP. As indicated earlier in this report, the extent to which cumulative impacts (particularly water usage) are addressed in the IDMP is limited.

Associated recommendations

Scoping and EIA reports need to be much more focussed and specific in identifying cumulative impacts and stating the implications for decision making. Even if it is not the role of the individual Scoping or EIA reports to investigate the cumulative issues, they should, at least, point out what studies need to be done to address the regional cumulative or trans boundary issues, when they need to be done relative to decision making processes, and what the implications are if not done (i.e. risks and possible consequences of decisions taken without adequate information).

Findings: Scoping Reports (SRs) for infrastructure supply.

.2. In one of the infrastructure proposals reviewed (i.e. provision of bulk water supply infrastructure to enable supply of water from the Umfolozi River) it is recommended that all tourist facilities use conservation and water demand management equipment and that carrying capacities should correspond to the regional water availability. This is a far reaching recommendation which could have major implications for the design and management of tourist facilities. It is a recommendation that fully recognizes cumulative and cross boundary effects. However, this critical recommendation is hidden within the general text and is not carried forward into the section on mitigatory and management actions. It is recognized that the Scoping Reports are making

recommendations on the impacts of infrastructure supply, not the tourist venues themselves - where such a recommendation would be particularly important, but it is questioned whether it is appropriate to approve each individual infrastructural development without looking at the full implications, including the development of the tourist venues themselves.

Associated recommendations

Key recommendations, particularly those relating to cumulative or trans boundary effects, must be highlighted in the sections of the report most likely to be read by decision makers (e.g. executive summaries, conclusions and recommendations).

Where there are actions which need to be taken by regional or national authorities (e.g. DWAF), these should perhaps be flagged or highlighted.

Findings: Scoping Reports (SRs) for infrastructure supply.

3. The Record of Decision (ROD) issued by DEAT for the reviewed infrastructure projects, directly reflects the recommendations made by the environmental consultants. This places a significant responsibility on the environmental consultants to ensure that all key mitigation and management issues that need to be incorporated into Records of Decision are identified. In this case, the above recommendation with regard to water demand management and carrying capacity were not taken forward into the individual RODs for the individual projects (possibly because of the reason mentioned above, i.e. that these ROD's deal with infrastructure supply to the tourist venues, not the venues themselves).

Associated recommendations

As stated above, environmental consultants, (particularly the project managers and those responsible for writing up the Scoping or EIA reports) who often have the most wide ranging and cross sectoral information at their disposal (due to their involvement in the various studies undertaken as well as the public and authority consultation process) have to ensure that this information is communicated clearly and unambiguously to key decision making authorities. Where cumulative impacts are recognized, EIA practitioners perhaps have to go beyond their immediate terms of reference (which may be project oriented) to point out the 'bigger picture' (i.e. cumulative and trans boundary implications)

- particularly if one consultant is involved in several projects as in this case.

In summary therefore, it has been found that although potential cumulative effects are being identified, not enough effort or resources are being put into drawing out the implications for project design, planning and decision making processes. In the reports reviewed, the key recommended approach to dealing with cumulative issues is to monitor the situation. This is not inappropriate in some cases (such as those dealing with issues related to visitor carrying capacity) but where the functioning of key ecosystems or river systems (such as Lake Bhangazi and the Umfolozi River) could be seriously impacted if too much water is extracted from them, one would expect to see more specific and wide ranging recommendations emerging (for example, recommendations for studies on regional water supply options and impacts and more detailed studies on what criteria should be used to determine when water extraction from Lake Bhangazi should cease or be reduced). There is insufficient effort put into long term prediction of the effects of various environmental scenarios. In addition, the risks of approving infrastructural developments, without the overall assessment of the associated tourist enterprises are not sufficiently identified.

PRELIMINARY EVALUATION OF THE ASSUMPTIONS

A preliminary evaluation of the validity of the assumptions is given below. The evaluation should be regarded as preliminary until such time as the recommended follow up studies are undertaken and further comment on this report is obtained. It is proposed that follow up studies be done to further validate or reject the assumptions as it is felt that the case study utilized (LSDI) has not provided sufficient basis for confidently confirming or refuting the assumptions.

Assumption 1: There is a common understanding of concepts of trans boundary and cumulative impacts at a regional level

Within the documents read (the Environmental Scan, the draft IDMP and the Scoping reports) there seems to be a reasonably common understanding of trans boundary and cumulative impacts at a provincial regional level. Understanding of cross country cumulative and trans boundary impacts could not be determined because of the relatively local nature of the reports reviewed.

Assumption 2: Most of the EIA studies of development initiatives give little attention to trans boundary and cumulative impacts at a regional level

From the reports reviewed (IDMP, Scoping reports), cumulative impacts (and

to a lesser extent trans boundary impacts) are usually identified. (Comment cannot be given on EIAs). However, the extent to which cumulative and trans boundary effects are addressed is limited. In general, they are either pointed out and then left for an unnamed higher authority or body to address, or it is indicated that the effect should be monitored, without much guidance on how or why and what the implications would be for the project under evaluation. There is therefore a lack of follow through.

Assumption 3: The EIA approaches being applied are not flexible enough to cope with the integrated needs of most development programmes and projects within the agricultural, water resources and land use planning sectors;

There is insufficient information from the reviews done to make a confident evaluation in this regard. At first analysis, the approaches used in the IDMP and the Scoping Reports themselves appear to be appropriate. Areas of weakness in addressing integrated development needs seem to be rather related to institutional structures and changes (insufficient capacity, co-ordination and communication) rather than the actual environmental assessment tools being used. However, EIAs, by their nature, are project specific and can predict possible cumulative impacts, but limited information on other project details limits their ability to fully address cumulative impacts. Other environmental assessment tools such as SEA or Environmental Overviews should therefore be used in projects such as the GSLWP where a number of small projects may have a significant cumulative impact.

Assumption 4: Such approaches and methods are generally operated on a project or sector specific basis, often precluding a comprehensive view of the socio-economic and physical environment;

EIAs are indeed generally mostly applied to projects. This is the purpose for which EIAs are designed. However, there are other tools (such as Environmental Overviews or Strategic Environmental Assessments) which can give more comprehensive views and understanding of the linkages between the socio-economic and biophysical environments if correctly applied. Project specific EIA's can be used to identify cumulative and trans boundary impacts. From the reports reviewed, it appears that the tools themselves are reasonably good, (i.e. they allow for identification of cumulative and trans boundary impacts) but there is insufficient attention being paid to how such impacts should be addressed. Possible causative factors are:

- Inadequate terms of reference for the EIAs;
- Insufficient awareness of the environmental consultants and the relevant authorities of the importance of cumulative or trans boundary effects;

- Insufficient understanding of the strengths and weaknesses of different environmental tools and how they should be utilized (particularly the SEMF in this case);
- Insufficient allocation of responsibility for the identification, tracking and addressing of cumulative and trans boundary issues in large projects;
- Possibly, inadequate consultation of national authorities (particularly those that are responsible for managing key scarce resources such as water) in the Scoping phase;
- Inadequate information exchange between key authorities and decision makers.

Assumption 5: Capacity to consider the multiple-use of land and the degree to which a particular resource use may be in variance with the overall regional need is not adequately taken into account;

This assumption may be correct but further investigation would be needed to confirm it. There seems to be a lack of capacity in terms of comprehending the bigger picture and coordinating the multiple inputs that are an integral part of large initiatives.

Assumption 6: This is further hampered by limited availability of resources and reduced institutional environmental capacity and mandate, poor capacity to design Terms of Reference and review EIA proposals and absence or weak EIA legislation and/or enforcement capacity.

These assumptions appear to be correct. There appears to be a lack of follow through even when cumulative effects are identified. There is also a lack of understanding of what tools are needed for what project types.

Problems related to legislation are largely related to weak enforcement, rather than the law itself.

Assumption 7: At a regional level, there is no clearly defined regional framework for harmonized EIA guidelines.

This appears to be correct. Development of harmonized EIA procedures and guidelines might be possible, but would have to be very general in order to accommodate the differences in environmental assessment processes between different countries. Minimum procedural standards could however be developed. It is most critical that at the beginning of any initiative (project, policy, or programme) which involves more than one country processes should be set in place to ensure that environmental procedures to be followed and

tools to be used at different stages are agreed upon and implemented. More importantly, mechanisms for communication and co-ordination amongst country representatives charged with environmental responsibility should be put in place.

SUMMARY OF KEY CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Although several policies in the affected countries support an integrated approach to addressing environmental concerns, there is a lack of procedures for translating policies and law into practice, particularly with regard to cumulative and trans boundary issues. In addition, the policies and laws reviewed place a heavy emphasis on application of EIA, which has significant benefits if correctly and timeously applied. However, EIA has limitations when applied at a regional, programme and large scale development initiative level. Other environmental tools such as SEA, Environmental Overviews, Sectoral or Regional Assessments need to be used as well, particularly at the strategic planning and conceptual stages of projects or programmes.

Although there have been good intentions with regard to incorporation of environmental considerations into the planning process, a lack of an agreed approach to addressing environmental issues in the LSDI or possibly, the inability to implement the proposed SEA approach, have contributed to an apparent breakdown in the consideration and assessment of cumulative and trans boundary issues in LSDI projects. A poor understanding of the capabilities of various environmental tools may be making the situation worse. There is also no law requiring that tools such as SEA, (which has been designed to address regional large scale programme level activities) be utilised. However, methods for applying SEA are not well developed and there is a need for increasing capacity in this field. Other planning initiatives (such as the development of regional Integrated Development Plans) may play a role in improving consideration of cumulative and trans boundary effects. This warrants further research.

At project level, cumulative impacts are being identified, but not sufficiently addressed. Cumulative and trans boundary issues tend to be 'referred up' to higher decision making authorities or are simply left un-addressed. Responsibility for identifying, tracking and addressing cumulative and trans boundary issues is not clearly enough specified in programme or project

design as well as the Terms of Reference for studies to be undertaken. Inadequate effort is being made in the LSDI documents reviewed, to clearly state the implications of cumulative impacts on the project design, decision-making and implementation process and the overall implications of the initiative.

Although there is a significant database of information available for the LSDI area, human resource and capacity issues, combined with insufficient communications appears to be leading to inefficiencies with regard to report commissioning, production and accessability. Confidentiality factors are hindering access to reports. These factors, in combination, are likely to reduce the chances of integrated holistic environmental processes.

The mechanisms for communication and co-ordination within and amongst environmental responsible departments across countries (if any) do not appear to be functioning well. It is not clear what mechanisms are in operation.

Key recommendations

Administrative procedures for EIAs that affect more than one country should be reviewed in order to take cognizance of trans boundary and cumulative impacts. In addition, provision should be made for a wider variety of environmental tools to be used at the appropriate project stages in regional large scale initiatives (including SEAs, Regional and Sectoral Assessments and Environmental Overviews). Guidelines on the strengths and weaknesses of different tools, and how they should be applied need to be further developed and communicated to key authorities and planners involved in the environmental management process. It is also very important that governments recognize that they should be responsible for funding SEAs (or similar processes) as these are done in the national or regional interest and payment cannot be reasonably expected from indivdual projects.

A harmonized, practical, implementable, and agreed on approach to address cumulative and trans boundary impacts needs to be developed amongst SADC countries. In particular, effective communications and administrative structures must be set up. These must be accompanied by effective and ongoing briefing of key stakeholders and decision makers of the processes and tools being used (capabilities and status). In addition, significant capacity building and training in sustainability concepts and application and in particular, the various tools that can be used to help identify cumulative and trans boundary impacts is needed. This should be supported by development of guidelines on methods for undertaking SEAs (and other similar tools). Training should initially be directed at the key institutions and authorities involved in environmental assessment and management functions. Further

research into the role of IDP's in assisting in cumulative and trans boundary impact identification and assessment is warranted.

Terms of reference for environmental assessments of large projects or initiatives must clearly specify the requirement for cumulative and trans boundary impact identification and assessment (where likely). In addition, the Scoping process must be sufficiently comprehensive to ensure that cumulative and trans boundary issues are identified. Key authorities, who are responsible for looking after scarce resources must be consulted in the Scoping Process (when relevant). Responsibility for identifying, tracking and addressing cumulative and trans boundary impacts must be identified and agreed upon early in the environmental impact assessment process (irrespective of which environmental tools are being used). Public involvement must be sufficiently broad to ensure that potential trans boundary impacts are identified. Environmental consultants and planners must take greater responsibility for alerting key decision makers and authorities about the implications of cumulative and trans boundary effects.

A means to improve identification of and access to key reports (e.g. a central repository) that will inform planning and environmental assessment in the area is recommended, together with creation of communication and co-ordination mechanisms that will facilitate information exchange. In addition, where multiple countries are involved, a single report which meets the legal and administrative requirements of all countries should be produced. Language barriers must be overcome by translating (as a minimum) the executive summary into the most common language (or as many languages as is necessary).

Finally, further work needs to be done on developing regional approaches to environmental assessment, particularly with regard to political, administrative and institutional collaboration between the affected countries. The recommendations made by Dr H Spaling, director of Environmental Studies at Kings University College in Alberta, are relevant. He states that : ….a management system that operates across projects and among stakeholders for determining regional environmental capacity and acceptable thresholds for cumulative effects, co-ordinating stakeholder participation in multiple projects and enabling a more efficient regulatory review and approval process for multiple projects needs to be established. This can be done by

- improving access to databases for available environmental data and project information;
- providing a coordinating mechanism for regional cumulative (and trans boundary) effects assessment and management that can co-ordinate the

environmental input relevant to planning of multiple development projects proposed in a region and help co-ordinate regulatory reviews of multiple project proposals, and facilitate the implementation of coordinated monitoring systems or management programs;

- setting regional environmental quality objectives or capacity targets or limits that are
  - specific to each valued environmental component or process, including levels of capacity (e.g. acceptable, critical, maximum) unique to that component or process;
  - determined using the best available scientific and traditional knowledge;
  - acceptable to the stakeholders;
  - reviewed from time to time in light of monitoring and new advances in science, technology or management.

- Specify management options (for meeting the regional objectives or capacity targets or limits) that are
  - Actions for managing cumulative (and trans boundary) effects (e.g. technology, economic instruments, monitoring);
  - Part of a coordinated response to regional management among stakeholders.

- Co-ordinate public consultation so that stakeholders are effectively consulted for multiple project proposals.

ASPECTS THAT NEED TO BE FURTHER INVESTIGATED

The following aspects warrant further research or investigation:

- The extent to which the sectoral and baseline studies carried out for the LSDI identify and address potential cumulative and trans boundary effects;
- The extent to which the newly formulated IDP's provide a tool for identifying and addressing trans boundary and cumulative effects.
- The effectiveness of the trans frontier conservation area protocols in facilitating the extent to which trans boundary and cumulative effects are addressed.
- The extent to which the preliminary conclusions drawn in this paper can be applied to the broader regional and trans boundary scope of the LSDI i.e. the representativeness of the findings of the initial review process and therefore their potential significance.

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Chapter Four

the Lesotho HighLands Water Development Project

by Lipasela Sissie Matela

BACKGROUND TO THE LESOTHO HIGHLANDS WATER PROJECT

Project background

The Lesotho Highlands Water Project, conceived in the early 1950s, came into being in 1986 after a treaty was signed between the Governments of Lesotho and South Africa in October of the same year. The aim of the project is to store water in a series of dams, transfer it through tunnels from Lesotho and deliver the water to South Africa to supplement the Vaal Dam, the major water source for the Gauteng Province in South Africa. The total project is a multi-phased water transfer and hydroelectric power generation scheme with a number of impoundments along the Senqu (Orange) River system.

The Lesotho Highlands Water Project data

Phase 1A which had most of its engineering work completed in 1998, consists of:

- a 185 metre high Katse Dam on the Malibamats'o River,
- 45 km of transfer tunnels to 'Muela, the location of the hydropower plant,
- a 55 m high dam at 'Muela,
- a 37 km long delivery tunnel from 'Muela to the Ash River outfall in South Africa, and
- 200 km of access roads.

Phase 1B consists of:

- a 145m high rockfill Mohale dam on the Senqunyane River,
- a 32 km long interconnecting tunnel to the Katse Reservoir,

a weir on Matsoku River, and
an interconnecting tunnel from Matsoku to the Katse reservoir.
Two new roads plus upgrading of an existing road

South Africa bears the full cost of the project, while Lesotho is responsible for 100 percent of the costs of the hydroelectric power component. Lesotho stands

to make $55 million per year in royalties, from the two phases covered by the Treaty (Phase 1A and 1B), a major source of income for the country.

The LHWP is developed within the borders of Lesotho to benefit the Gauteng Province of South Africa, and the economy of South Africa as a whole, through industrial development. The project utilizes a river system whose basin is shared between Lesotho, South Africa, Namibia and Botswana. Like most other Southern African countries, the countries sharing the Orange, river basin are highly water stressed, and have other forms of environmental degradation associated with water quantity and quality.

Lesotho: The existing environment

Physiography

The central and eastern parts of Lesotho consist of high mountain plateaus, with peaks rising to almost 3500m above sea level. The western lowlands, which are mainly plains and valleys, range in altitude between 1500 and 1800m.

Rainfall

Rainfall in Lesotho varies between 500 mm in the south-western lowlands to over 1600 mm in the eastern mountains, and snow is common between May and August. Lesotho has the highest precipitation of the four countries sharing the Orange River basin. Nonetheless, the country remains vulnerable to recurrent droughts as does the rest of Southern Africa.

Biodiversity

Lesotho's contribution to the Southern Africa biodiversity is quite significant. The mountains of Lesotho have been called "biodiversity hotspots" of Southern Africa, with up to 30 percent of endemism (National Environment Secretariat, 1999). The high mountain ranges are rich in species and provide the source areas for the bogs of the major South African rivers (Orange, Tugela, Vaal), linking to the most important water catchmnent of Southern Africa which forms the Lesotho Highlands Water Project.

Erosion

Average soil loss on agricultural land in Lesotho ranges from 30 to 100 metric tons per hectare per year. This is an average loss of 2.5 millimetres per year or 25 centimetres of topsoil in 100 year. This figure is four times the accepted level of soil loss (Rooyani, 1986). Major contributing factors are the poor agricultural practices including removal of crop residues for fodder and fuel, the rugged terrain, high intensity summer storms which come after the lengthy

dry spells of spring, overuse of the rangelands, and the high erodibility of the major agricultural soils of the lowlands.

Land use and economic activity

Accelerated erosion is a major feature directly related to patterns of land use and resource management in the highlands of Lesotho. The erosion is also associated with the uncontrolled grazing on the steep slopes. The breakdown in the traditional transhumance system of grazing whereby livestock was brought into the high lying areas for summer grazing and taken back into the lowlands for the winter has meant that the rangeland does not have the winter rest period and therefore has no time to recover. There has been a substantial decrease in the grazing capacity of the rangelands as a result.

Agriculture is no longer the major economic activity it once was, with its contribution falling from 25 percent to less than 15 percent in a four year period (Sechaba 1995). The agricultural potential of Lesotho is continuing to fall due to declining soil fertility, the frequent droughts and the decreasing land area for agricultural production, most of which has been lost to erosion and the ever expanding human settlements. Additional land has recently been lost due to developments associated to the Lesotho Highlands Water Project through direct flooding by the reservoir, power line routing, the road infrastructure and other infrastructure developments. Though the total land area permanently lost to the Lesotho Highlands Water Project may be insignificant by international standards, if one takes into consideration the total land area of Lesotho (30,355 km2), and the other losses mentioned above, any land loss by Lesotho standards is significant.

Lesotho has made a rapid transition from an agricultural to a cash based economy, which relies heavily on the cash wages of the migrant workers in the mines in South Africa. These wages are also in rapid decline due to the high rate of retrenchment from the South African mines, which leaves a high proportion of the men folk in Lesotho without a regular source of income

There is a high rate of rural to urban migration (5.5 percent per annum), though still lower than most other developing countries.

Environmental issues

Environmental concerns highlighted for action include:

- Overstocking and poor range management,
- Soil erosion and fertility loss
- Hazardous agricultural chemicals,
- Loss of natural and historical heritage,

- Unplanned urban expansion, and
- Pollution associated with waste disposal and industries (Government of Lesotho, 1989).

There have not been significant changes in the identified major environmental problems for the last decade. The major shift has been in the development of the policies and allocation of resources to address the problems. Until recently, addressing environmental problems was mostly superficial (P. Maro, personal communication, 2001). This was evidenced by the location of the Environmental Secretariat in the Prime Minister's Office, with the belief that the creation of a Ministry of the Environment "might accentuate the tendency for environmental issues to be thought of as separate from wider issues of economic and social development" (Kingdom of Lesotho, 1989). But in recognition of the importance of environmental issues affecting Lesotho, and to reduce intersectoral conflicts, the Ministry of Environment, Gender and Youth Affairs was created.

The major breakthrough has been the recent creation towards the end of 2001 of the Lesotho Environmental Authority (LEA) whose mandate and functions are still under development.

Environmental impact assessment of the Lesotho Highlands Water project

The EIA process in Lesotho at the start of the LHWP had classical characteristics of a process dictated by aid funding, not necessarily a good practice aimed at sustainability.

When the project started in 1986, Lesotho had no EIA guidelines, and no specific legislation for implementing impact assessments. Hence, the guidelines adopted were those of the World Bank. An environmental study was carried out by Environmental Resources Limited in 1988 as part of the feasibility study. No EIA report was produced to provide decision-makers with information to help them make better decisions. The implementation of the Environmental Action Plan lagged behind the engineering throughout most of the implementation of the Phase 1A. This resulted in a lot of conflicts and disagreements between the project authorities and environmental pressure groups both inside and outside Lesotho. However, baseline studies were undertaken whose results were utilized to prepare the Environmental Action Plan in 1990.

A comprehensive EIA which follows closely along internationally accepted guidelines was carried out for Phase 1B.

Table 1: Criteria used to determine impact significance in Phase 1B

1. Defined time span for predicted impacts
   - Short term: construction phase, up to 7 years
   - Medium term: 7 – 20 years
   - Long term: for the duration of the project's existence

2. Scale of impacts
   - Local: within close range of a specified component or activity
   - Watershed (catchment): within the drainage area of the Senqunyane River
   - Regional: within a specified and well-defined area within the boundaries of Lesotho
   - National: country wide
   - International: of concern to other countries

3. Levels of severity of impacts
   - Very high: major losses or systems disruption; system unable to funtion without mitigation or major compensation programme; an impact that is irreversible
   - High: substantial losses or system disruption; system would probably still function albeit at a lower level; an impact that is irreversible
   - Moderate: measurable losses, or system disruption; system able to continue without mitigation
   - Low: small changes, possibly measurable
   - Nil: no measurable impact

4. Certainty of impact occurrence
   - Definite: not doubt that impact will occur
   - Probable: probability of impact occurrence judged to be more than 50%.
   - Possible: probability of impact occurrence judged to be less than 50%.

5. Significance of impacts
   - Very high
   - High
   - Moderate
   - Low

The intent of the EIA was to identify and describe the positive and negative effects that the Phase 1B of the LHWP would have on the biophysical and socio-economic components of the area's environment. The EIA would thus indicate the relative importance of the various impacts and provide approaches to be taken to mitigate the negative impacts likely to occur (Lesotho Highlands Development Authority, 1996).

Improvements to the above indicate a good content EIA should include, in addition:

Probability of occurrence:
- Improbable (low likelihood)
- Probable (distinct possibility
- Highly probable (most likely)
- Definite (impact will occur regardless of prevention measures)

Legal requirements:
- Identify and list the specific legislation and permit requirements which potentially could be infringed upon by the proposed project.
- Provide reference to the procedure required to obtain permits (Weaver et al, 1998).

ADVERSE ENVIRONMENTAL EFFECTS OF LARGE DAMS

River impoundments result in a number of physical, social and biological impacts. It is important to understand and describe these impacts in order to develop systems and tools for monitoring and addressing them.

Large dam impacts

Resettlement

One of the most direct and immediate social impacts is the resettlement of the communities living within the catchment and deriving economic benefits from the river catchment. Resettlement results in the disruption of the livelihoods of the communities through direct loss of land. People are removed from their well-known environment and way of life, lose resources, have to adjust to a new way of life and away from traditional homes. Those who remain at the upper reaches and are not directly affected by the large body of water can no longer interact freely as travel distance become longer around the water bodies.

Hydrological impacts

- *Runoff and sedimentation*
  Construction phase disturbance such as vegetation removal, soil compaction and pumping of water can affect streamflow and sediment loads.
- *Sediment*
  Streams draining from construction sites export large quantities of sediments which is sometimes mixed with concrete deliberately or accidentally dumped into the waterways. These sediments can threaten fish and invertebrate population.
- *Nutrient release*
  Nitrogen can be released through disturbance of established grassland soils, and its entry into streams and ground water may lead to enrichment of water bodies away from the site.
- *Oils and other pollutants*
  Spillages are common at construction sites and can enter water courses directly or penetrate the soil mantle leading to ground water pollution.

Aquatic communities

Downstream impacts include changes physical and biological characteristics of the river catchment. The impoundment results in silt being trapped behind the dam wall, thus reducing silt replenishment in the rivers, and resulting in increased erosion of the river banks. The resultant high sediment loads increase turbidity, and damage habitats for aquatic species.

Stream flow

Impoundments result in more uniform stream flow as a result of the controlled water release from the reservoir. The more natural conditions of floods, drought and fluctuating water temperature are altered and this affects the habits and cycles of the organisms inhabiting the stream and surroundings. Thus species composition, both type and numbers changes. The more controlled water flow with the altered water volume and speed, impacts on the overall ecology of the river basin.

The controlled water movement results in changes in species composition both in and around the reservoir in order for organisms to adapt to the new and different environment. New habitats associated with the new flow regime are created, some of which are associated with vectors and hosts of diseases previously unknown in the area (Petts, 1984).

Major Lesotho Highlands Water Project impacts

The impacts in previous section also apply to the LHWP. In addition, those impacts which affect environmental resources, their management, people, and their significance, have to be understood as they could determine the future trends of development activities of the countries concerned. Most of the environmental and social impacts were inside Lesotho as the project had to start with construction of the required advance infrastructure such as roads and power lines before embarking on the water transfer related infrastructure.

Short-term impacts associated with construction include:

- Refuse and waste disposal
- Hazardous materials
- Removal of vegetative cover
- Topsoil loss
- Dust
- Noise
- Relations with local communities
- Impacts on flora and fauna
- Erosion and stormwater disposal
- Stockpiles
- Impeded access for local communities
- Rehabilitation of disturbed areas
- Opening of borrow pits and quarries

Reversing the flow of a major water system such as the Orange River system is bound to have some major environmental and social impacts both on its new and old course. There is little evidence that these impacts were well evaluated and understood by those affected before deciding to implement the project as evidenced by the protest marches taking place, the last one on record being at the end on 2001.

It is worth noting that impacts based on observations that are specific to the LHWP and that can be discussed at this stage are those mainly associated with construction, as those associated with dams have not as yet manifested themselves fully due to the short time that the project has been in place. Regular monitoring of impact is in place and the results thereof should be used in order to have the full picture.

The Phase 1B EIA identified a total of 140 impacts. These included 29 downstream impacts. 31 impacts were rated as being of high significance and 6 of very high significance.

A scoping report on the erosion protection works along the Ash river downstream of the Delivery Tunnel was produced in October 2000. This report provides some information on impacts based on observations after operation of Katse Dam and 'Muela Hydropower commenced, including unanticipated accelerated erosion associated with operation of the 'Muela Hydropower Plant (Trans Caledon Tunnel Authority, 2000).

Socio-economic impacts

Displacement: - This affects inhabitants of villages situated dangerously close to the reservoir, those villages that will be inundated or partially inundated, and those that will be very close to the full supply level. The loses in this category include physical structures, arable and grazing land.

Access: - Reservoir indundation has resulted in disruption of access for local people. They have been cut off from some of the traditional grazing areas and other cultural events. On the other hand, there has been a substantial improvement in major roads connecting the traditional rural communities to major towns. Movement and mixing of people has thus substantially increased, with the resultant dilution of the mountain cultures and life styles, including a transition from a land based to a cash based economy.

Reduction of available land resources: - Physical land loss is incurred through inundation, and the water also acting as a physical barrier, thus stopping interaction from one bank to another, with the result that families are cut off from using land on the opposite bank. Land uses such as crop production and grazing have been eliminated, as Lesotho does not have alternative land to which the people who were moved could be relocated or continue with agricultural production.

Table 2: Land losses in Phase 1A from LHWP implementation (Source: Lesotho Highlands Development Authority, 1989)

Land use type	Hectares
Rangeland	2600
Arable land	1729
Garden land	17.04

Food security: - Household depending on cultivating land for food and those grazing areas inundated by the reservoirs will suffer reduced food security.

Health and safety: - The high levels of in-migration by project workers, loss of agricultural land and cultural identity, and the pressure to keep up with the cash based economy results in highland inhabitant abandoning their lifestyles and land based economic activity. There are easier choices such as buying non-nutritional foods and becoming sex workers with the resultant malnutrition and increased incidence of sexually transmitted diseases. The improved access will also result in higher incidences of road accidents.

Terrestrial and Aquatic Impacts

Habitat destruction: - Construction in previously undisturbed areas, and in some cases close to major water sources, resulted in irreversible alteration of the land, rivers and some wetlands. Permanent removal of vegetation and construction of river crossing facilities resulted in cutting off and diversion of water supply, channeling and forcing to the surface of water previously confined to subterranean flows and replenishment of ground water. Thus features of surface erosion and stream bank erosion were initiated.

Pollution effects during major earthworks: - With the noise from blasting, some mammals were observed moving to other localities. Since the baseline studies were carried out after some of the major works had started, it was difficult to determine how many animals relocated permanently and how many came back.

Water pollution especially at upstream sites had some impact on species sensitive to high sediment loads during construction. The permanent alteration of the rivers that have been dammed has changed the species composition irreversibly, thus creating a totally new habitat, and affecting the aquatic systems.

Impacts of soil erosion and fertility loss: - The physical reduction of the land base has resulted in livestock over-crowding and overgrazing, resulting in reduction of organic residues, hence organic matter and loss of the soil mantle. These losses mean that the soils are no longer available and there is decreased productive potential for cultivation or rangeland production, thus contributing further to the weakening of the agriculture based economy. The erosion further contributes to the stream sedimentation, thus adversely affecting aquatic systems.

Erosion damage was recorded on the Ash River due to the fluctuation in flow resulting from the power generation at the 'Muela Hydropower Plant, which follows the power demand curve of Lesotho. According to the Trans-Caledon Tunnel Authority (2000), the fluctuations represent approximately a 1:5 year flood occurring in the AshRriver daily.

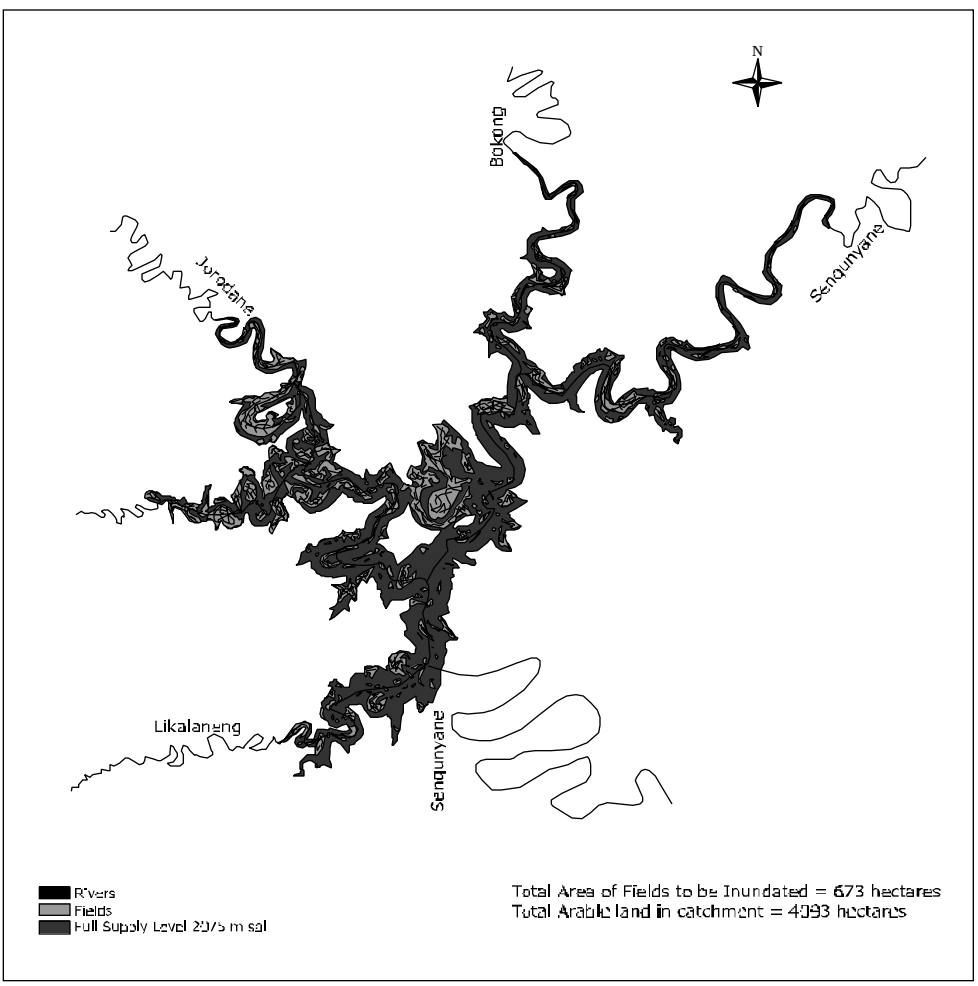
The drawdown zone

The drawdown zone especially of the Mohale reservoir represents a significant area of barren, unusable and unsightly land, whereas the Katse reservoir on the Malibamatso River valley with its steep banks represents relatively less of a loss.

Riparian zone grazing

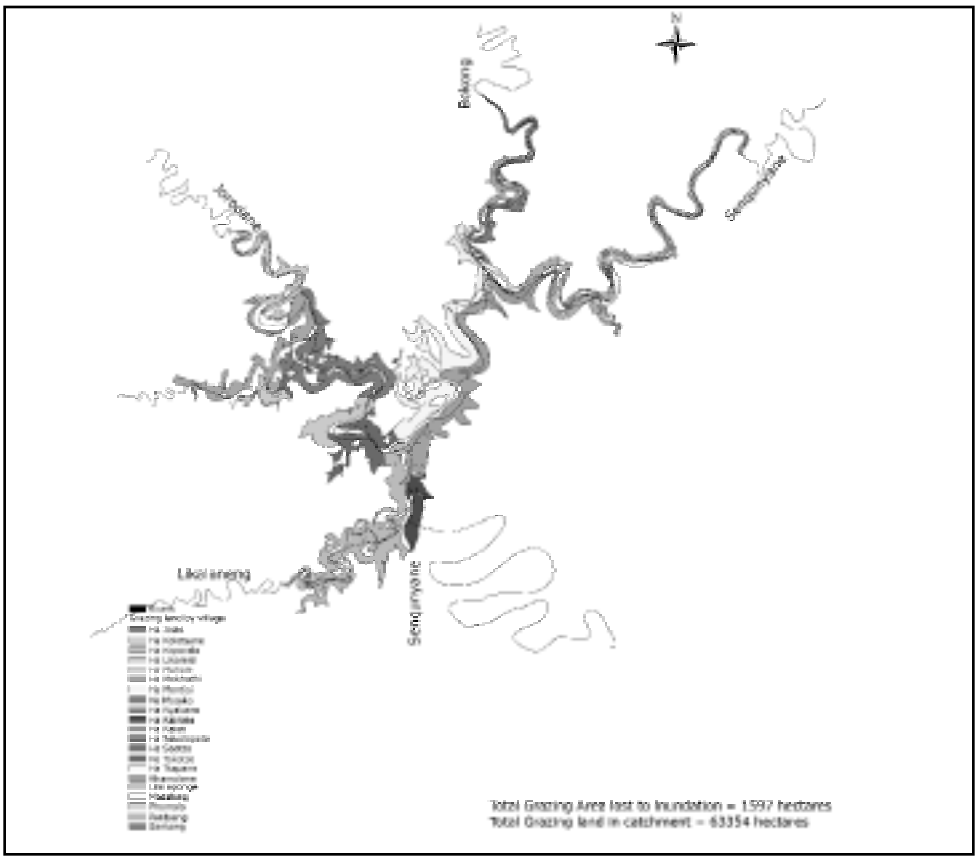
The grazing contributes to further erosion, thus contributing to the deterioration in the health of the river. A healthy riparian zone serves as an important filter for light, nutrients and sediments (Letsela, 2001)

Map 1: Arable land lost to Inundation in Phase 1B



(Map courtesy of Lesotho Highlands Development Authority, 1997)

Map 2: Grazing land lost to Inundation in Phase 1B



(Map courtesy of Lesotho Highlands Development Authority, 1997)

IMPACTS ON AGRICULTURE

Lesotho, South Africa and Namibia have a scarcity of high potential agricultural land, with water as the major limiting factor. In Lesotho, agriculture employs more people than any other sector and provides the principal means of livelihood for the majority of the rural population. There has been a steady decline in the total agriculture output countrywide. Landlessness is now very common and the average farm holding per household has been decreasing. This has been attributed to:

- Reduction in the area under cultivation due to faster growth of other sectors
- Declining soil fertility
- Soil erosion and land degradation and
- Poor management and cultural practices
- Land being taken out of production for residential and industrial uses (Chakela, 1999).

Figures produced by the Lesotho Bureau of Statistics (1996) show that the contribution of agriculture to Lesotho's Gross Domestic Product declined from 32 percent to around 10 percent within a 30-year period.

Construction and operation of the LHWP, even without a detailed analysis, is bound to have impacts on agricultural production on both the old and the new river course as the water is diverted northward to the industrial Gauteng Province. Based mainly on literature, and empirical information, impacts on agriculture can be surmised as below.

Physical land loss

Land uses such as crop production and grazing have been eliminated due to inundation in Lesotho, and the economic activity associated with the land uses above has been restricted as Lesotho does not have alternative land to which the people who were moved could be relocated or continue with agricultural production.

Damming of rivers results in changes of channel morphology below the dam which is dependent the degree of flow regulation, the resistance of the channel bed and bank material to erosion, and the quantity and nature of downstream sediment sources. The reduction in sediment load caused by a dam will tend to cause net scour, while the elimination of flood peaks reduces transport capacity. The extend and rate of degradation will therefore depend on the resistance of the channel boundaries and the downstream contribution of sediment. Formation of flood plains and the rich and highly productive alluvial soils is thus negatively impacted.

Changes in crop production patterns

A large proportion of families relocated from Phase 1B areas moved to towns where agriculture production trends tend towards irrigated home gardens, producing mainly vegetables. There is likelihood therefore of increased vegetable production and a possible reduction in field crop production associated with land loss and resettlement.

Loss of genetic resources

A large body of water such as the Katse Dam can have the effect of isolating ecosystems and habitats, creating unnatural conditions for ecosystem functioning, thereby contributing towards genetic vulnerability through in-breeding. In addition, there has been a move by project authorities to introduce fast growing and high yielding crop varieties into the highlands, with increased use of pesticides and chemical fertilizers, thus contributing towards phasing out of traditional cultivars, and encouraging monocultures.

Nutritional changes

Floodplain inundation in areas of high flows normally results in a reduction on the productivity of the river flats and agricultural lands at the edge of the river because of lack of nutrients supplied by silts deposited during floods. However, it has been determined that in Lesotho, the loss of flood events should not significantly affect the productivity of riparian fields primarily due to relatively large soil depth and hence high moisture storage capacity that is replenished by rainfall and augmented by runoff from neighbouring hillsides (Report No.LHDA 648-f-21, 2000). Impacts should however be of a relatively higher significance along the Orange River in South Africa where rainfall is lower.

Changes in animal production patterns

Where there is limited grazing, the common practice is to keep high producing dairy cows on the homestead rather than keep large numbers of traditional livestock. This is also linked to urbanization which is resulting from resettlement of communities affected by the LHWP. Therefore it is likely that there will be a reduction in the numbers of livestock units per unit area, and a rise in the keeping productive stock for income generation.

Reduction in quality and quantity of grazing, livestock and livestock products

The physical land loss has resulted in reduction on available grazing for livestock, which in turn impacts on the quality and quantity of livestock and livestock products. This means more animal units per land area due directly to inundation, resulting in overcrowding and over-grazing and further degradation of the productive land base. The inverse relationship between rangeland productivity and range utilization has therefore increased.

Animal health

According to the sociological report of the IFR study, there are risks to animal health for 41.5 percent of sheep and goat owning households during a dry season and 65.5 percent of households are at risk in the case of a drought due to the deterioration in water quality, quality of grazing and the presence of microinvertebrates. Dependence on livestock and livestock products has increased with the reduction in the amount and quality of land for crop production. Therefore the residual impact is of high significance.

Table 3: Indicative duration and timing of animal health impacts
Source: LHDA, 2000

Component	Sub-component	Biophysical links	Onset of biophysical changes	Onset of animal health impacts
Internal parasites	Liver fluke Stomach fluke and other internal parasites	Increase in vegetation that can potentially act as habitat for snail, such as wetbank annuals	1-2 years	2-3 years
		Increase in aquatic snails	1-2 years	
Bacterial infection	Pulpy kidney and / or grasses	Increase in wetbank annuals	1-2 years	1-2 years
	Increase in algae		1-2 years	
	Anthrax	Increase in clay and mud Potential increase in low flows	2-10 years Immediate	2-10 years
Viral infection	Bluetongue	Increase in aquatic macrophytes	1-2 years	1-2 years
	African horse sickness	General increase in midges	1-2 years	
Nutrition / grazing	Susceptibility to disease	Overall decrease in vegetation available for grazing	1-2 years	1-2 years
	Lack of nutrition	Increased risk of overgrazing resulting form decrease in species	1-2 years	
Physical	Slipping injuries	Increase in biofilm	1-2 years	1-10 years
	Death	Increase in mud and fines	2-10 years	
	Bogging	Increase in clay and mud	2-10 years	

Water quality and aquatic habitats

There are likely to be impacts associated with the rerouting of the Senqu River tributaries, both on the new and the old river course. Increased river bank erosion on the Ash River which is receiving the additional water from Katse Dam on its way to the Vaal Dam, has been noted. The water in the river has increased erosive power and a higher sediment load (South African Broadcasting Corporation News Bulleting, March, 2002).

Reservoirs act as thermal regulators and nutrient sinks so that seasonal and short-term fluctuations in water quality are regulated. The salinization of water below dams in dry climates due to high evaporation rates such as exists in the Southern African countries in question, can be a problem. In this case it would mostly affect areas downstream of the LHWP dams when saline drainage water from irrigation streams is returned to rivers downstream. Salinization can also be a problem on flood plain wetlands in the absence of periodic flushing and dilution by flood water. This renders wetlands unsuitable as sources of high quality water for river systems, hence a reduction in the quality of water available for agricultural production.

Water storage in reservoirs induces physical, chemical and biological changes in the stored water. Significant drops in water temperatures result in oxygen depleted, nutrient rich water which may be high in hydrogen sulphide, iron and / or manganese (McCartney et al, 2000). Such water may already be polluted, but in addition, its capacity to flush out other pollutants from the soil and effluents becomes significantly reduced.

ADDRESSING THE IMPACTS OF THE LHWP

Major processes for addressing the impacts of the LHWP which became the integral part of the project implementation include:

Incorporating environmental concerns into project planning and design

This was done more effectively for Phase 1B than for Phase 1A as the results of the EIA study were available in advance of the construction phases of the project

Baseline studies

The main environmental studies carried out for the two starting phases were:

- Baseline Epidemiology Survey
- Erosion and Sedimentation
- Archaeology and Palaeontology
- Baseline Biology Survey and Reserve Development
- Water and Atmospheric Quality and Aquatic Communities
- Soil Survey and Mapping (Development Authority, 1993).

These studies provided information against which future changes can be documented and adverse impacts addressed.

Compensation and resettlement

Households whose properties and livelihoods would be adversely affected by the construction and operation of the LHWP received compensation in the form of cash as a once off payment, grain and fodder for a specified period, or were relocated away from the danger zone.

Instream flow requirements study

The IFR was implemented after completion of Phase 1A and during construction of Phase 1B. Ideally it should have been done before the project commenced. The aim of IRF study was to determine more realistic and justifiable water releases to downstream rivers. The study assessed the long-term impacts of modified flow regimes on the ecosystems and communities along the rivers, provided recommendations for mitigation, and recommend a long-term monitoring plan (Metsi Consultants, 2000).

The stated objectives of the study were:

- to assess the instream flow requirement of the Senqu, lower Senqunyane, lower Malibamatso and lower Matsoku rivers;
- to assess the long-term impacts of the modified flow regimes resulting form the construction of the proposed LHWP dams on the ecosystems of the study rivers, and to provide recommendations for mitigation against, and compensation for significant impacts linked with the proposed projects;
- to recommend a long-term programme to monitor the efficacy of the IFR releases, the results of which can be used to adjust the IFR as required.

Environmental monitoring in Lesotho to ensure compliance with environmental specifications

There is day-to-day in-house construction and operations monitoring utilizing environmental specifications prepared as an integral part of the construction contracts on the one hand. Monitoring environmental and social aspects of the engineering and construction projects includes site visits and inspections, with a relatively higher frequency near the beginning of construction, with the record of action to be taken by the Contractor effected immediately after the site visit (Maema, 1995). On the other hand, there is the more detailed monitoring done by outside experts with extensive documentation of observations and recommendations for further action. There is also a Panel of Environmental Experts that has been retained since the start of the project. The POE carries out visits to project sites at least once a year. All the teams keep track of progress, ensure achievement of targets, removal of constraints and ensure that corrective action is taken.

Environmental monitoring in South Africa

Extensive environmental studies were carried out in advance of the LHWP implementation to predict impacts on the Ash / Liebenberg / Wilge River System, and to put in place mitigation measures. Mitigation measures were designed to cater for short-term construction phase impacts and long-term operation impacts.

The measures, however, did not adequately predict fluctuation flows through the delivery tunnel into the Ash river which would follow the power demand curve in Lesotho. These fluctuations are reported to represent approximately 1:5 year flooding occurring twice daily, have resulted in erosion damage which required urgent protection measures.

Application of legislation

Pieces of legislation such as the Land Act 1979 make provision for Government to declare any area of land a Selected Development Area (SDA). The LHWP and associated developments are provided for under this legislation. It was therefore possible to undertake development of special protected areas within the LHWP areas, whereupon all titles to the land within the area are lapsed. It was necessary though not to apply the full force of the law and negotiate use of such areas as protected areas with the local community and develop plans together which, if properly utilized, will ensure benefits to those communities who "donated" the land.

Capacity building

Capacity building was undertaken in two major categories. There was the technical training for LHWP staff to improve their skills to participate effectively in the planning, design, construction, supervision and monitoring of the project, and to advise project authorities on the best action to address impacts of the project the biggest component in terms of numbers being those engaged in environmental and social impacts management. LHDA was thus enabled to address environmental concerns more aggressively than any other institution in Lesotho. According to Ambrose et al (1999), this was appropriate as LHDA had responsibility for water, a commodity which has proved to be Lesotho's major exploitable natural resource, and a commodity essential to the environment and its major components.

There was also the training provided to the communities and families whose livelihoods were affected by the LHWP, that would allow them to participate in economic activity and be able to take advantage of the project in their area. The training would also help the rural people acquire skills that would allow the people to participate in economic activities other than agriculture.

CUMULATIVE IMPACTS

Cumulative impacts should not be assessed on the basis of the one project currently being developed, but from complexes of new and existing developments with impacts on ecosystem functioning, the economy, overall human well-being and health. Many predicted changes would have little impact in isolation and in the short-term, but in combination they would result in major changes on resources and livelihood of the inhabitants of the system.

Phase 1 of the LHWP was designed to maximize the amount of water for transfer from Lesotho to South Africa and environmental evaluations at the early project stages intimated that negative impacts would mainly be limited to the immediate reaches of downstream rivers and would be mitigated by flows from downstream tributaries.

Catchment rather than project EIA would be more desirable in a major water development project such as the LHWP.

The individual components of the Lesotho Highlands Water Project such as roads, power lines, tunnels and the dam, and the associated noise, dust and water pollution, all produced impacts of differing magnitude and duraiton. The individual impacts, when combined by themselves, and then combined with impacts of other activities such as crop production and rangeland utilization, become cumulatively even more significant. When assessing cumulative impacts in the context of the LHWP, the effects of the multiple developments should be closely examined, together with the past and present activities which contribute to the cumulative impacts.

If cumulative impacts of developments are to be effectively determined, there is need for a systematic identification of possible environmental impacts, including comprehensive and rigorous analysis of their magnitude and probability.

The LHWP Phase 1B EIA rates important environmental components for four variables, namely:

- Duration of impact
- Area extent of the impact
- Severity of the impact
- Certainty of the impact

Cumulative impacts of large dam development projects, with specific reference to the LHWP

LHDA (1997) defined a cumulative impact as: "an impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions, regardless of whatever agency or other person undertakes such action. Cumulative impacts can result form individually minor but collectively significant actions taking place over a period of time".

For assessing cumulative impacts of the LHWP, criteria established for assessing cumulative impacts were based on the assumptions that:

- Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time;
- An impact that may have a low significance rating on its own, could contribute with other similar impacts, or totally different impacts, to a much greater impact on the IEC than the sum of all the individual impacts

Loss of hydrological processes

The maintenance of hydrological process is dependent on maintenance of the integrity of the soil mantle. Construction of dams results in population movements, first to make way for the dam, and later towards the dam to have easier access to water especially for livestock. The main threat to the soil mantle is erosion; in the Lesotho highlands the topsoil and wetland soils with their high organic matter contents are especially vulnerable to erosion once disturbed, mainly through trampling, but also by cultivation. Another risk is degradation of the surface characteristics that would reduce the infiltration capacity of the topsoil. The risks here would be systematic removal of organic matter by burning and overgrazing, and compaction of the surface by over-cultivation and high livestock densities.

Conservation of aquatic and riparian ecosystems

Water is not only a basic requirement for life but an important transport mechanism. Changes in hydrology will have a direct impact on biodiversity and are also important indicators of the degradation of catchments. Most aquatic organisms are dependent on specific hydrological regimes for their sustained maintenance. There are several species that inhabit the cool clear water of the mountain catchments, several of which will be altered by construction and damming of the Lesotho highland rivers. The loss of one species then has repercussions further along the food chain.

Changes in seasonality or the reliability of stream flow or increases in turbidity, sediment loads or pollution levels, or any combination of these, are likely to negatively affect these fragile aquatic ecosystems. Mismanagement, overuse and alteration of the catchments, in the case of the LHWP through damming, will affect both water quality, quantity and the reliably of dry season flows.

Hydrological functioning, in addition to its direct importance for maintaining biotic diversity, is also a useful early indicator of other biological impacts.

Loss of species and changes in species composition

River impoundments represent manipulations of flow regimes which result in unnatural disturbances to aquatic systems. This can result in the disturbance of the cycle of the organisms inhabiting the systems, to the extend that the organism life cycles and the environmental conditions become mismatched, thus affecting the natural rhythms such as feeding, hibernation and reproduction patterns. The more vulnerable and less adaptable species could face a threat of extinction while some predators, pests and disease vectors thrive.

In Phase 1B alone five of the nine known locations where the endangered Maloti minnow is found, will be seriously affected by the LHWP. The instream flow requirements study records the following as possible consequences of river regulation:

- Hydrological cues that trigger fish spawning or seed germination may occur at the wrong time of the year or not al all, resulting in affected species perhaps failing to reproduce.
- Seasonal reversal of wet and dry season low flows could mean that hydraulic and thermal conditions become mismatched with life-cycle requirements, again causing species to decrease in numbers and abundance.
- Other species, including those regarded as pests, are able to take advantage of such environmental conditions, or the weakening of competition from the affected species, and increase in abundance (LHDA, 2000).

Some replacement species would be mud rather than rock dwellers, thereby rendering them inaccessible as a food source for birds and fish. Lesotho's fishing industry is very poorly developed, and the river impoundments would result in further reduction in the number of sites available for development of the fishing industry.

Streamflow

A well-vegetated catchment routes most of the rainfall through the soil profile into the groundwater and then slowly released the water into rivers. Impoundment of the rivers in the Lesotho highlands has resulted in reduction of the total land area available for production, hence higher livestock densities and more intensive cultivation of the remaining land. If the vegetation of the catchment is degraded through clearing to increase the amount of land for agricultural production, and through increased animal densities, a larger proportion of water reaches rivers as overland flow. This results in a more rapid streamflow response to rainfall events and a quick recession of flows afterwards. The likelihood of floods is therefore greatly increased. Because the total soil water storage and ground water recharge is reduced there is reduced low season stream flow.

Commercial farming and irrigated agriculture

Though not directly applicable to the LHWP, it is worth noting that construction of dams normally means more water available for irrigated agriculture, and therefore increased levels of commercial farming. Commercial farming practices can have severe impacts on riparian and aquatic communities. Commercial farming often results in substantial imports of nutrients in the form of fertilisers for pastures, supplementary feeds for animals and fertilisation of agricultural crops. The extensive use of pesticides and herbicides can have a significant impact on biodiversity, particularly where the residues of even direct spray enters riparian and aquatic ecosystems. Is there any positive impact that can be considered from irrigated agriculture?

Population growth

The population of South Africa is growing at approximately 2% per year, and figures for Lesotho have shown dramatic increases in stock density in the last 20 years. An increase in population will mean that more people will be demanding the same level of productivity from the same finite resource base, in Lesotho from the reduced land base, and in South Africa from industrialization, thus the pressure will be increased in the near future. The present uncoordinated and fragmented approach to conservation is insufficient to address the complexity of the situation. If management is not undertaken at a strategic level as well as implemented at grass roots, duplication of activities will continue, resources will not be optimally utilised, and ultimately this will contribute to degradation of resources.

Industrial pollutant deposition

The transfer of the water to the Gauteng Province, the industrial hub of South Africa, is to further economic development in the province for the benefit of

the whole country and for urban water supply. In addition, the other dams along the Orange River have benefited irrigated agriculture. Other benefits that have accrued from the LHWP include generation of hydro-power for Lesotho. As a direct consequence of increase in available water, further industrial development will take place, more jobs will be created resulting in people flocking to the industrial centres. There will be an increase in concentration of vehicles per unit area, and land under irrigated agriculture will increase. The overall result is an increase in the amount of emissions and pollutant deposition.

Ecosystems most sensitive to acidic precipitation are the high-lying alpine wetlands. Direct effects on these ecosystem and indirect effects through the soil may lead to changes in species composition in the wetlands and the streams draining from them, especially when the effects lead to changes in the pH of the soil and water bodies.

Air pollution can act directly on vegetation and animals, or indirectly via the soil. The direct effects of air pollution on plants and animals depend on the concentration of pollutants in the air, while the indirect effects are related to the cumulative level of deposited pollutants in the soil and streams. The threshold for direct effects varies greatly between species, and between plants and animals. The indirect effects are strongly modified by the "buffering capacity" of the soil or water body, which in turn depends on its chemistry and volume (MacKenzie and El-Ashry, 1992). The waters draining from the region are typically weakly buffered, and slightly acid.

POLICIES, LEGISLATION, PROTOCOLS AND AGREEMENTS GOVERNING SHARED WATER COURSES

The development and management of the Lesotho Highlands Water Project is designed to follow along guidelines as provided for in the Treaty, the applicable national legislation, and the Lesotho Government policies, guidelines and standard practices (Lesotho Highlands Development Authority, 1998).

SADC Countries have a vision for achieving sustainable water management through regional integration, research, strengthening regional cooperation and strategic international partnerships. The countries which have recently engaged in the process of developing policies have used expertise from those SADC member countries who have the relevant experience, and also

extensively used the other countries' policies to formulate their own. This cross referencing should helped in reducing conflicts in individual countries' policies when it comes to shared resources such as the water resources. Compatible national frameworks that can be adapted to cater for shared resources are strongly advocated.

Regional guidelines for safeguarding shared watercourses have been developed, and issues around fair share, waste management and conservation of biodiversity are adequately addressed and documented with credible specialist input. However, most of the agreements and policies have not yet been implemented on the ground due mainly to the short time that they have been in place, and also because of lack of trained manpower to implement and monitor their application (Puling, personal communication, 2001).

The issues identified as requiring action for sustainable environmental management and for safeguarding shared watercourses include:

- Recognizing the environment as a legitimate user of water
- Addressing environmental degradation resulting from high population densities, poor livestock management and deforestation
- Waste management
- Improved monitoring and strengthening of regulatory mechanisms (SADCWSCU, 2000).

Policy responses to address negative impacts on shared water resources

Lesotho, South Africa and Namibia have the following in common:

- Environmental legislation of the Lesotho, South Africa and Namibia follows along the constitutional principles of the rights of citizens to a clean and healthy environment. Constitutional principles therefore provide the basis for environmental policy and legislation dealing with environmental protection.
- All three countries are young democracies, therefore their environmental protection laws and regulations are developing concurrently with other laws governing utilization of natural resources like water, forestry and land, which makes it relatively easier to adapt practices associated with the use of resources. The laws and regulations operate in conjunction with policies and regulations guiding the use and protection of other environmental resources, hence acceptability of environmental management policies.
- The three countries are signatories to international conventions and protocols such as the Convention to Combat Desertification and the Ramsar Convention on the Protection of Wetlands. These conventions,

among others, aim to guide the conservation of resources, including water management.

- The three SADC countries along the Orange River waterway share a vision of a future with adequate water resources despite the frequent occurrence of drought. They have, at different times, participated in international events aimed at influencing integration of environmental management and development, water resources management and people's participation, and subscribe to the principles thereof.
- All have signed and ratified the SADC Protocol on Shared Water Courses (revised 2000).

The legal framework for environmental management in Lesotho

There is a multitude of laws and regulations in Lesotho relating to the environment and aimed at guiding utilization of natural resources which were developed to respond to specific needs, for example land allocation, range management. Most of the laws in Lesotho governing resource utilization are sectoral, and there are a lot of overlaps and inconsistencies, and as such, were totally inadequate for accommodating a project of the magnitude of the Lesotho Highlands Water Project. A case in point is the Societies Act No.2 of 1966 used to establish and register Grazing Associations. The Act allows the Associations to hold property and enforce rights and obligations against a backdrop of tradition and culture which recognizes grazing land as a communal asset. These Grazing Associations lease/own grazing rights within areas normally allocated for communal grazing, which in terms of Regulation 8(1) of the Range Management and Grazing Control Regulations of 1980, are designated communal land (Matela et al, 2000).

Catchment management initiatives have been undertaken over the years led by the Ministry of Agriculture with donor funds. These were mainly for addressing soil erosion and rangeland degradation. The Range Management and Grazing Control Regulations (1980) has specific provisions regulating stock numbers by type per designated grazing area, and has specific clauses on prohibiting burning. To safeguard against erosion, the Regulations prohibit cultivation of virgin land without proper assessment. Areas determined to be unsuitable for cultivation are to be re-grassed. To a limited extend, these regulations required some form of impact assessment in the absence of proper EIA regulations.

The basis for Lesotho's comprehensive legal instruments to ensure the country's environmental protection is the Environmental Act 1999. Predating the Act is the National Environmental Action Plan which was prepared in

response to increasing concern over the country's environmental degradation. The plan provides the framework for the integration of environmental considerations into the planning and decision making process for social and economic development (www-wds.worldbank.org). The Act requires that EIA be undertaken for any development project which could have significant impact on the environment.

Table 4: Commonly used sectoral pieces of legislation, policies and regulations, forming the basis for the new environmental regulations

Policy/Legislation/Regulations	Year	Implementing agency
The Land Husbandry Act	1969	Ministry of Agriculture
The Water Resources Act	1978	Department of Water Affairs, Ministry of Natural Resources
The Water Resources regulations	1980	Department of Water Affairs, Ministry of Natural Resources
The Land Act	1979	Ministry of Agriculture
The Range Management and Grazing Control Regulations	1993	Range Management Division, Ministry of Agriculture
The Managed Resources Areas Dept. Order of 1993 Planning	1993	Ministry of Local Government, of Land Survey and Physical
The Forestry Act	1998	Forestry Division, Ministry of Agriculture

Implemented through specific line government Ministries and Departments has resulted in fragmentation and costly performance monitoring and auditing.

In an effort to consolidate and improve the effectiveness of environmental management, Lesotho Government has developed and approved the more comprehensive Environment Bill together with other more specific guidelines including:

- The National Environmental Action Plan, 1989
- The National Action Plan to implement Agenda 21, 1994
- National Environmental Policy for Lesotho, 1996
- Environment Act, 1997
- The EIA Manual for Lesotho, 1999.
- Guidelines for Environmental Impact Assessment of 1999
- Environment Bill of 2000
- The Water Resources Management Policy, 2000

The National Environmental Action Plan (NEAP) was the first attempt to review the different policies and consolidate environmental management policies which were, until that time, addressed under different government departments.

The NEAP identifies areas of environmental concern which are the highest priority and specifies actions necessary to address these areas. These are:
- Overstocking and poor range management
- Soil erosion and fertility loss
- Hazardous agricultural chemicals
- Loss of natural and historical heritage
- Unplanned urban expansion and settlement and
- Air and water pollution

The constitution of the Kingdom of Lesotho

On the protection of the environment, the Constitution of the Kingdom of Lesotho 1993 states:

"Lesotho shall adopt policies designed to protect and enhance the natural and cultural environment of Lesotho for the benefit of both present and future generations and shall endeavour to assure all citizens a sound and safe environment adequate for their health and well-being (www.lea.org.ls).

Environment Bill of 2000

The NEAP identified the need for the establishment of an appropriate institution to make policy and coordinate activities likely to have adverse environmental impacts. The Environment Bill establishes the Lesotho Environment Authority to carry out that function.

The Bill identifies categories of projects and activities which are subject to the EIA process. Dams and activities involving a river or other water resources, including:
- Construction of a reservoir, storage dam, levee, barrage or weir;

- A project or activity affecting water sources such as ground water, springs and wells;
- A project or activity involving a canal, channel, aquaduct, river diversion or water transfer (Environment Bill, 2000)

On protection of fresh water resources, the Bill has the following provisions with regard to river, riverbank, lake, lakeshore or wetland:
No person shall, without prior approval of the Authority carry out the following activities:

- use, erect, construct, place, alter, extend, remove or demolish a structure
- excavate, drill, tunnel or disturb
- introduce or plant any part of a plant, plant specimen whether alien or indigenous, dead or alive
- deposit substances which are likely to have adverse environmental effects
- direct or block
- drain

Guidelines for environmental impact assessment of 1999

The EIA process as outlined in the EIA guidelines is comprehensive. It is based upon the requirements of the Environment Act 1999 and promulgated pursuant to this law and is consistent with it.

Lesotho's EIA process is designed to integrate EIA requirements within the project cycle. The integration ensures that the EIA provides environmental information for the different stages in the project cycle and at the level of detail appropriate for that stage for both environmental protection and economic development objectives. The EIA guidelines are comprehensive and have information found in EIA guidelines for most developing countries and for the SADC region. In addition, the steps included compare favourably with EIA assessment procedures as outlined for countries like New Zealand and the United Kingdom (Wood,1995).

Below are the steps in the EIA process as outlined in the guidelines for Lesotho

Figure 1: Main steps in the Lesotho EIA process

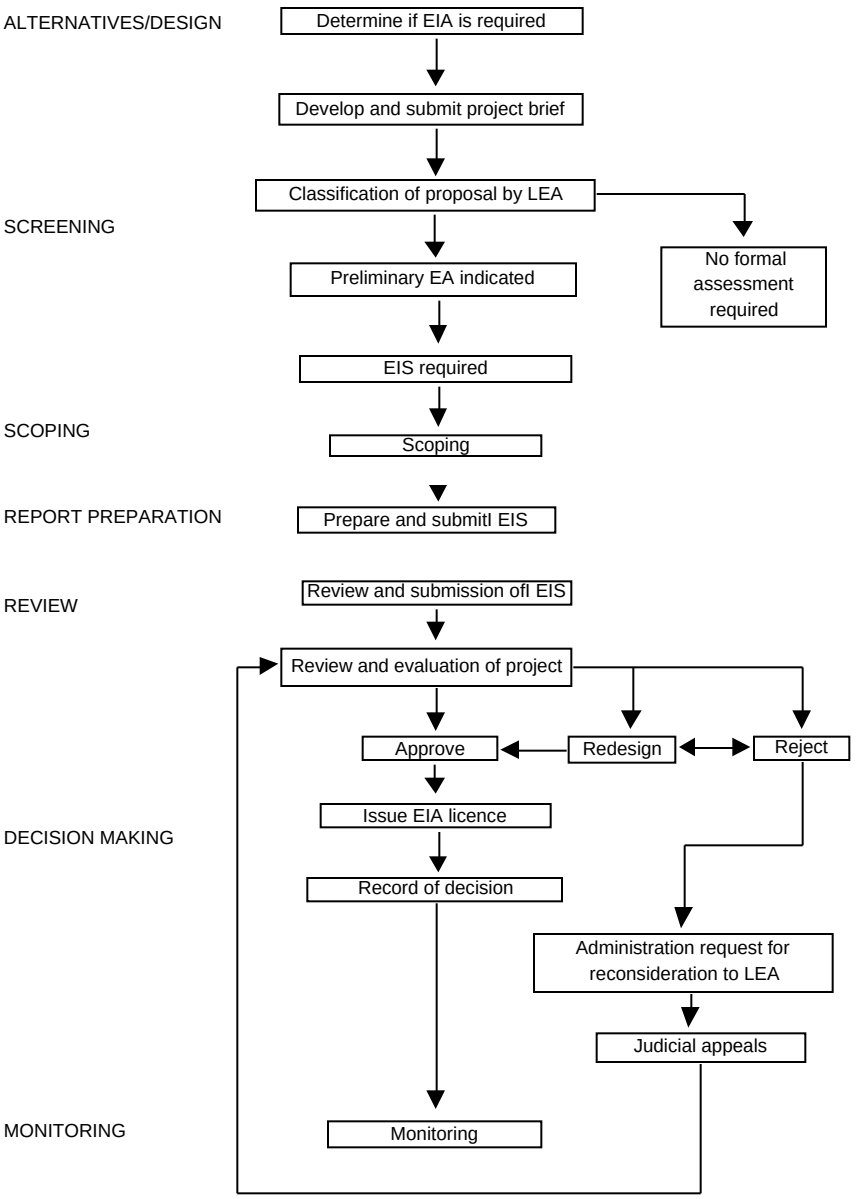


Diagram by S.Matela using text In: Project Developer's EIA Manual for Lesotho, 1999.

National Environmental Policy for Lesotho (1996)

On Water Resources Management, the policy emphasizes the importance of developing integrated and coordinated approaches to conservation and use of water resources. It also recognizes the right of all people to have access to potable water in order to reduce the incidence of water-borne diseases.

One of the water resource management strategies in the policy is promotion of research and conservation of shared watercourse systems and resources with neighbouring countries in the SADC region.

The Water Resources Management Policy, 2000

According to this policy, all water resources development projects have to undertake environmental impact assessments.

Policy Statement V states that:
Lesotho recognizes its special responsibilities with regard to water as an upstream riparian country, and the source of water of a large part of flows of the Orange River. The Government will ensure that water will be managed in a way that ensures maximum benefits to Lesotho while taking cognisance of her obligations to her neighbours and downstream users.

One of the long term strategies in the Policy is that within the framework of SADC, there should be joint planning and management of shared water courses, and a specific integrated plan for the Orange River Basin.

Environmental management and the governing legislation in South Africa

There are various pieces of legislation relating to the environment and resource utilization in South Africa.

South African law, while recognizing the need for adequate water resources to ensure human well being, also emphasizes the need to ensure that development of the country's water resources should be environmentally sustainable. The National Water Act states that levels of water consumption, use, pollution, as well as the associated infrastructure to impound and supply, should not cause unacceptable or irreversible impacts on the population or ecosystems, that the ecological reserve must be safeguarded and not used for other purposes (Government Gazette No 19565, 1998).

The Constitution

On the Environment:

The environmental clause of the Bill of Rights of the South African Constitution, the supreme law of the land, provides that:

Everyone has the right -

- To an environment that is not harmful to their health or well-being and
- To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that
  - prevent pollution and ecological degradation
  - promote conservation
  - secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

On Water

The Constitution guarantees every person the right of access to sufficient, affordable clean water.

There should be sufficient water to maintain the ecological integrity of the water resources, and that water conservation and sustainable, justifiable economic and social development are promoted.

The Environmental Conservation Act

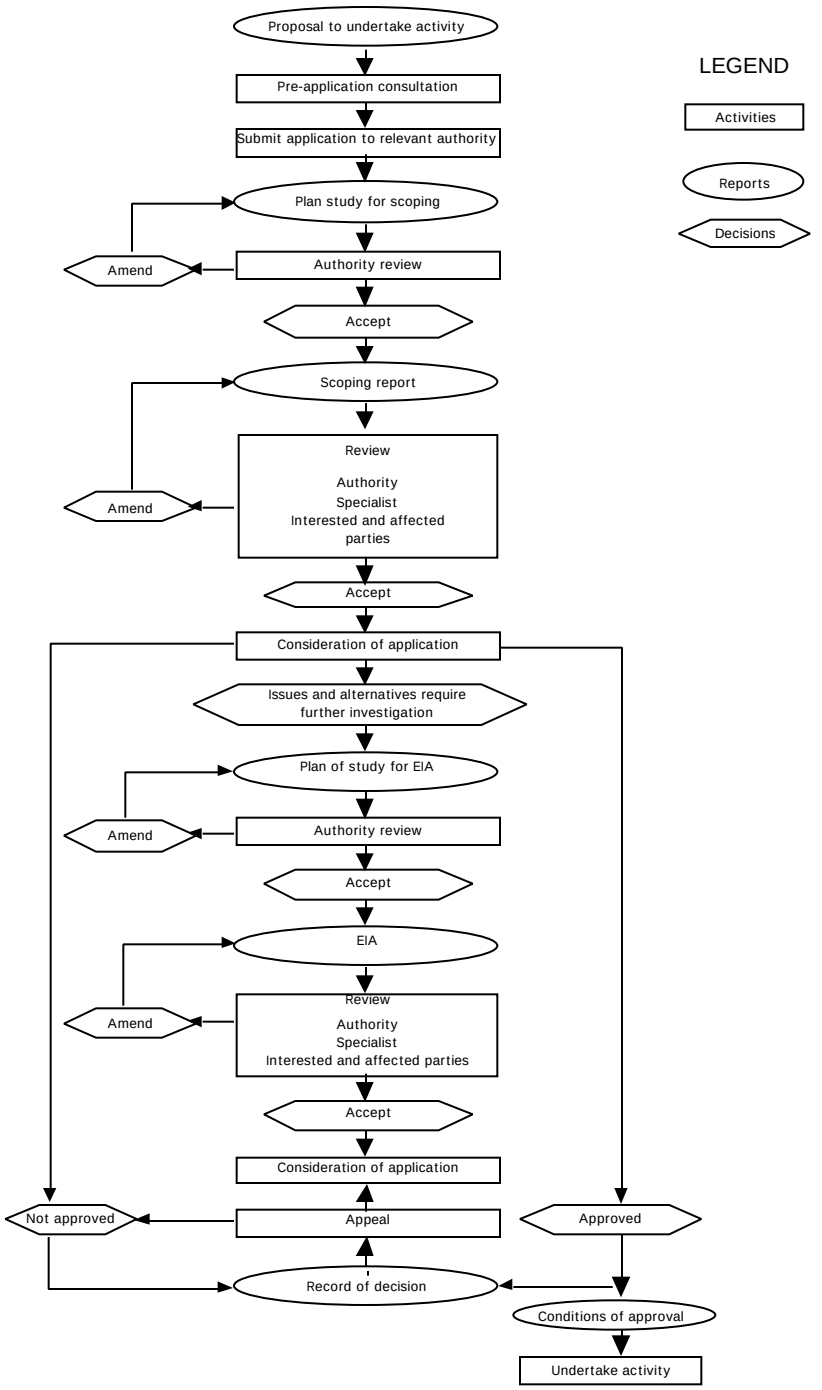
The Environmental Conservation Act (73 of 1989) provides for the effective protection and responsible utilization of the environment. According to the Act, the protection of the environment and the promotion of sustainable utilization of natural resources will take place as a matter of policy.

The White Paper on Water Policy

On regional cooperation

When addressing the issues of relations with neighbouring countries, the White Paper on Water Policy (1997) states, as one of its objectives, the importance of adjusting to pressures and demands of the future through cooperation, not conflict, based on needs of the common developmental goals and the protection of the environment.

Figure 2: South African AIE Regulations Applications Procedure, DEAT, 1998



…there must be respect for each country's equitable right to water from the shared resource. Because water does not recognize political boundaries, whether national or international, its management will be carried our in catchment areas although care must be taken the policy of subsidiary does not interfere with the need for a national and international perspective on water use.

…each country which shares a river basin has the right to a reasonable and equitable share of the water in the basin, and the greatest benefit should be achieved the least disadvantage to the other states.

The need is recognized to provide for the Environmental Reserve in order to protect the ecosystems that underpin South Africa's water resources.

On international obligations according to the White Paper, South Africa will ensure that water allocations for downstream countries are respected. Where necessary, Government will have the right to allocate water to downstream countries in preference to local water allocations, this to promote equitable and effective cooperation with South Africa's neighbours.

The treaty governing the LHWP

At the time the Treaty was signed to go ahead with the project, Lesotho had a military government, South Africa had the apartheid government, and Namibia was a territory governed under South Africa. Following the transition to democratic rule in all three countries, it is reported that an inquiry took place and the elected governments of Lesotho and South Africa indicated support for the project. The Government of independent Namibia is also reported to have indicated support for the previous no objection given during a United Nations vote before Namibia obtained its independence (Lesotho Highlands Development Authority, 1996)

The Treaty signed between the Governments of Lesotho and South Africa provides for the establishment, implementation, operation and maintenance of the project. It states the project purpose as follows:
"To enhance the use of the water of Senqu/Orange River by storing, regulating, diverting and controlling the flow of the Senqu/Orange River and its affluent in order to effect the delivery of specified quantities of water to the Designated Outlet Point in the Republic of South Africa and by utilizing such delivery system to generate hydro-electric power for the Kingdom of Lesotho" ***(Article 4: Purpose of the project).***

Article 7 of the Treaty states that flow rates in the natural river channels immediately downstream of the Katse and Mohale dams shall be maintained at not less than five hundred and three hundred litres per second respectively. Appropriate amounts of water are to be released to maintain such rates of

flow, provided that in the event of either reservoir being at its minimum operating level, the quantities of water released shall be equal to the flow rate into such reservoir not in excess of the specified rate of release. The minimum rate of flow to be maintained in the Senqu / Orange River shall be established by agreement between the Parties from time to time.

The basis and methodology for the flow rates into the natural river channels is not stated. It has been reported that these values exceed annual minimum flows in nine out of ten years of record (Metsi Consultants, 2000).

The Treaty also provides guidelines to be used for addressing social impacts, which is to ensure that measures are taken to maintain and to even improve the standard of living of local communities in the Lesotho who will be affected by flooding, construction works, or other similar project related causes. According to the Treaty, the affected people have to be enabled to maintain a standard of living not inferior to that obtaining at the time of first disturbance. Compensation will be given for any loss to such member as a result of the Project related causes, not adequately met by other measures.

On the issue of environmental maintenance, the Treaty states that measures necessary for catchment conservation as well as the prevention of pollution, resulting from the implementation, operation and maintenance of the project should be implemented (Article 10: (1) (d).

The Parties agree to take all reasonable measures to ensure that the implementation, operation and maintenance of the Project are compatible with the protection of the existing quality of the environment. In particular, due regard shall be paid to the maintenance of the welfare of persons and communities affected by the Project (Article 15 of the Treaty).

The protocol on shared watercourses in the SADC community

The Protocol, first signed in 1995, was repealed and replaced because of a change of perspective on some issues and to strengthen the environmental components and to specifically provide guidance on water quality and quantity (Ramoeli, 2002).

According to Article 3 of the Protocol on Shared Watercourses in the SADC Community (2000):

- State Parties shall maintain a proper balance between resource development for a higher standard of living for their people and conservation and enhancement of the environment to promote sustainable development.

- State Parties shall exchange available information and data regarding the hydrological, hydro geological, water quality, meteorological and environmental condition of shared water courses.

Article 4, 1.(b) states that
Before a State Party implements or permits the implementation of planned measures which may have a significant adverse effect upon other Watercourse States, it shall provide those States with timely notification thereof. Such notification shall be accompanied by available technical data and information, including the results of an environmental impact assessment, in order to enable the notified States to evaluate the possible effects of the planned measures.

The complication with the LHWP is that the total project is developed within Lesotho to benefit South Africa. Therefore the State Party in terms of the physical project location would be Lesotho, but in terms of the benefits and overall implementation responsibility it would be South Africa.

Inside South Africa, the Orange River has been dammed several times and therefore a lot of the adverse impacts associated with degradation of the watercourse are already being experienced. What has not yet been determined is if the LHWP further exacerbate the impacts.

Article 4,2(b) on prevention, reduction and control of pollution,
- State Parties shall, individually and, where appropriate, jointly, prevent, reduce and control the pollution and environmental degradation of a shared watercourse that may cause significant harm to other Watercourse States or to their environment, including harm to human health or safety, to the use of the waters for any beneficial purpose or to the living resources of the watercourse.
- Watercourse States shall take steps to harmonise their policies and legislation in this connection.

State parties are also under obligation to protect and preserve the aquatic environment using internationally acceptable principles and standards.

VALIDATING THE ASSUMPTIONS

Water development projects, including transboundary water projects such as the LHWP, are driven by political aspirations of countries to achieve self-sufficiency in available water resources, generation of energy, employment creation and food security. It would therefore hold that national goals and

priorities are more of a priority than regional cooperation and collaboration. Laws and regulations governing water use are designed to protect national interests, and the responsibility of associated impacts is normally left to individual countries.

Cohesive, regional-scale collaboration and cooperation sometimes falls victim to national goals, priorities and ideals, especially in regions such as Southern Africa where survival is still the order of the day for the majority of the populace. Decisions to alter river courses and natural landscapes are based on perceived benefits such as employment creation, which in turn will result in the overall rise in living standards, leading to general development including better education, health facilities and improved infrastructure. Balancing the needs of the people and those of the environment to enable it to regenerate itself and keep on providing are usually compromised especially where accelerated service provision is used to measure the performance of those voted into office.

The table below shows elements of reasonably executed EIA process, and has an analysis on how the process was followed in the two components of the LHWP comprising the Phase 1. The sequence can be used to determine if the procedure used allows for prediction and planning for addressing likely impacts.

Table 5: EIA application in Phase 1 of the LHWP inside Lesotho, compared to components/checklist of a properly executed EIA (Adapted from Sadar, 1994 and Lesotho National Environmental Secretariat, 1999)

Key EIA element	Phase 1A
Knowledge of key planning policy, administrative requirements, governing acts and regulations	Acts and regulations for EIA did not exist for Lesotho at project inception and therefore were not part of advance preparations. The project was conceived mainly as an engineering project and environmental considerations were not properly integrated into the project design
Complexity of environmental components as well understood and designed for as the engineering components	A full EIA was undertaken as part of the planning and design stage, and its recommendations were followed for formulating decisions
Environment Bill was being drafted, but major components had already been determined and discussed.	All of the baseline studies were undertaken after construction had commenced, and were therefore not predictive. These include Baseline Water Quality and Aquatic Communities, 1991/92; Baseline Biology Survey, 1992
Project-environment interactions fully understood Significance attached and linkages established between environmental impacts, related social consequences, human health effects and agricultural production Consultation with the public carried out	Studies carried out after the engineering works had started. The Socio-economic Census of the Lesotho Highlands Water Project - Phase 1A, 1988; Epidemiological Survey, 1992/93 Consultation mainly with leadership, not representatives from all socio-economic backgrounds, especially the local people
Cost of EIA built into the project design	No

The assumptions below provide a test on the understanding of EIA methods as they were applied for the LHWP, implications of deficiencies and how they could be addressed.

Assumption

There is a common understanding of concepts of transboundary and cumulative impacts

EIA studies of development initiatives give little attention to transboundary and cumulative impacts at regional level

Status

Legislation establishing standards for environmental management, is still country specific. There is extensive and lose multi-disciplinary collaboration by professional practitioners, mostly in the form of paid consultancies, but no real evidence of the project authorities making a clients having an interest. Countries have developed guidelines which reflect their understanding of their international obligations and the need for compliance with specified standards as stipulated in the conventions. However, project by project assessments are still common, falling short of assessing the whole environmental system affected by developments. A case in point in the LHWP would be Phases 1A and 1B having separate assessments, South Africa and Lesotho carrying out own assessments within their respective borders, and the IFR ending at the border inside Lesotho.

Assumption

EIA approaches being applied are not flexible enough to cope with the integrated needs of most development programmes and projects within agriculture, water and land use planning sectors

Status

The perception by developers that EIA is designed to stifle growth persists especially in developing countries as it is relatively inflexible to avoid abuse and cutting corners. One of the criteria for EIA is that it should begin early enough in the project cycle to influence the technical and financial plans for the proposed project. In the LHWP, the EIA process was an add on and therefore an additional expense.

A properly executed EIA recognizes that it is useful to return to earlier stages and reconsider previous findings and conclusion because:

- New or unforeseen issues may arise, including changes in public attitude or project design
- Environmental and social conditions may change, especially for a multi-year project such as the LHWP
- Knowledge about the environmental interactions may improve and lead to better identification of issues, prediction of impacts or their significance (Sadar, 1994).

Assumption

Methodology generally applied on projects or are sector specific, often precluding a comprehensive view of the socio-economic and physical environment

Status

EIA by its nature allows for consideration of the potential impacts on the biophysical, socio-economic and cultural aspects of the environment. Its interdisciplinary approach is designed to ensure that a number of major groups including elected representatives, business leaders and the general public are involved. The iterative nature of EIA is meant to ensure that proper scoping, prediction of impacts, evaluation of significance of the impacts would guide the development of plans which would avoid, mitigate and adequately compensate for impacts. The intent to utilize EIA to identify and describe the positive and negative effects that the LHWP would have on the biophysical and socio-economic components of the environment, especially for Phase 1B, was clearly stated. The one element which does not seem to have been considered and guidelines applied rigorously on is abandoning projects based on the significance of the impacts.

Assumption

Capacity to consider the multiple uses of land and the degree to which a particular resource use may be in variance with the overall regional need is not adequately taken into account

Status

Regional EIA guidelines do not exist. The only guiding principles referred to, to which member countries subscribe are international conventions and river basin agreements. There is no real evidence on the ground of the application of concepts such as environmentally sustainable development as provided for in Agenda 21, or application of the Helsinki rules on users of the Waters of International Rivers. Natural resource management policies are still sector specific which would make it difficult to extend application beyond national boundaries, and recognition for interdependencies between resources and their uses, even though recognized in reality, is not well catered for in the policy framework.

All the above point to a need to provide in-house capacity

Assumption

Terms of reference and EIA reviews are not properly carried out because of limited resources, lack of institutional capacity, weak EIA legislation and weak enforcement

Status

Terms of reference and EIA reviews are normally implemented by consultants, normally with expertise in specific sectors, limited knowledge of conditions on the ground, and with no long-term vested interest in the success or failure of the project. Even though there are many similarities in the basic features of the EIA process, EIA arrangements differ in detail between different countries (Lee, 1994).

Assumption

There is no clearly defined regional framework for harmonized EIA approach

Status

Guidelines for co-opreration exist within the different sectors in the SADC countries which can be used to develop a regional framework. A harmonized EIA approach could contribute towards the shared vision for achieving sustainable resource management through regional integration, research, strengthening regional cooperation and strategic international partnerships.

CONCLUSIONS AND RECOMMENDATIONS

EIA approach is not uniform from project to project, and this is more true when one reviews approaches in the different countries. To meet the current and future demands, the resources and the demand need to be managed, and the cumulative effects of regional initiatives addressed. Without management intervention, the resources will become further degraded and less able to support life.

The laws and regulations guiding the use of environmental resources for the individual SADC countries utilizing resources associated with the Orange River system are written in such a way that they will safeguard the rights of the individual countries and ensure sustainability within those countries. Individual countries' efforts in addressing the impacts and to respond to environmental change have included passing of national laws, development of national policies, signing of international agreements, and monitoring and research. Most of operating laws governing water and other environmental resources in South Africa, Lesotho and Namibia have been promulgated in the last five years. As a result, the impact of these laws is not yet noticeable, as are the impacts of the dams constructed under the Lesotho Highlands Water Project, except those impacts directly associated with construction.

The choice of impacts and alternatives to be considered could be approached in a certain way if guidelines exist for the different types of development projects.

The need for a regional approach to impact assessment

A regional EIA approach can:

- reduce subjectivity at least between similar projects
- enable the sharing of regional resources
- contribute to effective and efficient regional resource management, toward attainment of sustainable development
- result in cutting the cost in terms of time and money.

However, it is essential to first carry out an evaluation and assessment of policies, plans and programmes before carrying out an assessment of the consequences of proposes projects. This would require undertaking a Strategic Environmental Assessment (SEA), which would determine first the overall direction, culminating in development of forward looking strategy with coordinated national and regional (SADC) priorities, options and measures for implementation of policy.

All human life depends ultimately on the natural resource base, through provision of food, water, shelter, energy, and raw materials for various other needs. If resources are depleted and ecosystems degraded, (a common pattern presently in Southern Africa), they are less able to function properly, to regenerate, or to reproduce. This impacts on the potential for secure livelihoods, economic returns, eco-tourism and other developments or utilisation of the resources.

Conclusions

The LHWP design and implementation does not adequately cater for transboundary and cumulative impacts, in that potential additive or combined effects of the past (construction), existing (construction and operation), and proposed (operation and maintenance) activities are not well catered for with respect to the biophysical, economic and social environment.

Combined impacts of the components of the project, that is going from Katse and Mohale dams, Matsoku Diversion, 'Muela Hydropower, Ash River, Vaal Dam, Gauteng Province, and adding impacts on the Orange River system and whole of the Southern African region. Most of the assessments done were not necessarily designed for understanding and monitoring impacts beyond the present project sites

Environmental assessment methodology which seeks to address socio-economic and physical environment impacts at regional level is essential, combining strategic and environmental assessment methodology.

Recommendations

- Negative cross border impacts can be significantly reduced if in-country policies, laws and regulations are enforced and monitored. Individual national policies indicate the importance of cooperation and avoidance of conflict, and therefore form a basis for the necessary assessment processes.

- In addressing impacts associated with shared water resources, the priority action is to coordinate land use from a strategic perspective across the study region.

- Provision of water, land degradation potential, erosion potential, agricultural potential, and biodiversity assessments should be investigated to provide an overall assessment of the strengths, weaknesses, opportunities and constraints across the territory traversed by the Orange river, or any other watercourse in the region.

- Considering the study area as a whole, strategic planning can be more effective, and result in less fragmentation and degradation of ecosystems, than uncoordinated, piecemeal planning.

- The existing SADC protocols provide the necessary framework for coordinated action, and should be utilized.

- There is a need to raise awareness among policy makers, developers, investors and the public that the quality of the environment determines to a great extend what developments are possible, thereby linking economic growth and development directly to the health of the environment. While decision makers seek to address the more pressing social and economic needs in the SADC region, they should also seek to balance the demands of development and the environmental management.

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Chapter Five

THE SUGARCANE IRRIGATION SCHEME DOWNSTREAM OF MNJOLI DAM IN SWAZILAND

by Absalom M Manyatsi

SUMMARY

The objective of the study was to determine if there was need a need for a regional approach to environmental impact assessment, based on the understanding of procedures and approaches in undertaking EIA in Swaziland using case studies of sugar cane irrigation schemes downstream the Mnjoli dam along the Mbuluzi River.

The methodology used included a desk study to identify the sugar cane irrigation projects downstream the Mnjoli dam that had EIA carried out, review of EIA reports and associated documents to determine the processes involved, as well as to determine the issues that were considered. A desk study was conducted to review policies and legislation to enforce EIA as well as institutional framework and capacity to conduct and supervise EIA in Swaziland. The views of stakeholders in Swaziland on issues related to EIA were solicited by means of a question guide. A field visit to Mozambique (Maputo) was undertaken where consultations were held with key stakeholders in EIA in the country.

A number of irrigation projects in Swaziland were initiated before the enacting of the Swaziland Environment Authority Act of 1992, and so there were no EIA done for the projects. The operation and implementation of the Swaziland Environment Authority Act (1992) has been improved by the Environmental Audit, Assessment and Review Regulations (2000). The regulations empower the Swaziland Environment Authority to identify and maintain a list of undertakings that cause concern to the Authority or public because of their impact on the environment. It requires an operator of an identified undertaking to submit an Environmental Audit report and a Comprehensive Mitigation Plan (CMP). The Environment Management Bill (2001) that has been tabled to parliament intends to provide for and promote the enhancement, protection and conservation of the environment.

The Swaziland Environment Authority has among its duties the responsibility to institute measures for the co-ordination and enforcement of environmental protection legislation and international conventions. The Environment management Bill of 200 also states the commitments of Swaziland on international agreements on management of the environment. The Swaziland National Water Policy (Draft, 2001) states that water development and management in the country shall conform to the principles of fair and equitable sharing of international watercourses among riparian states, and the Government shall engage its counterparts in neighbouring countries to ensure that water entering and leaving the country conforms to international safety, health and environmental standards.

The National Directorate for Natural Resources is responsible for overseeing the management of natural resources in Mozambique. The environmental laws in the country state that it is the duty of the government to protect the environment, with the local communities. Mozambique does not have environmental standards established by law, and the environmental impact assessment ordinance defers health related standards to of the World Health Organisation.

Swaziland has ratified a number of protocols and agreements that governs the use of natural resources. They include the protocol on Wildlife Conservation and Law Enforcement in the Southern African Development Community and the protocol on shared watercourses in Southern African Development Community. An agreement on the utilisation of the Mbuluzi River was also entered to between Swaziland and Mozambique.

The procedure for EIA in Swaziland gives the format and requirements for the EIA. It also gives the major impacts to be considered when undertaking the EIA. The process is however more localised, and it lacks the foresight of transboundary and cumulative issues.

The issues that were addressed by the EIA for the three case studies were localised. There were some references in passing of international and transboundary issues in some reports, and such issues mainly concerned the flow of water and sedimentation in the rivers. The environmental issues downstream the Mnjoli dam (Mozambique) included accumulation of nutrients in the Pequenos Lebombo dam from fertilisers in the irrigation schemes in Swaziland as well as downstream aquatic biota being contaminated due to pesticides and herbicides.

The constrains in including transboundary issues in EIA included lack of knowledge of legislation of neighbouring countries in relation to EIA, lack of homogenous rules and policies in different countries, as well as lack of acquaintance of experts and procedures in neighbouring countries. Constraints in including cumulative issues in EIA included lack of equipment for systematic measurements and predicting environmental impacts as well as lack of localised experts to undertake cumulative impacts.

In order to facilitate adequate consideration of transboundary and cumulative impacts when undertaking an EIA in the region the following recommendations are made:

- Developing a common procedure and requirements with emphasis on transboundary and cumulative impacts and considering neighbouring countries as affected parties.

- Updating and reviewing outdated bilateral agreements

- Conducting regional training workshops for practitioners and enforcers of EIA.

- Acquiring equipment and facilities for systematic measuring of impacts and projecting cumulative impacts.

- Encouraging mentoring of less experienced practitioners of EIA during the EIA studies.

- Improving conditions of service for enforcement agents in order to recruit and retain well-trained and experienced cadre.

- Compiling and making readily available legislation, rules and policies for the different countries would be beneficial in identifying the policies related to EIA.

- Developing a framework to facilitate sharing of data between member countries.

- Developing clearly defined mechanisms for enforcement of protocols and agreements.

INTRODUCTION

Environmental impact assessment and development

Numerous large and small-scale development initiatives have occurred in all countries in Southern Africa. Whilst development can bring about positive change it can also lead to conflicts. The need to avoid adverse impacts and to ensure the long-term benefits of development has become an essential feature of development. In order to predict environmental impacts, including social impacts, and to provide an opportunity to militate against negative impacts and enhance positive impacts, the environmental impact assessment (EIA) procedure was developed in the 1970's. The EIA provides a unique opportunity to demonstrate ways in which the environment may be improved as part of development.

EIA is a management tool for planners and decision-makers and complements other project studies on engineering and economics. Environmental assessment is now accepted as an essential part of development planning and management. It should become as familiar and important as economic analysis in project evaluation. It is important that an EIA is not considered as just part of the approval process, but rather as an action plan to be followed during the planning, implementation and post implementation phases of a project cycle. When undertaking the EIA consideration should be taken with respect to transboundary and cumulative implications for natural resources.

Transboundary environmental impacts of irrigation projects

The introduction of irrigation schemes comes with some change to the local hydrological regime. Changes to the low flow regime may have significant negative impacts on downstream users, whether they abstract water (irrigation schemes, drinking suppliers) or use the river for transportation or hydrology. Return flows are likely to have significant quantities of pollutants. Low flows need to be high enough to ensure sufficient dilution of pollutants discharge from irrigation schemes and other sources such as industries and urban areas. A reduction in the natural river flow together with a discharge of lower quality drainage water can have severe negative impacts on downstream users, including irrigation schemes. Habitats both within and alongside the rivers are often endangered because of alteration of microhabitats. Flood protection works, such as dams, achieve their purpose, but are likely to increase flooding downstream. Table 1. highlights the likely transboundary impacts of irrigation projects.

Table 1: Transboundary environmental impacts of irrigation projects

Major Impact	Problem	Effect
Hydrology	Low flow regime	Reduced downstream flow
	Flood regime	Increased flooding downstream
Water quality	Solute dispersion	Alteration of capacity for environmental to assimilate water soluble pollution
	Toxic substances	High concentrations of
	Agrochemical pollution	dissolved salts High nutrient level essential for productive agriculture
Soil properties	Saline drainage	High salinity in irrigation water
	Saline intrusion	Changes to flow regime may alter salinity of the estuary
Erosion and sedimentation	Hinderland effect	Decreasing vegetation cover due to increase in intensity of human activities
	River morphology	Alteration of river morphology
	Sedimentation	Sedimentation from scheme deposited into river
	Estuary erosion	Mangrove threatened by changes to estuary morphology
Biological and ecological change	Water bodies	Reduced quality of flow has adverse impact on downstream ecosystem
hydrology	Valleys and plains	Downstream aquatic biota affected by changes to of river system
	Wetlands	Reduction in flow leads to increase in soil salinity which favour smore salt-tolerants pecies
Socio-economic population work	Human migration	Irrigation schemes attract from neighbouring countries to as agricultural labourers.
	Regional effects	Increase demand for roads, railway service and harbour.
Ecological imbalances water	Pests and weeds	Spread of diseases via drainage
	Aquatic weeds	Fertile water favourable to aquatic weeds
Human health create	Disease ecology	Ecological changes resulting from introduction of irrigation may conditions favourable to disease vectors (such as mosquitoes)

Source: Modified from Dougherty and Hall, 1995.

Cumulative effects of irrigation projects

Evidence is increasing that most devastating environmental effects may result not from the direct effects of a particular action, but from the combination of individually minor effects of multiple actions over time. Cumulative effect has been defined by the Council on Environmental Quality (1997) as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such actions. It results from spatial (geographic) and temporal (time) crowding of environmental perturbations.

APROACH AND METHODOLOGY

The study was conducted through a number of tasks. A desk study was used to identify the sugarcane irrigation projects downstream the Mnjoli dam that had EIA carried out. The EIA and associated reports were reviewed to determine the processes involved in carrying out the EIA for each of the projects, as well as to determine the issues that were considered with respect to transboundary and cumulative implications for natural resources essential to agriculture or for the livelihood of people who depend on agriculture.

A desk study was conducted to review policies and legislation to enforce EIA in Swaziland, as well as the institutional framework and capacity to conduct and supervise EIA in Swaziland.

A question guide was used to establish the issues to be considered in EIA, constrains and incentives in considering transboundary and cumulative impacts during EIA in Swaziland, as well as the capacity (personnel) for EIA in Swaziland.

A two-day field visit to Mozambique was undertaken where meetings were held with key stakeholders in EIA. The following were the primary purposes for the visits:

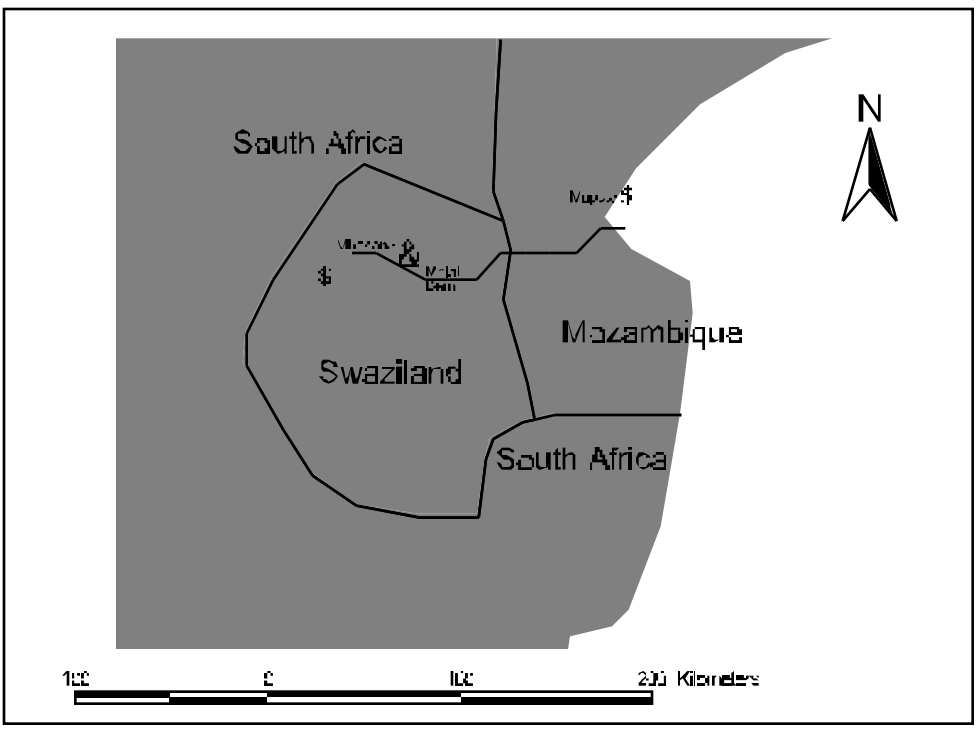
- To ascertain the land use adjacent to the Mbuluzi River
- To determine the existing and likely environmental effects of the irrigation projects along the Mbuluzi river
- To review literature of land use, legislation and policies in Mozambique
- To hold discussions with stakeholders on environmental effects of the projects in the Swaziland side and possible ways of alleviating the effects

BACKGROUND INFORMATION AND UTILISATION OF MBULUZI RIVER

Demographic and land use information

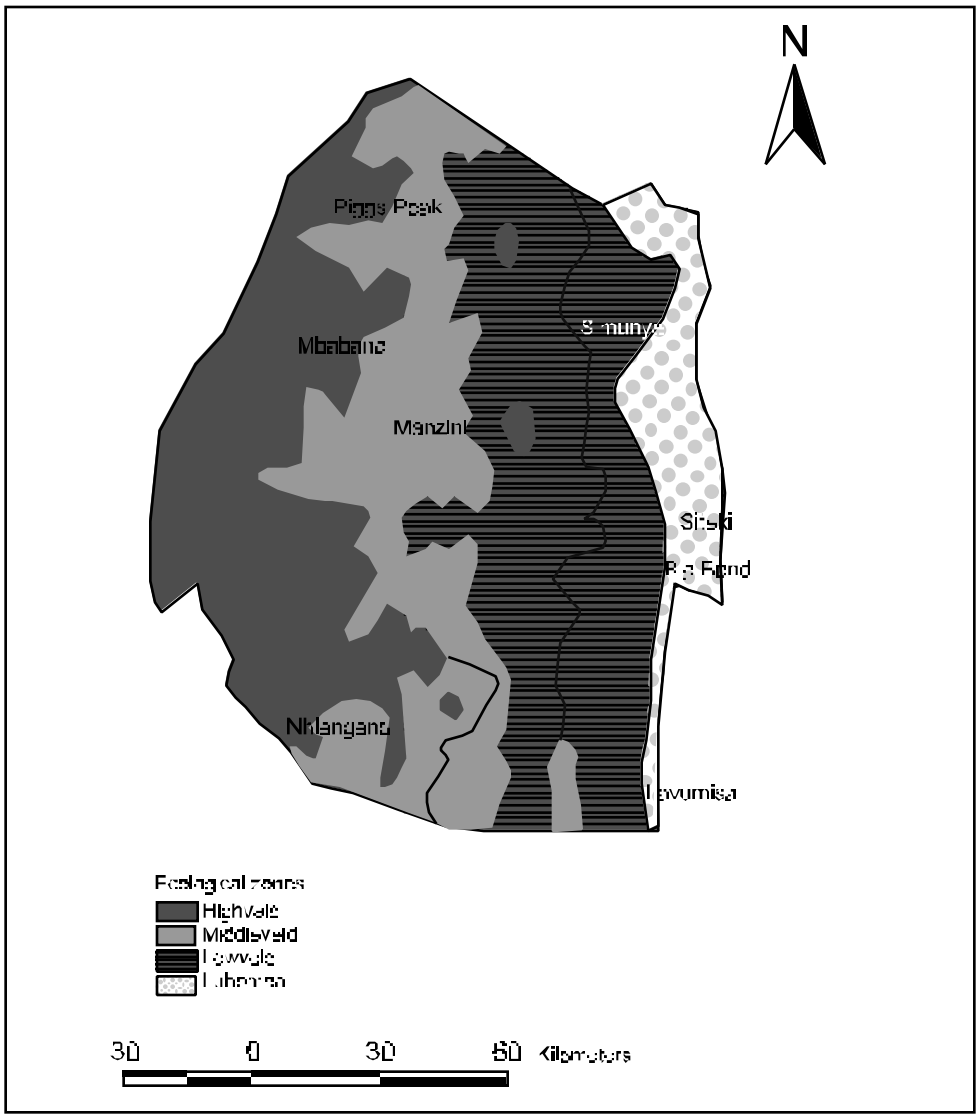
The Kingdom of Swaziland covers an area of 17,364 square kilometres and lies between latitudes 26 oS and 27 oS and longitudes 31oE and 33 oE. It is surrounded on the north, west, and southern sides by the Republic of South Africa, and on the east by Mozambique (Figure 1). The total population according to the 1997 census was 986,000. The annual growth rate of 2.8 % over the past five years is among the highest in the world.

Fig. 1: Map showing Swaziland and location of Mnjoli dam on the Mbuluzi River.



Swaziland is recognised as having four broad ecological zones that are distinguished by altitude, rainfall, geology, and vegetation (Figure 2): the highveld, middleveld, lowveld, and the Lubombo zone (Sweet and Khumalo, 1994). In terms of physiography the middleveld and lowveld both contain two distinct zones: upper and lower middleveld (differentiated by altitude, rainfall, and geology, and eastern and western lowveld differentiated by geology.

Figure 2: The ecological zones of Swaziland



The mountainous highveld lies on the western side of the country. Steep slopes, incidence of frost, sour grasses, and some poor soils restrict the agriculture of the highveld to mainly grazing activities. Only 3% of the area of the region constitute good arable lands, although Murdoch (1968) classifies 10% of the area as having a fair potential for crop agriculture. Lying to the east is the middleveld, which is generally hilly and includes several large valleys. It is a sub-tropical region, with a drier and warmer climate than the highveld.

Close to 20% of the upper middleveld has arable soils of good to fair quality, whilst in the lower middleveld the corresponding proportion is about 10%.

The gentler slopes and good arable land makes this region the most developed and densely populated part of the country (Swaziland Government 1983). The lowveld lies to the east of the middleveld and for most part comprises gentle undulating terrain. The annual rainfall of between 500 and 750 mm is deceptively high as potential evaporation exceeds precipitation throughout most years (Swaziland Government 1994). According to Murdoch (1968) about 12% of the eastern lowveld has good or fair soils, whilst the eastern lowveld about 30% of the area falls into this category. Finally there is the Lubombo zone which borders Mozambique in the east. About 12% of the zone have arable soils of good to fair quality.

The sugar industry in Swaziland

The history of the sugar industry dates back to the mid-fifties when commercial sugar growing resulted in the establishment of a small mill at Big Bend in the southeastern part of Swaziland. A larger mill was built in Big Bend in 1960, and that same year a second mill was built at Mhlume in the northern lowveld. In 1980 a third mill was established at Simunye. By the end of the 1999 / 2000 season, total annual sugar production stood at 534,000 tons, with 42,606 hectors harvested. The harvested area showed an increase of 6,362 ha from the area of 1989 / 90 season. All the sugar cane in Swaziland is produced under irrigation. The total number of smallholder growers stood at about 500 in 1999 / 2000. During the same season sugarcane growing contributed 59% to the total agricultural output and 33% to the total agricultural wage employment. The sugarcane milling contributed 25% to the total manufacturing output. The sugar industry as a whole-contributed 19% to national output Sugar exports contributed 12% of total export. Contribution to public revenues in the form of company tax, sugar levy, sales tax and personal income tax from employees continue to make the sugar industry by far the largest contributor to the fiscus (Swaziland Sugar Association, 2000).

The Mbuluzi River and Mnjoli dam

The Mbuluzi River is one of the two main rivers in Swaziland whose origin is within the country. It originates from the highveld of Swaziland and flows past the lowveld of the country due east towards Mozambique. It joins the Indian Ocean next to the Port of Maputo (Figures 1 and 3).

The Mnjoli dam, situated on the Mbuluzi River in the lowveld of the country was built by the Swaziland Government solely for irrigating the Simunye Sugar Estate that is owned by the Royal Swaziland Sugar Corporation (RSSC). The dam with storage capacity of 153 Mm2 has been the largest in the country before the construction of Maguga dam. The surface area flooded by the dam is 15 km2.

An agreement was entered between the Government of Swaziland and the Royal Swaziland Sugar Corporation in the construction of water works for irrigation and water supply, the usage and payment for the water in 1977 (Water Agreement, 1977). The construction of the waterworks was completed by December 1979. The Royal Swaziland Sugar Corporation has about 9,800 ha of irrigated sugarcane. Tabankulu on the other hand started using water from the Mbuluzi River for irrigating sugarcane as early as 1965, more than a decade before the construction of Mnjoli dams. Tabankulu has about 3000 ha under sugarcane and another 550 ha under citrus. They obtain the water for irrigation from the Komati River through a canal as well as by pumping water from the Mbuluzi River. The Royal Swaziland Sugar Corporation has expanded its revenue base through pork production, cattle feedlot, an ostrich production, and a 14 million litre-distilling unit. It employs approximately 3 500 employees, all of whom live in one of the corporation's two towns (Simunye and Ngomane). The total population of the town is estimated to be 18 000 people. RSSC provides health services with three doctors and two fully equipped clinics. Recreation facilities are also provided and there are over 1 500 children attending the five schools on the property. Tabankulu on the other hand employs about 2,000 persons and the local resident population is 3,500.

The use of Mbuluzi River in Mozambique

The Mbuluzi River drains into the Indian Ocean adjacent to the city of Maputo. The two villages / towns situated along the river on the Mozambique side are Goba and Boane. They both fall under the Lubombo Spatial Development Initiative. Goba is a border post village, and was a former Partial Protected Zone for tourism. It has some industrial, tourism and agriculture capacity. Boane on the other hand is a heavily populated semi industrial zone with a strong military, agriculture, and construction material industry. The Pequenos Libombos Dam was constructed between 1983 and 1987. It is situated about 10 km from the border with Swaziland. It has a catchment area of about 5620 km2, with 60% (3320 km2) of it being in Swaziland and another 40% (2300 km2) in Mozambique (Figure 5), with a storage capacity of 400 Mm2. The surface area flooded by the dam is 38 km2. It was built mainly for the following purposes (Chonguica, 1995):

- To supply water to the city of Maputo and surrounding settlements.
- To provide irrigation water
- For flood control
- Energy generation

Along the dam is an irrigation scheme, and its water is the main source of potable water for the city of Maputo. An aluminium smelter has also been opened next to Boane.

Figure 3: Location of the sugarcane irrigation scheme downstream of Mnjoli dam

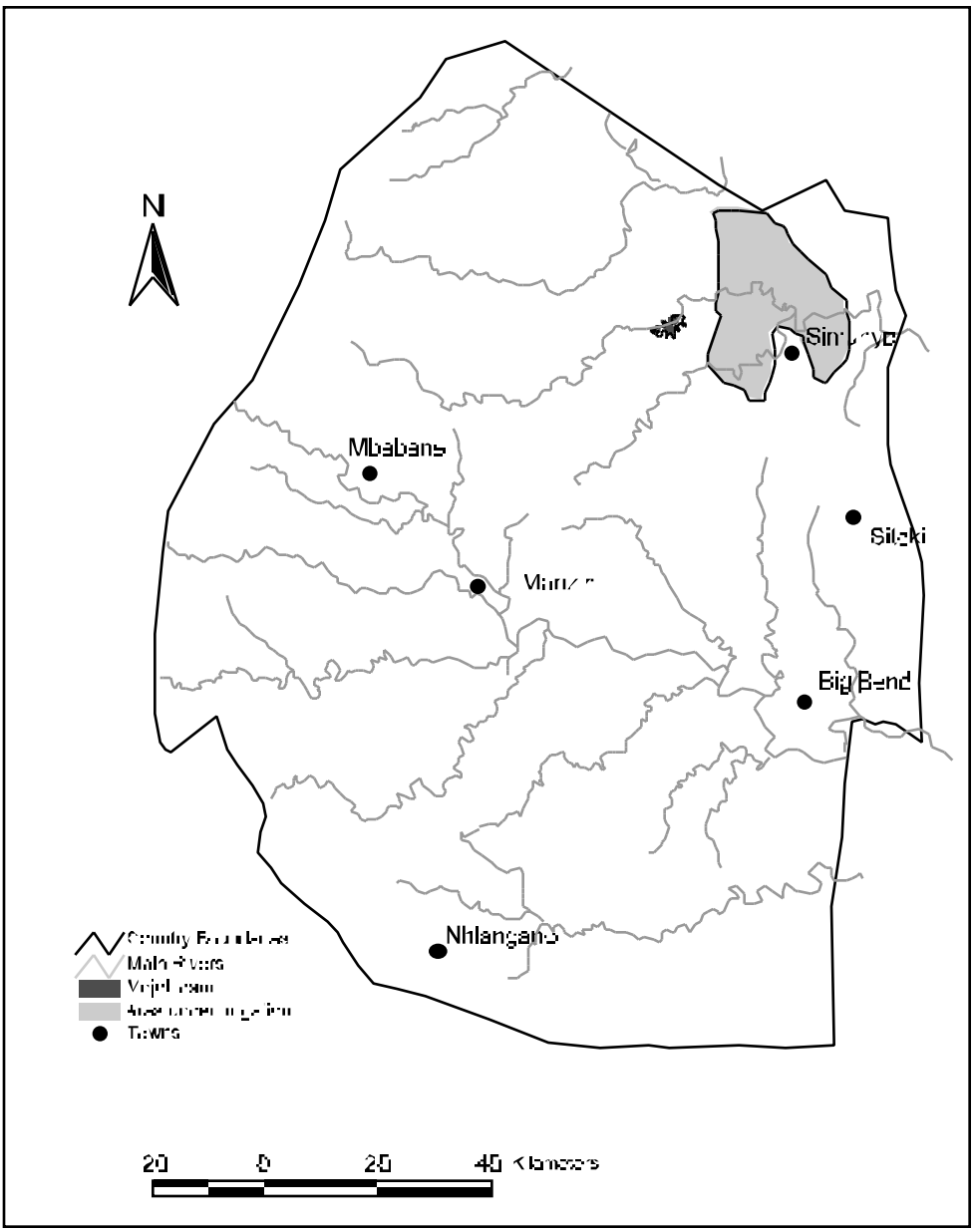


Figure 4: The Mbuluzi River (Umbeluzi) drainage pattern Source: Chonguica, 1995

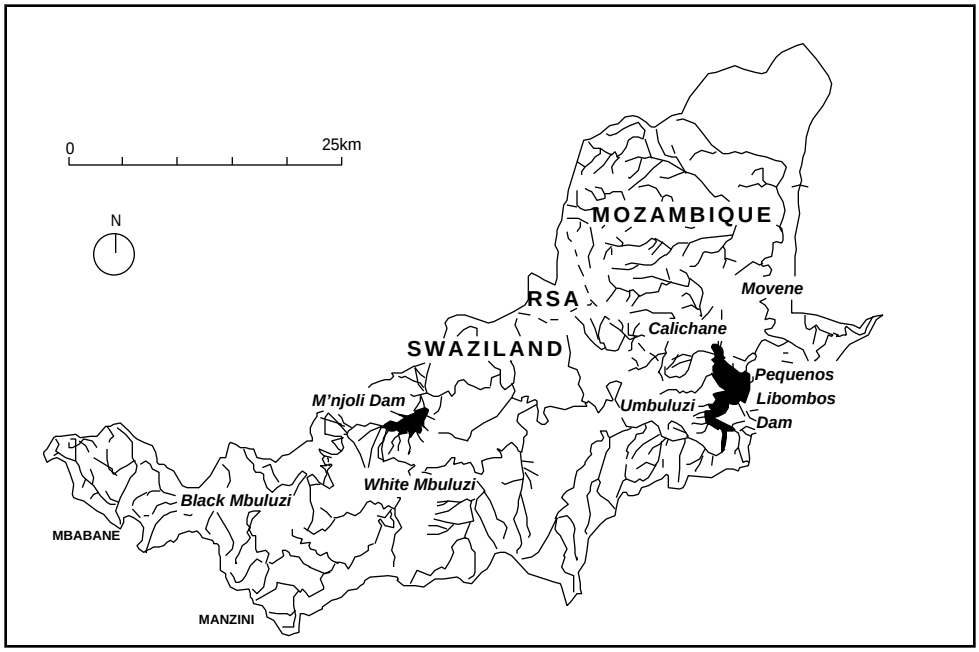
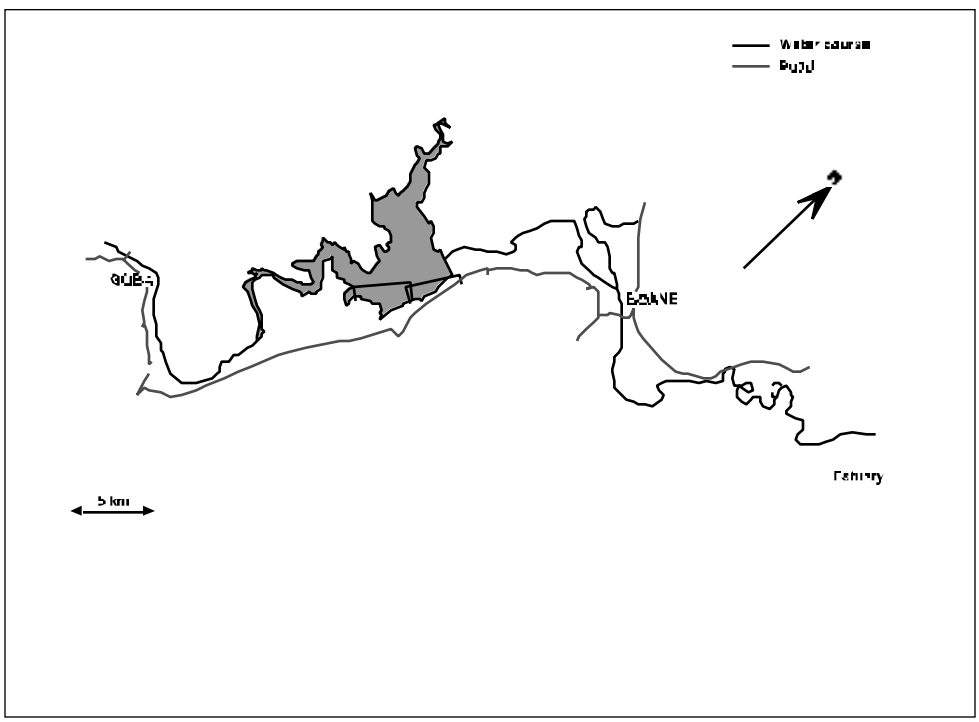


Figure 5: The Mbuluzi River in Mozambique, with the Pequenos Libombos dam Modified from Ryden (1994)



CASE STUDIES OF EIA IN SWAZILAND

The following three sugar cane development projects along the Mbuluzi river presented to SEA for decision regarding issue of an Environmental Compliance Certificates were taken as case studies:

- Sugar cane development at North Hlane Riverside
- Sugar cane development at Kings Lodge
- Manzana sugar cane development scheme

Sugarcane development at North Hlane Riverside

The North Hlane Riverside cane project is bordered to the north by the White and Black Umbeluzi Rivers and is 2 to 8 km west of the Simunye Sugar Mill. It is cut off from the rest of Hlane by a fence and the busy Sumunye-Ngomane road. The proposal envisages swapping the northernmost 700 ha of Hlane Royal National Park for 2 700 ha comprising the Simunye Nature Reserve and an area known as Mashayazimile. Should this exchange take place, these latter areas, which are contiguous with Hlane, would become formally proclaimed as protected and RSSC would plant the proposed area to irrigated sugar cane.

The Environmental Impact Assessment for the sugar cane development at North Hlane Riverside was completed in December 1999 (Dobson and Associates, 1999). The Royal Swaziland Sugar Corporation (RSSC) was the proponent of the project, and they intended to plant the proposed area to irrigated sugar, extracting water from the Mbuluzi River. The Terms of Reference (TOR) indicated the required composition of the study team as well as the methodology to be followed. The team consisted of specialists in environmental science, zoology, botany, agribusiness, training, land use, traditional Swazi culture and archaelogy.

The consultants contacted the main stakeholders and other interested parties who were identified from the affected region (Lubombo Region). Other interested parties included Tibiyo Taka Ngwane (TTN), RSSA and SEA. A scooping meeting was advertised and held, and the biophysical and socio-economic issues raised in the Scooping report were addressed when undertaking the EIA. The issues raised during the scooping phase tended to be localised, and as a reflection of the composition of the stakeholders and other interested parties transboundary issues were not raised. The following were the main issues raised during the scooping phase:

- Issues related to relocation of animals on Northern Hlane Riverside (NHR)
- Carrying capacity of host area should not be exceeded

- Need to deal with sacred plants in area
- Access to the river for animals to drink
- Limiting the public to harvest useful trees
- Availability of timber for wood carvers and carpenters
- Adequacy of irrigation water for the development
- Possibility of settlement on the area

The EIA and CMP addressed immediate and long term adverse impacts under the headings of biophysical impacts, impacts from bushclearing and land preparation, impacts from the growing of irrigated sugar cane and socio-economic impacts. Pertinent issues that were addresses in the EIA and CPM related to transboundary and cumulative impacts of the irrigation project are summarised in Box 1

Box 1: Issues related to trans-boundary and cumulative impacts addressed in the EIA and CPM

Expansion of total area under irrigation will place increased pressure on water resources and increase the potential for water shortage and would advance the necessity to raise Mnjoli dam.

Deterioration of water quality in groundwater and rivers from irrigation is a serious long-term hazard, and regular analysis with reporting of results must be carried out and monitored.

Attention is drawn to RSSC's rather patchy performance regarding control of sheet and rill erosion in and around sugar cane fields.

The fragmentation of Lowveld vegetation requires attention at national and subcontinental levels, ideally through incorporation with the implementation of the national Biodiversity Strategy Action Plan (BSAP).

Several mitigation measures for both immediate and longer term impacts are suggested. The mitigation measures for immediate term impacts are given on Box 2 while Box 3 gives the mitigation measures for longer term impacts.

Box 2: Mitigation measures for immediate term impacts

RSSC's Environmental Officers would direct mitigatory measures comprising translocation of threatened and medical plants to Mlawula nursery.

Retention of a 100 metre wide undisturbed belt of vegetation next to the White and Black Umbeluzi Rivers and 50 metres strips either side of drainage lines.

Control of the sequence of bush clearing so that animals move southwards into Hlane.

Identification and protection of raptor nests until the end of breeding season.

Box 3: Mitigation measures for longer term impacts

The Comprehensive Mitigation Plan emphasises practical measures such as avoidance of vulnerable soils, care with infield gradients and grassing and stone packing of waterways in order to control sheet and rill erosion.

The deterioration of water quality (groundwater and river water) needs to be halted by avoiding the use of unfit soils, draining marginal ones and by the very careful control of fertiliser applications, and of agrochemical and irrigation practice.

By good management and focusing the project on only the most suitable soils, the associated ills of sedimentation, eutrophication, salinization, sodicity and alkalinity would be avoided.

Waterborne and related diseases would need to be avoided by provision of potable water.

Sugarcane development at Kings Lodge

The Kings Lodge is part of the Kings Hunting Ground and is situated in the Northern Lowveld of Swaziland, southwest of the Ngomane section of the Royal Swaziland Sugar Corporation (RSSC) estate and north of the Msulutane and Mgubaneni areas of Hlane Royal National Park. It is divided into two parts known as Kings Lodge South and Kings Lodge North, by the road from Hlane to Lonhlupheko. It is about 26 km from the Simunye Sugar Mill. His Majesty King Mswati III appointed a Libandla (group of representatives) charged with allocating the 590 ha of Kings Lodge that could become the net sugar cane planted area (out of 710 ha of land surface at Kings Lodge). The

intention is that the main beneficiearies should be Farmer Associations whose members were displaced when the Simunye estate was established. South (280 ha) has been allocated by the Libandla to Bambanani Balimi Farmer Association with 245 members, while the Kings Lodge North 100 ha has been allocated to Maphikweni Farmer Association with 74 members and 30 ha to Nkhosikati Lamasuku. Takhamiti Farmer Association with about 80 ha will be allocated 130 ha, and the remaining 50 ha will be used as a meeting place for the annual Butimba Royal Hunt, and will not be available for planting sugar cane.

The EIA and CPM for the sugar cane development at Kings Lodge was prepared in terms of the scooping report that defined the Terms of References. The RSSC was the proponent of the project. The EIA and CMP reports were submitted in July 2000. The composition of the team undertaking the study was the same as that which did the EIA and CMP for the North Hlane Riverside (Cassidy and Associates, 2000).

The consultants contacted the stakeholders and interested and affected parties, and using the issues identified by the scooping report as a guide, they investigated socio-economic and biophysical impacts which could result from the change in use of the land from a part of the King's hunting ground, with limited grazing and plant resources, to production of sugar cane.

The environmental impacts were identified in two major categories, socio-economic and biophysical, both beneficial and adverse.

Beneficial socio-economic impacts identified included the following:

- Longterm and shortterm employment opportunities
- Fuel and timber availability
- Increase income to Farmer Associations members and RSSC
- The opportunity for Takhamiti to make members more equitable than at present
- Increased skills and economic opportunities

On the other hand adverse socio-economic impacts included management conflicts, health and safety hazards and loss of plant resources. The only beneficial biophysical impact was increase in aquatic environment providing a wider diversity of habitat for flora and fauna.

Adverse biophysical impacts encompass the following:

- Reduction of biodiversity and Lowveld woodland fragmentation
- Soil erosion and fertility hazards

- Reduction of river flow
- Deterioration of river water quality
- Salinization
- Sodicity
- Alkalinity
- Sedimentation
- Eutrophication
- Pollution
- Weed infestation at field edges

Box 4 is a summary of mitigation strategies for socio-economic impacts.

Box 4: Enhancement and mitigation of socio-economic impacts

- In recruiting shortterm personnel for project preparation activities and for harvesting of fuel wood and timber, preferences would be given to the home communities of Farmer Association
- Farmer Association members would be encouraged to continue with their existing farming activities so that the sugar cane earnings would supplement rather than replace their present income
- A detailed training programme would be prepared for all levels of staff involved in sugar cane production
- Health and safety impacts would be mitigated though appointment of Farmer Association committee members responsible for health who would ensure that proper practices were followed
- Hlane Clinic staff would receive training on treatment of chemical poisoning and in occupational and environmental health
- RSSC would provide training in handling and use of agrochemicals

Several mitigation strategies for biophysical impacts were suggested and are highlighted in Box 5.

Box 5: Enhancement and mitigation of biophysical impacts

- To enhance creation of an improved aquatic environment, newly wetted areas resulting from return flows outside sugar cane fields would be undisturbed
- Seeds, cuttings and bulbs of medicinal and threatened plants would be collected and translocated to Mlawula nature Reserve nursery
- Herbalists and other interested persons would be awarded contracts to harvest these plants, and representative plant samples would go to Mlawula nursery
- In mitigation for loss of biodiversity, land unsuitable for sugar cane including 50 m strips either side of drainage lines as well as the pan, would be left uncultivated in perpetuity
- Analysis of water quality by Umbeluzi Catchment Association members should be done and monitored by SEA
- Deterioration of water quality would be reduced by careful use of fertilisers, agrochemical and good irrigation practices

Manzana sugarcane development scheme

The Manzana Development Association is proposing to undertake a sugar cane project at the Manzana Farm located at Dvokolwako in the Hhohho region. The land to be developed totals 107 ha. To develop the site into a sugar cane plantation will involve the following:

- Fencing of the site to demarcate the boundaries of the sugar cane area and to keep off livestock.
- Clearing of indigenous bush vegetation to pave way for erection of farm infrastructure
- Erection of farm infrastructure, which will include construction of access roads, construction of offices and associated buildings, and setting up, of pump house and irrigation pipes.

The development will be labour intensive, employing approximately 70 people from the surrounding communities on a regular basis, and possible more of temporary workers during the cane cutting season.

The terms of references were prepared by the proponents of the project, and they highlighted the specific impact areas such as soils, land use, terrestrial and aquatic habitats, hydrology, aesthetics, cultural property, social and economic development (First Environmental Consultants, 2000).

Box 6: Negative impacts associated with the development scheme.

Subsistence agriculture had used 10% of the land, and this will change permanently with the proposed commercial cultivation.

Removal of natural vegetation and natural ecosystem fragmentation causing imbalances in the natural processes that contribute to air cycling and weather moderation.

Commercial agriculture may cause extensive soil erosion mainly because of the topographical features of the farm, and nature of the soils of the area, as the soils are highly erodable.

Two gravesites are located within the farm, and clearing may impact negatively on them.

Box 7: Proposed mitigation measures for the Manzana sugarcane development scheme

- The negative impact of land use will be lessened by the fact that the proponents own the project and all proposed activities on site are carefully planned to continue along the same agricultural activities.
- The resident members have been allocated alternative land with a provision for communal grazing.
- The problem of soil erosion has been mitigated by preventing cultivation on steep areas, especially close to the banks of the Mbuluzi River and keeping away livestock by fencing off the farm.
- Mitigation measures include a direction-specific pattern of clearing of woodland that will allow animals to migrate to adjacent forested areas.
- Slow moving easy to handle reptiles such as tortoises will be physically translocated to the Njoli Nature Reserve nearby.
- Trees will active nests will not be felled until the chicks fledge.
- Pesticides and other agricultural chemicals will not be stored on site to reduce pollution of the surface water.
- A good drainage system will ensure that silting is minimised.
- A belt of riverine vegetation at the boundaries of cultivated areas will be left intact.
- Gravesites will be demarcated to prevent encroachment during clearing, will be fenced and the visual shields of trees will be left intact.

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

Policies and legislation to enforce EIA in Swaziland

The Swaziland Environment Authority Act created the Swaziland Environment Authority (SEA) in 1992 to establish regulations, guidelines and standards relating to pollution of air, water and land and to develop and co-ordinate environmentally sound and sustainable activities. The SEA was established with the following among its duties (SEA Act, 1992):

- Establish guidelines for preparing Environmental Impact Assessments on all developmental projects.
- Review and approve from an environmental stand point, projects with potential impact on the environment
- Control all forms of environmental pollution including pollution caused by the discharge of toxic wastes into the air, water and land in the manufacture of toxic hazardous chemicals
- Institute measures for the co-ordination and enforcement of environmental protection legislation and of international conventions and for the prosecution of the offences in co-operation with relevant bodies

The Environmental Audit, Assessment and Review Regulations (2000) require any new and existing projects to ultimately obtain an Environmental Compliance Certificate from the Swaziland Environment Authority through the receipt of an Initial Environmental Evaluation (IEE) report and a Comprehensive Mitigation Plan (CMP) or EIA report which contains a description of the mitigation measures to be implemented to reduce the environmental impacts of the proposed project. The regulations empowers the Swaziland Environmental Authority to identify and maintain a list of undertakings which cause concern to the Authority or to the public because of their impact on the environment and to publish the list of these undertakings in its annual report. It requires an operator of an identified or listed undertaking to submit an Environmental Audit (EA) report and a Comprehensive Mitigation Plan (CPM) to the Authority and submit them within six months after notification to do so. It is in this line that the several developments that were undertaken before the SEA was operational in the country could be requested to prepare the reports, including the sugarcane irrigation projects downstream the Mnjoli dam.

The Environment Management Bill, 2001 has been tabled by the Swaziland Environmental Authority, and its purpose is to provide for and promote the enhancement, protection and conservation of the environment and where appropriate, the sustainable management of natural resources. The bill operates on the following principles:

- the environment is the common heritage of present and future generations
- adverse effects should be prevented and minimised through long term integrated planning and the co-ordination, integration and co-operation of efforts, which consider the entire environment as a whole entity
- the precautionary principle, which requires that where there is a risk of serious or irreversible adverse effects occurring, a lack of scientific certainty should not prevent or impair the taking of precautionary measures to protect the environment
- the polluter pays principle, which requires that those causing adverse effects shall be required to pay the full social and environmental costs of avoiding, mitigating, and / or remedying those adverse effects
- the generation of waste should be minimised wherever practicable;
- waste should, in order of priority, be re-used, recycled, recovered and disposed of safely in a manner that avoids creating adverse effects or if this is not practicable, is least likely to cause adverse effects;
- non-renewable natural resources should only be used prudently, taking into account the consequences for the present and future generations; and
- renewable resources and ecosystems should only be used in a manner that is sustainable and does not prejudice their viability and integrity.

International and transboundary consideration of environmental impacts

The Environment Management Bill, 2001clearly states the commitments of Swaziland on international agreements on management of the environment. It states that the Swaziland Government shall exercise and give effect to Swaziland's sovereignty over its natural resources, including its genetic resources, and its powers and rights to manage the living and non-living natural resources within its territories and in areas over which it exercises rights of sovereignty, to the fullest extent permitted under international law. It further gives the following commitments:

- The Government shall co-operate with other Governments, and with domestic and international organisations in order to protect the regional and global environment.
- After signing an international agreement designed to protect the environment the Minister, shall as soon as is practicable cause the agreement to be ratified and take appropriate measures to give effect to the agreement, including making regulations.
- A court of competent jurisdiction may use any international agreement designed to protect the environment which has been ratified by Swaziland, as an aid to interpreting any domestic legal rule of Swaziland

that can reasonably be regarded as being intended to implement the requirements of that agreement.

- The Minister, on the advice of the Authority, may make regulations to implement any international agreement designed to protect the environment that has been ratified by Swaziland; and to bring the laws of Swaziland into conformity with laws, standards, guidelines and practices applied internationally or in the region, provided that these regulations do not conflict with the purpose of this Act.

The Water agreement between the Swaziland Government and Royal Swaziland Sugar Corporation (RSSC) in 1977, prior to the construction of the Mnjoli dam acknowledges that there are subsisting rights to the water in the Mbuluzi River vested in primary and secondary users in Swaziland, and the Republic of Mozambique. It states that the Republic of Mozambique is entitled to receive at its border with Swaziland a volume of water equal to 40% of the aggregate of flow from time to time as recorded at gauging stations closer to the border between Swaziland and Mozambique. The Republic of Mozambique is entitled to receive at its border with Swaziland a volume of water equal to 40% of the aggregate of the flow from time to time of the Black Umbuluzi, as recorded at Gauging Station 3 and, and the White Umbuluzi as recorded at Gauging Station 10. The long term mean records for Gauging Station 3 and Gauging Station 10 are 6.66 cubic metres per second and 0.78 cubic metres per second. The long term records for Gauging Station 32, which is situated at the border between Swaziland and Mozambique (on the Swaziland side) is 6.62 cubic metres per second.

The purpose of the National Development Strategy (NDS, 1999) is to formulate a Vision and Mission Statement with appropriate strategies for socio-economic development for the next 25 years and provide a guide for the formulation of development plans and for the equitable allocation of resources. It is designed to strengthen the Government's development planning and management capacities and to have a national consensus on the direction of future developments in the country. The NDS addresses the issues of water resource develop and give several recommendations including the following:

- Enter into negotiations for shared water guided by a National Water Master Plan
- Update information pertaining to all the river basins to facilitate investigation for future water resources development

Following the recommendations of the NDS the Ministry of Natural Resources and Energy has prepared a water bill (Water Bill of 2001), that has been tabled to parliament and passed by the national assemble, to consolidate the pieces

of legislation found in different acts and orders. According to this Bill, water in Swaziland will be declared a national resource to be managed in public interest. It provides for the development of appropriate policies on water allocation, water pricing, pollution control, water storage, and catchment management. The Bill also seeks to establish River Basin Authorities, which will help in enhancing public involvement in water resources management, and also include the private sector as a partner in development.

The Swaziland National Water Policy is an instrument to serve as a guideline to all agencies in addressing the current and anticipated problems in the water sector. It supersedes all other policies that deal with water in the country directly and indirectly (Draft National Water Policy, 2001). The policy is designed to facilitate the implementation of the proposed water Act (Swaziland Water Bill, 2001). Water is declared to be a national resource that has to be developed and used for national benefit with emphasis on poverty alleviation. It also ensures that existing water users will still have their share while at the same time access to the resources is extended to previously deprived sectors of the Swazi society. It also provides incentives for water conservation and efficient use among others. The policy also devolves the day-to-day administration of water from exclusive Government preserve to new institutions comprising stakeholders. On transboundary issues the policy states the following:

- Water resource development and management in the country shall conform to the principles of fair and equitable sharing of international watercourses among riparian states
- The Government shall ensure adequate and effective representation of the country in all relevant institutions prescribed in national and or international laws, conventions and agreements
- The Government shall engage and enter into agreements with neighbouring countries to ensure that water entering and leaving the country conforms to international standards on safety, health and environment

A protocol on shared watercourses was signed by Southern African Development Community (SADC) member states (Protocol on Shared Watercourses in SADC, 2000). The overall objectives of the protocol is to foster closer co-operation for judicious, sustainable and co-ordinated management, projection and utilisation of shared watercourses and advance the SADC agenda of regional integration and poverty alleviation. In order to achieve this objective, this Protocol seeks to:

- Promote and facilitate the establishment of shared watercourse agreements and Shared Watercourse Institutions for the management of shared watercourses
- Advance the sustainable, equitable and reasonable utilisation of the shared watercourses
- Promote a co-ordinated and integrated environmentally sound development and management of shared watercourses
- Promote the harmonisation and monitoring of legislation and policies for planning, development, conservation, protection of shared watercourses, and allocation of the resources
- Promote research and technology development, information exchange, capacity building, and the application of appropriate technologies in shared watercourses management

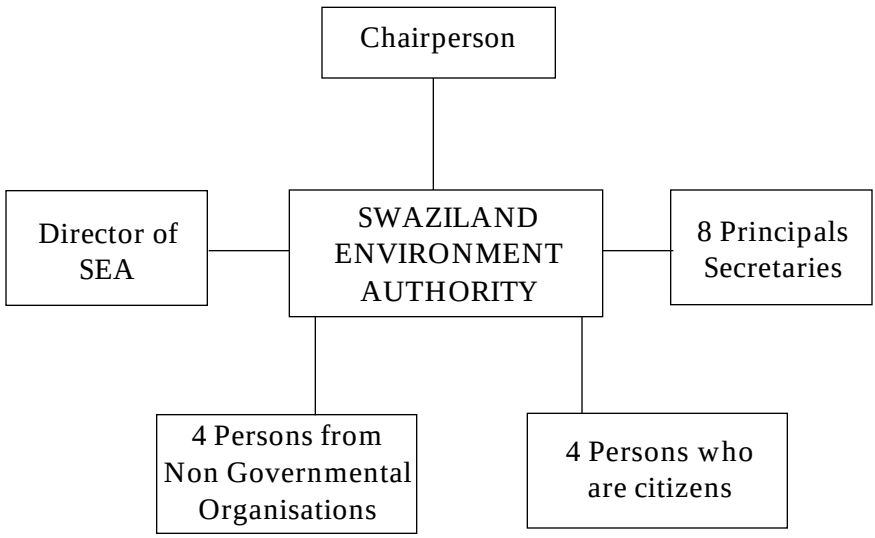
Another protocol signed by Swaziland includes the Protocol on Wildlife Conservation and Law Enforcement in Southern Africa (SADC Natural Resources Management Programme, undated). The Protocol is relevant to the current study in the following manner:

- It states that all member states are convinced that the conservation and sustainable use of wildlife in the region depends on the proper management and utilisation of wildlife
- The states agree that enforcement of laws governing the proper utilisation of management and utilisation of wildlife
- The states agree that they will co-operate to manage wildlife resources as well as any transboundary effects of activities within their jurisdiction or control

Institutional framework and capacity of EIA in Swaziland

The Swaziland Environmental Authority is the main body responsible for enforcing the undertaking of the EIA in the country. It is composed of eighteen members as outlined in Figure 6.

Figure 6: The structure of the Swaziland Environment Authority.



The Chairperson of the SEA is appointed by the Minister responsible for environmental affairs. The daily activities of the SEA are co-ordinated by the Director of the Authority. It is the duty of the Director to prepare and issue annual reports of the Authority, and to promote the co-operative arrangements between the Authority and national and international organisations. The Principal Secretaries who are members of the Authority are those for the Ministries of Agriculture and Co-operatives, Works and Construction, Commerce and Industry, Economic Planning and Development, Natural Resources and Energy, Housing and Urban Development, Education, and Health and Social Welfare. Four persons from different Non-Governmental organisations involved in environmental issues are appointed by the Minister from among persons nominated by such organisations. Four persons who are citizens of Swaziland, and noted for their special knowledge of or interest in environmental matters are also appointed by the Minister.

The Authority has the following technical officers:

- Senior Environmental Officer
- Environmental Engineer
- Environment Assessment Officer (EIA)
- Environmental Assessment Officer (Audit)]
- Ozone Officer
- Environmental Information Officer

The process of EIA in Swaziland

The procedure and requirements for EIA in Swaziland are outlined in the Environmental Audit, Assessment and Review Regulations of 2000. It provides that all proponents of proposed projects that might have environmental effects should obtain environmental compliance certificates before the projects can be implemented. The proponent of a project prepares an Initial Environmental Evaluation (IEE), Environmental Impact Assessment, Environmental Audit Report (EAR), and a Comprehensive Mitigation Plan (CMP). The IEE, EIA, EAR and CMP are submitted to the Authority which then distributes the copies of these documents to concerned and affected ministries, local authorities, parastatals, non-governmental organisations and any other persons. The Authority then calls for public hearing of the proposed project. The Chairperson of the public hearing delivers a report of its findings approved by all the appointed hearing officers who participated in the public hearing. The report of public hearing is made available for the public inspection. The key elements to be included in each of the submitted reports are outlined below (The Environmental Audit, Assessment and Review Regulations, 2000):

Box 8: Report format for initial environmental evaluation

Introduction

Purpose of the IEE

Description of the Project

Location, size, construction or operational activities, schedule for implementation, workforce, any alternatives.

Description of the Environment

Brief description of physical, ecological and human aspects of the site and its surroundings.

Impact Description and Evaluation

Brief account of the significant impacts likely to occur if no mitigation occurs. If an EIA is needed because of the nature and extent of expected impacts then a recommendation to this effect should be made.

Impact Management

Description of mitigation measures, monitoring programmes and schedule of implementation (CMP). Technical and institutional requirements for successful implementation.

The IEE report should be short (no more than 20 pages) and written in clear, simple language. The IEE should result in a short IEE report and a CMP as per the format outlined in this Schedule.

Box 9: Report format for environmental impact assessment

Executive Summary

A brief account (no more than 10 pages) of the findings of the EIA with emphasis on the key issues, for consideration by decision-makers in the Swaziland Environment Authority, the authorising agencies and members of the public.

Introduction

Purposes of the EIA. Boundary of study area and time horizon for which impacts will be predicted (speculated future date or time).

Description of the Project and Reasonable Alternatives

Location, size, construction or operation activities, workforce, schedule for implementation. Description of any associated project (for example roads, aggregate extraction) needed

Description of the Environment

An overall evaluation of the type and quality of the environment (bio-physical and social components and processes) within the study area with specific information presented only when relevant to the prediction and evaluation of impacts. Description of any expected changes to the "baseline" environmental situation before implementation of the project subject to an EIA (the "no project" alternative).

Prediction and Evaluation of Impacts

For all alternatives:-

- distinguish between significant adverse and beneficial impacts;
- identify irreversible impacts;
- allocate significance against international and or national regulations, standards and quality objectives governing:
- health and safety
- protection of environmentally sensitive areas
- land use
- ambient pollution levels
- identify significant data deficiencies and assumptions made;
- determine the spatial and temporal distribution of impacts;
- identify mitigating measures.

Analysis of Alternatives and Selection of Preferred Option

Select preferred alternative by comparing the residual environmental impacts of each option (i.e. the environmental impacts which cannot be prevented) on the basis of the expected results of all mitigating actions to be implemented.

Impact Management Plan (for preferred alternative)

Action to enhance benefits and prevent or reduce adverse impacts. Required monitoring programmes. Schedule for implementation. Technical and institutional requirements for successful implementation.

Consultations

Results of any consultation held with government agencies, NGOs and the public during EIA work

The results from the EIA should be contained in an EIA report and a CMP as per the format outlined in this Schedule (Reporting Format, under Box 10)

Box 10: Report format for environmental audit report

Introduction

Purpose of EA Report

Description of the Project

Location, size, workforce, inputs and outputs, operations and manufacturing processes, transport.

Description of the Environment

Brief description of physical, ecological and human aspects of the site and its surroundings.

Impact Description and Evaluation

Inventory, with amounts of all effluent discharges, after pre-treatment to air, water and land (including noise and vibration and odour). Inventory of all solid wastes produced and their handling, storage, transport and eventual disposal.

Inventory of chemicals which are used in operational or manufacturing processes and which reach air, water or land through non-point source.

Concentrations of chemical, radiological and energy pollutants in air, water, land in the vicinity of the installation (based on inventory).

Identification and evaluation of the impacts of these concentrations on the environment and health (when data allows). The results should be contained in an EA report and a CMP as per the format outlined in this Schedule.

Box 11: Report format for comprehensive mitigation plan

This plan is prepared by using the results obtained from IEE, EIA and EA Reports. Its identifies:

- impacts to be prevented or reduced in severity
- benefits to be enhanced
- mitigation measure, to achieve the above
- costs, institutional and training requirements
- monitoring programmes to track project related impacts and implementation of mitigation measures
- community liaison procedures needed

The plan must contain:

- schedules for implementation / targets
- reporting procedures
- work programmes
- budget
- staffing and training requirements

Box 12: Format for project compliance report

Introduction
Purpose of the report
Description of Project
Location, size, phase of implementation (construction or operation) workforce.
Performance Review
Checking of implementation of CMP. Results of actual impacts of projects (if data allows)
Recommendations
Recommendations in order to improve environmental performance. Date for the preparation and submission of the next Project Compliance Report

The institutional and legal framework in Mozambique

The National Directorate for Natural Resources, that is responsible for overseeing the management of natural resources falls under the Ministry for the Co-ordination of the Environmental Action (MICAO). It has the following among its tasks (Meneses and Cunha, 1998):

- Analysis of environmental impact assessment studies.
- Monitoring of development projects and application of standards for environmental quality of the air, water, soil and other environment components.

- Activities of preservation and of damage control and relief in case of environmental accidents.
- Ensure the management of the natural resources in accordance with the principles of sustainable development.

The environmental laws of Mozambique (as quoted by Meneses and Cunha, 1998) states that it is the duty of the government to protect the environment, with the local communities, NGOs and private sector participating in the management of such areas. The law outlines prohibition of the following activities among others in an effort to protect the environment:

- Pollution of the soil, sub soil and atmosphere
- Activities which may cause erosion, disertification, deforestation and environmental degradation
- Activities which may threaten conservation, reproduction, quality and quantity of biological resources
- Implantation of other infrastructure and deposit of waste and other material or residues that may impact negatively on the environment.

Mozambique does not have environmental standards established by law, and the environmental impact assessment ordinance defers it to that of the World Health Organisation.

STAKEHOLDERS VIEWS ON PROCESS AND PROCEDURE OF EIA

Issues to be considered when undertaking EIA

All the stakeholders felt the EIA was a necessity in irrigation projects. The critical issues that they felt should be included when undertaking an EIA for irrigation projects included the problem of reduced quantity of flow downstream, High salinity of irrigation water adverse impacts on downstream ecosystem due to reduced quality of flow and sedimentation from scheme deposited into water.

On the question of taking into consideration of transboundary issues when undertaking an EIA for irrigation project the feeling was also that the transboundary issues should be considered. However there was also a feeling that the magnitude of development should be taken into consideration. The feeling was that there are agreements between neighbouring countries on some transboundary issues to be taken into consideration when implementing projects. Some of these agreements were considered to me outdated and they

needed to be reviewed. The critical transboundary issues that needed to be considered when undertaking an EIA are outlined in Box 13

Box 13: Critical transboundary issues to be considered in EIA of irrigation projects

- Reduced quantity of flow downstream
- Downstream aquatic biota affected by changed hydrology of the river system
- Adverse impact on downstream ecosystem due to reduced quality of flow
- Sedimentation from scheme deposited into rivers
- Alteration of river morphology

The stakeholders also felt that cumulative issues should be considered when undertaking an EIA. The cumulative issues to be considered are shown in Box 14.

Box 14: Cumulative issues that stakeholders felt should be included when undertaking an EIA

- Water quality degradation from land use and multiple point-source discharge
- Water shortage from unmonitored allocations of water supply that exceeds the capacity of the resources.
- Loss of fish and wildlife population from creation of multiple barriers to migration
- Degradation of sensitive ecosystems from incremental stresses of resource extraction and recreation
- Diminished land fertility and productivity through chemical leaching and salinity
- Habitat fragmentation resulting from cumulative effects of multiple land clearing activities
- Cultural site degradation resulting from streambank erosion, construction and ploughing
- Sedimentation delivery to stream

Constraints in including cumulative and transboundary issues in EIA

Several constraints in including transboundary issues in EIA were raised by the stakeholders and are outlined in Box 15.

Box 15: Constraints in including transboundary issues in EIA

- Lack of knowledge of legislation of neighbouring countries in relation to EIA
- Lack of homogenous rules and policies in different countries
- Lack of acquaintance of experts and procedure in neighbouring countries
- It would be time consuming to include transboundary issues
- Including transboundary issues would increase the cost of undertaking such an exercise, and it is not clear as to whom should bear the additional costs
- There is often lack of historic data about neighbouring countries
- The bureaucracy involved would make the project unworkable
- Lack on networking of experts and practitioners of EIA

The constraints in including cumulative issues in EIA are outlines in Box 16.

Box 16: Constraints in including cumulative issues in EIA.

- Lack of equipment for systematic measuring and projecting cumulative issues
- Not enough time to measure baseline trends since cumulative issues are long-term
- Not enough historic data or any records to give an indication of the baseline trends of the environment concerned
- Lack of localised experts to undertake cumulative impacts
- Lack of financial resources
- Lack of techniques and technology to reliable predict net impact of projects
- Difficult to determine if project will cause a significant impact to already existing projects
- Cumulative issues are often not of direct interest to proponents of projects

Other issues as perceived by stakeholders in Swaziland

The proponent of a project is the one responsible for preparing the Terms of Reference as well as selecting the consultant (s) to undertake the EIA. The Terms of References are prepared in accordance with guidelines from the Swaziland Environment Authority. The feeling of some stakeholders was that the SEA should be responsible for preparing the Terms of References and selecting the consultants, as they will not have to “pay allegiance” to the proponent of the project. The consultants are selected by proponents on the basis of academic training of members, experience as well as the charges for undertaking the study. Local consultants and consultant companies with local

components are given preference when awarding the contracts. The stakeholders were mostly satisfied with the outcome of consultants undertaking EIA. On the issue of possible registration of EIA practitioners the feeling was that they should not be registered with professional body since different EIAs require different experts, as the team may comprise of University professors, engineers, lawyers, medical doctors, hydrologists, geologists, social workers etc. The composition of the team depends on the nature of the project and its potential impact. To certify every practitioner would not be practical because some experts may be called to participate only once in their lifetime. Rather, the selection process should ensure that the EIA practitioner has reliable references and a track record of success in their particular field of work.

The feeling was that transboundary issues should be included in EIA, as a sign of good will to neighbouring countries as a way of making sure that some protocols are respected. It would foster broader holistic co-operation between neighbouring countries. The inclusion of such issues would also reduce the risk of legal liabilities, such as being sued by individuals, communities, organisations or governments of neighbouring state for any adverse effects resulting from the project. The inclusion of cumulative issues in EIA would give a good indication of long term potential impacts of a project and the impacts would be mitigated. Communities and ecosystem would be benefit in the short term and long term and sustainable development would be achieved.

Environmental issues pertaining downstream Mbuluzi River in Mozambique

The main problems encountered in Mozambique from the sugar cane irrigation projects downstream the Mnjoli dam in Swaziland manifest themselves in the Pequenos Lebombo dam. This is because the dam is situated hardly 10 km from the boarder of Swaziland, and there is no intensive land use in the Mozambique side of the border before the dam. Nutrients from sugar cane production are washed into the Mbuluzi River and accumulate in the dam. This leads to increase in production of algae and bacteria in the Pequenos Lebombo dam. Increase in production of bacteria in the dam has been realised in the past three years. Ciano bacteria posse dangers for people consuming the water from the dam and also leads to increase in costs for chemicals to treat the water.

There has been some detection of contaminated fish in the dam, and the contamination can be attributed to pollution from the irrigation projects upstream. Reduced number is birds have also been recorded, and this is due

to decrease in vegetation species. The increase in plants and algae in the dam leads to reduced oxygen level and reduced biodiversity.

The water coming from the Swaziland side comes with sedimentation from the sugar cane fields. The sedimentation has lead to silting of the dam, and thus reducing its storage capacity. However sedimentation in the dam was mainly attributed to the removal of trees for firewood in the catchment of the dam in the Mozambique side.

The agreement of the minimum annual river flow from Swaziland to Mozambique is being respected. However the feeling is that the agreement needs to be reviewed as the minimum allowable flow is too little. It stands at 40% of the aggregate of the flow of both the Black Mbuluzi and White Mbuluzi as recorded in gauging stations prior to the utilisation by Royal Swaziland Sugar Corporation. At the moment the average annual flow from Swaziland at recorded at Goba stands at 6.62 cubic metres per second, which represent about 89% of the aggregate of the flow of both rivers. On the basis on the agreement Swaziland can still utilise some 49% of the water flowing to Mozambique. The agreement thus hinder development in Mozambique in that planning for water utilisation has to be done on the basis of the 40% of flow that was agreed upon.

The water resources of the Pequenos Lebombo dam are not yet fully utilised and large amount of water is released to river channel, and thus encroachment of salinity is controlled. A dyke was also constructed to control salinity from encroaching into the fresh water. The lack of systematic measurements for water quality in Mozambique precluded the detection of some negative impacts of the sugar cane irrigation projects along the Mbuluzi River.

Box 17: Environmental issues downstream the Mnjoli dam (Mozambique)

- There is accumulation of nutrients in Pequenos Lebombo dam from fertilisers in irrigation schemes in Swaziland
- Sedimentation from cultivated fields is silting the dam
- Downstream aquatic biota is affected by contamination due to pesticides and herbicides
- Lack of systematic measurements of water quality precludes detection of some impacts of irrigation schemes
- There is need to review agreement on use of the water of the Mbuluzi river between Swaziland and Mozambique

SYNTHESIS OF FINDINGS

In this section the findings of the study are discussed in the context of the basic assumptions that were listed in the Methodology section; understanding of the concepts of transboundary issues by stakeholder, attention given to transboundary and cumulative issues, availability of resources and institutional capacity, regional framework for harmonised EIA guidelines, EIA undertaken on a project or sector specific environment, and flexibility of the EIA process.

Understanding of concepts of transboundary and cumulative impacts

The concepts of transboundary and cumulative impacts are to a large extent understood by the enforcement agents of EIA, the practitioners and proponents of development projects in the region. The transboundary and cumulative issues that are well understood are those covered by regional and bilateral conventions and agreements.

Transboundary issues related to irrigation projects well understood are those to dealing with reduced quantity of flow downstream, as the issue is covered by a number of bilateral and tripartite agreements between Mozambique, South Africa and Swaziland. The understandings of the concepts of transboundary issues are to a large extent with the aim of respecting the agreements and conventions. Issues that have impacts on the socio-economic aspect such as increase demand for roads and attraction of population from neighbouring countries to work in irrigation projects were not considered to be critical by stakeholders.

Cumulative issues that tend to be considered critical in irrigation projects are those that are directly related to water, such as degradation of water quality and water shortages. Issues of human health hazard from emission of gases during burning of crop residues and from factories were not considered as critical by the stakeholders.

Attention given to transboundary and cumulative issues

The process and procedure of EIA for countries such as Swaziland is locally based. Transboundary issues that are addressed are only those covered by conventions and agreements. Even under such cases the affected country (s) are not consulted during the EIA process, as only local parties are considered to be interested. The relevant Government Ministries (or departments) have the responsibility to make sure that the intended developments do not breach

regional and international convention or agreements.

Localised issues tend to be raised during scooping, and as the scooping reports are used to determine issues to be included in EIA study, the studies tend to dwell more on localised issues, and transboundary issues are only implied, unless there is an agreement and or convention covering such the issue.

Local cumulative impacts were addressed in most of the EIA studies, as the procedure indicate that they should be included. However the tendency was to include only those impacts that are relatively well known and easy to predict due to a number of limitations that includes lack of facilities such as computers and modelling software for projecting cumulative issues and the need to implement a project within a certain time limit.

Availability of resources and institutional capacity

The proponents of irrigation projects are responsible for producing EIA reports to be submitted to the enforcement agents. In most cases the proponents contract consultants to undertake the EIA study on their behalf. The costs involved in undertaking the study tend to force the proponents to meet the bare minimum requirements for producing an acceptable EIA report, and reduce costs by contracting the consultant charging the least, who may not produce the best results.

There is lack of qualified and experienced experts to undertaking EIA in countries such as Swaziland. The fact that when awarding contracts to undertake EIA there is often always a minimum requirement for local component of team members means that in some cases team members with no experience end up playing a major role in the study.

Measurements on water quality are often done at irregular and very long intervals. There is often lack of historic data and records to give an indication of the baseline trends of environmental concern. Countries are also not willing to share data with neighbouring countries.

The fact that the idea of EIA studies is relatively new in many countries of the region comes with some problems in capacity to enforce EIA legislation. In Swaziland for example there are only six established positions for environment officers, and at most times not all the established positions are filled. This hinders the operation of the Swaziland Environment Authority, as it becomes difficult to meet the deadlines spelled out in the guidelines to review EIA reports. There is also high staff turnover, as well trained and experienced environment officers leave the civil service and joint private organisations

that often provide batter terms and conditions of service. The countries also lack of monitoring systems and clear procedures to undertake the monitoring of environmental impacts.

Regional framework for harmonised EIA guidelines

There is no clearly defined regional framework for harmonised EIA guidelines. The lack of regional framework for harmonised EIA guidelines hinders the consideration of transboundary and cumulative impacts when undertaking EIA. In as much as there are a number of protocols and agreements signed between member states, there is no protocol that forces a country to involve its neighbouring country during the process of undertaking an EIA. The present protocols mention the fact that the member countries will co-operate to manage resources as well as any transboundary effects of activities within their jurisdiction.

The region needs to develop a convention that stipulates the obligation of member states to assess the environmental impact of certain activities at an early stage of planning. It needs to lay down the general obligations of states to notify and consult each other on all projects that are likely to have significant adverse environmental impact across boundaries. The convention could be developed to apply on agreed upon set of activities such as building of dams and reservoirs, and developing irrigation projects on shared rivers. The size, location and effects of such activities to be covered by the convention should also be agreed upon. The United Nations Economic Commission for Europe (UNELE) developed a convention on Environmental Impact Assessment in Transboundary Issues. The convention had been signed and ratified by about 30 countries as of August 2001 (UNELE, 2001), which include European countries and non European countries such as Canada and the United States of America. Some principles forming the backbone of the ENELE convention that can be adopted in a regional convention or protocol for EIA are highlighted in box 18.

Box 18: Principles that need to be included in regional convention for EIA and national procedures for EIA.

- The country of origin (proponent) should notify any other country which it considers may be affected by the development activity as early as possible, and not later than when informing its own public about that proposed activity.
- The affected country should indicate if it intends to participate in the environmental impact procedure.
- The affected country should provide the country of origin with infor-

mation relating to potentially affected environment under its jurisdiction.

- The affected country should ensure that its public that is likely to be affected are informed and provided with possibilities for making comments or objections on the proposed activity.
- The country of origin should furnish the affected country with the environment assessment documents, and the affected (concerned) country should arrange for distribution of the documentation to the authorities and the public in the affected areas.
- There should be well-defined procedures for policing implementation of conventions and settlement of disputes.

EIA operated on a project or sector specific environment

The countries lack national development plans to stream line their development projects and match them with the available resources. This leads to EIA studies being done on project or sector specific basis. In all the case studies reviewed there was lack of comprehensive review of the socio-economic and physical environment at national and international level.

One EIA study done in Swaziland was that of the host area for resettled communities from the Maguga development along the Komati River. In as much as the area does not fall under the case studies for the present study, it is worth mentioning that the EIA reports go in details in addressing the environmental issues and their mitigation measures (KOBWA, 2000 a & b). Residual and induced impacts were addressed adequately. It also has a monitoring programme (biological and socio-economic) built within it. However the emphasis is only within the area to be developed and the very neighbouring communities. Issues like increased demand for services such as roads are not adequately addressed. Even in such a detailed EIA report the capacity to consider the multiple use of the water resources of the river shared by three countries (Mozambique, South Africa and Swaziland) is not adequately taken into account.

Flexibility of EIA approaches

The environmental impact assessment is a process of identifying, predicting, evaluating and mitigating the biophysical, social and other relevant effects of development proposals prior to major decisions being taken and commitments made. In order to promote effective practice of EIA consistent with the institutional and process arrangements that are in force in different countries, the International Association for Impact Assessment (IAIA) in co-operation with Institute of Environmental Assessment designed the Principles of EIA best practice (IAIA, 1998). The basic principles are included in the document, and it is stated that a balanced approach is critical when applying the principles

to ensure that environmental impact assessment fulfils its purpose and is carried out to internationally accepted standards.

Strategic environmental assessment (SEA) can be defined as systematic process for evaluating the environmental consequences of policies, plans, programmes or proposals to ensure that they are addressed on par with economic and social considerations and early in the decision making process (DFAIT, 2001) has been adopted by some institutions in order to facilitate development. SEA, also referred to as Environmental Reviews is an important tool in the progress towards sustainable development because it provides decision-makers with information that allows them to make better-informed decisions. An example of a strategic environmental assessment in Swaziland is one prepared by the Ubombo Sugar Limited as a result of its five-year strategic development and expansion programme (Ubombo Sugar Limited, 2001). It was prepared after the SEA insisted that the sugar cane expansion as well as the associated downstream developments be subjected to environmental assessment to establish as a minimum the cumulative effects of all the activities constituting the new plan.

The SEA and EIA approaches complement each other in that the SEA can be undertaken for all the components of a proposed development, followed by detailed EIA for those that are likely to have significant adverse environmental impacts. The processes are flexible enough to cope with the integrated needs of development, as long as they are used within the context of a national development plan and regional requirements.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The environmental impact assessment is an important component of implementation of projects for developments. Its is however a relative new concept to a number of countries including SADC member states. In Swaziland the Swaziland Environment Authority was established in 1992. It is the body that is responsible to enforce environmental regulations. Prior to that it was not mandatory to undertake an EIA before any project could be implemented. Ordinary citizens of the country do not yet understand the process of EIA, and it is perceived as a delaying process for development. The enforcement of the tasks of the Swaziland Environment Authority is being facilitated by a number of regulations and bills. The draft Swaziland National Water Policy has among its intentions the conformity to the principles of fair and equitable sharing of international watercourses among riparian states, and engagement

of its counterparts in neighbouring countries to ensure that water entering and leaving the countries conforms to international safety, health and environmental standards. The Water Bill has passed through the House of Assemble in Swaziland, and is still to go to the House of Senate for debate before it goes to the King for assent to be a law.

Several agreement and protocols have been signed and ratified by the SADC countries, but there is often lack of means to police the enforcement of such laws. There is often lack of facilities for systematic measurement of impacts of projects. The water flow between Swaziland and Mozambique in the Mbuluzi river about the only impact that is monitored at regular basis. However due to the fact that the agreed minimum annual was very low, the agreement appears to be respected.

The procedure and requirements for EIA in Swaziland and Mozambique do not emphasis international and cumulative impacts. Only local parties are considered to be the main stakeholders and interested parties, and are consulted during the undertaking of EIA. The feeling of some stakeholders was that the agreements between neighbouring countries are adequate to safeguard transboundary impacts without transboundary parties being involved in the EIA process. The issues raised during scooping sessions in some case studies reflected the problem of only considering the local parties as affected parties. The fact that the proponent of a project is the one responsible for selection of consultant to undertake the EIA, as well as preparing the Terms of references tend to compromise the output of the EIA. Long term (cumulative) adverse effects such as fragmentation of vegetation and deterioration to underground water quality were addressed in some case studies.

The fact that local consultants and or consultants with at least 50% of local team membership may have an adverse effect on the undertaking of the EIA as the concept of EIA is relatively new in the region, and there is still shortage of well trained and experienced practitioners in EIA. On the issue of EIA practitioners being registered with a national or regional professional body the feeling was that it would not be practical, as different experts are always needed to undertake the EIA.

Several constraints in including cumulative and transboundary issues when undertaking EIA were identified and they need to be overcome. They include lack of knowledge of legislation of neighbouring countries as well as lack of networking of experts and practitioners of EIA.

Recommendations

In order to facilitate adequate consideration of transboundary and cumulative impacts when undertaking an EIA in the region the following recommendations are made:

- A common procedure and requirements for EIA should be prepared by the SADC member states. The requirements should emphasis the need for transboundary impacts and cumulative to be considered for projects of an agreed magnitude.
- Neighbouring countries should be considered as affected parties, especial when undertaking EIA for irrigation projects, and should be invited for initial scooping process in order to identify the likely transboundary impacts.
- Protocols and agreements that are outdated should be reviewed so that they do not place downstream countries at disadvantages when it comes to quantity of water flow.
- Regional workshops should be conducted for both practitioners of EIA and enforcers of the EIA regulations to facilitate networking and sharing of information about transboundary issues. The workshops would also assist in training of practitioners.
- The countries should make it a priority to acquire equipment and facilities for systematic measuring of impacts as well as for projecting cumulative issues. The equipment include those to be used for flow measurement, water quality as well as computer hardware and software for modelling long term impacts of projects.
- The practice of giving priority to local practitioners for undertaking EIA should be reviewed with the view of making sure that the consultants undertaking the exercise are well trained and experienced and encouraging mentoring of less experienced practitioners.
- The enforcement agents such as National Directorate for Natural Resources in Mozambique and SEA in Swaziland should play major roles in selection of consultants and preparation of terms of references.
- The terms and conditions of services for the enforcement agents should be improved in order to recruit and retain well-trained and experienced cadre.

- A compilation of legislation, rules and policies for the different countries would be beneficial in identifying the policies related to EIA.
- A framework should be developed to facilitate sharing of data between member countries.
- There should be clearly defined mechanisms for enforcement of protocols and agreements.

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Part III

Other Experiences and Perspectives

Chapter 6: Harmonisation of E.I.A: experience of Egypt

Chapter 7: Proposed generic approach to assessing cumulative impacts

Chapter Six

HARMONIZATION OF EIA : EXPERIENCE OF EGYPT

by A. G. Abul-Azm

ABSTRACT

The increase of awareness on the sustainability of economic development in Egypt led to the issue of a new Law for the Environment, known as Law 4/ 1994. Environmental Impact Assessment became mandatory for development projects according to this law. During the past few years and since the implementation of the Law, awareness of EIA has increased considerably in Egypt. The capacity building and relevant experience has also increased locally, based on limited experience regarding the international cooperation and harmonization in that field.

The paper presents an overview of the Environmental Impact Assessment system in Egypt, the problems encountered in the past few years and the attempts at solving them. The paper also presents the Egyptian perspective for tackling the issue of harmonization of environmental impact assessment in the region and the follow-up priorities.

OVERVIEW OF EIA SYSTEM IN EGYPT

In February 1994, the Government of the Arab Republic of Egypt has issued Law No.4/94 concerned with protection of the environment. The objective of the Law was not only to address pollution measures and control, but also to involve new developments and projects, including expansions of existing ones.

Under the Law for the Environment the Egyptian Environmental Affairs Agency (EEAA) was established, which then replaced the Agency established in 1982 in all rights and obligations. The EEAA has a public juridical personality and is affiliated with the competent Minister of State for the Environmental. In this respect, the EEAA formulates the general policy and prepares the necessary plans for the protection and promotion of the Environment Law. Enforcement is another mandate given to the same agency.

New developments are required to carry out an Environmental Impact Assessment (EIA) before construction. Articles no.19 to23 and 70 to 73 of law 4/94 stipulate measures related to EIA. Relevant articles in the Executive Regulations complement the Law. The executive regulations were issued by the Prime Minister's decree No.338 of 1995.

Several discussions took place in 1994 between EEAA and the line ministries for the screening of different projects in Egypt. Guidelines for EIA were issued by the EEAA in 1996, to the preparation of which local and foreign experts contributed. The list approach stated in the Egyptian EIA guidelines depends on screening projects into three categories based on different levels of EIA required, each appropriate to the severity of possible environmental impacts.

- A white list project for developments with minor environmental impact.
- A grey list project for developments that may result in substantial environmental impact.
- A black list project for developments that require a fully-fledged EIA due to their potential impacts.

The guidelines (EEAA, 1996a) also included a screening form (A) for the white list projects, a screening form (B) for the gray list projects and a brief outline for the fully-fledged EIA. The guidelines were presented late 1996 to investors, bankers and Non-Governmental Organizations in Egypt. The Law specified that the proponent should submit the EIA form or study to the EEAA through the Competent Administrative Authority (CAA). The EIA must then be reviewed by the EEAA. According to Law 4/94, the EEAA evaluation process should take a maximum of 60 days, otherwise it should be considered approved. The Law also allowed for a permanent appeals committee as discussed in the law, the executive regulations and the EIA guidelines. In 1998, review of the (white) list projects, were delegated by the agency to the CAA. At the inception of the Law 4/1994, the EEAA was faced with limited experience within the body of national consultants. The Agency relied on International community for the technical support from the beginning. Experience in the field of EIA started to increase either outside or inside the agency. However, capacity building and awareness of local consultants still needs to be enhanced.

Since 1994, the EEAA has started to receive EIA submissions from different Competent Administrative Authorities, and the number of authorities is increasing every year. In 1998, the Minister of State for the Environment started a campaign for promoting the EIA when applying for a development license. The Minister contacted all local governments and informed them of the

requirements for EIA's. This campaign resulted in a tremendous increase in the number of EIAs submitted. Table (1) shows the number of CAAs and the number of EIAs submitted to the EEAA since 1994.

Table 1: Number of CAA and EIAs Reviewed by EEAA (Abul-Azm, 2001a)

Year	1994	1995	1996	1997	1998	1999	2000	2001
No. CAA	3	4	10	13	25	6	52	55
No. EIA	7	26	44	91	196	11,199	10,300	8,300

The agency is currently relying on University professors in the review system, these individuals are also taking the role of building up the capacity for the next generation at the agency. EIA quality is still a problem facing the EEAA, as an accreditation system is still needed to certify the consultants to overtake studies in Egypt. An accreditation law is currently under discussion within the agency.

Decisions by the EEAA on the EIAs averaged over the past 3 years were 65% acceptance, 4% rejection of the proposal and 31% as others. Others would indicate the following; (a), the activity should be exempted from presenting an EIA; (b), the activity had violated law 4/94 by starting operations prior to submitting an EIA (which indicates that EIA, is used as an enforcement tool); or (c), missing information or incomplete form. Table (2) presents the percentage of EIAs received by the EEAA categorized by sectors. "Others" in Table (2) indicates that the study was returned to the CAA for the reasons previously presented.

Table 2: Distribution of EIAs per sectors during year 2000 (Abul-Azm, 2001b)

Sector	Agriculture	Industry	Tourism	Electricity	Gas and Petroleum	Infra-structure	Utilities / Services	Others
% EIA to EEAA	3.95	67.24	1.73	0.05	0.65	0.35	25.22	0.81

ASSESSMENT OF THE EIA SYSTEM IN EGYPT: PROBLEMS AND SYSTEM EVOLUTION

The previous section presented the current situation of the EIA system in Egypt. Through experience and practice several problems had been resolved, the nature of which might be different from one sector to the other or even geographically within Egypt. Some of those problems may be attributed to the current legislation.

EIA problems in Egypt

Although new, Law 4/94 only mandated the EIA for new developments or extensions of existing ones. In some cases, and from practice, a sectoral or regional EIA may be required for best environmental practices, and it may be late to submit an EIA only for one establishment. In such cases the cumulative impacts are often not looked at thoroughly. Sectoral EIAs as a planning tool can address cumulative impacts in a broader sense and harmonize decision-making.

Lack of institutional capacity poses another type of problem in the implementation of Law 4/94 regarding the EIA. The law for the environment clearly stated the role of each authority. However, due to the lack of EIA background in some institutions, EIAs are sometimes not submitted to the agency before the construction starts, and in many cases the EIA study misses much vital information for decision-making.

Financial constraints are another major problem facing the EEAA. In addition to the increase in the number of EIAs submitted to the agency for review and the need for qualified and objective consultants to review the study and provide recommendations and comment for decision-making, there are also needs for field visits and follow-up visits after approval is granted. All this requires financial capacity at the agency, which is sometimes not available.

Lack of public participation and public awareness of the EIA, occasionally make it difficult for the agency to make a decision on a specific project.

In summary, the EEAA faces the following constraints and challenges in the implementation of the EIA system in Egypt (Abul-Azm, 1999);

- The limited human resources in the agency;
- The increased quantity of the studies submitted to the agency, particularly small projects (types A and B);
- The poor quality of the EIAs (particularly the full fledged EIAs);
- Scarcity of specialized local consultants for a fairly new subject;
- The need to face new challenges in the future;
- The need to develop a common language with the investor and the CAAs;
- The limited time of 60 days given by law 4/94; and (most importantly),
- The absence of land-use plans and the mandate for regional EIAs, which could have assisted in the decision-making process.

The agency has increased its motivation for the following actions:

- The need to decentralize decisions;

- The need to issue guidelines and checklists to standardize the process for proponents or consultants reviewing the study;
- The need for building the capacity inside and outside of the agency.

In order to reach its objectives and to reach an efficient level of work, the following specific actions have been taken during the past few years.

(1) Drafting more exhaustive lists, which are now divided into four categories;

- A guiding list of activities exempted from EIA, but complying with Law 4/94.
- A new "A" list, a new "B" list and a new "C" list.

In drafting these lists, several laws have been consulted, together with the experience of EEAA during the past eight years, and the issued guidelines.

(2) A standard condition has been set for the type "A" projects and most of type "B" projects. Scoped EIAs and full-fledged EIAs are still reviewed centrally by consultants, in some cases by two consultants. In the mean time, the EEAA has issued specific guidelines for projects; this could assist in the preparation of the EIA of specific sectors. Sector guidelines have been prepared for the following: industrial estates, tourist development centres, sewage treatment plants, land reclamation, Harbours, Ports and Marinas, cement, petroleum, electricity projects and pharmaceuticals, concentrating on the regional development for each sector. These sectoral guidelines have proven to be a useful tool particularly in the tourism sector. The concept of Integrated Development Centres (IDC) was introduced in 1998 and the cumulative impacts are dealt with when the EIA is applied for the IDC infrastructure rather than each individual resort. These specific guidelines will assist the proponent to reach an acceptable quality of the study. The main features of the guidelines include:

- Basic data, including economic analysis.
- Model results if needed.
- Impacts, including those on the natural environment or on society.
- Alternatives for location and /or technology.
- Mitigation.
- Monitoring program as part of an Environmental Management Plan.

(3) Checklists are also another means, which can be used by the EEAA reviewers to standardize the decision-making process.

EIA System Evolution

During its short existence the system has undergone several improvements in response to the pressures and barriers encountered. The improvements are either due to major decisions taken by EEAA or incremental improvements or measures implemented during the work.

Major decisions taken during the past three years to respond to the pressures and problems facing the EIA review system were:

- Devolution of category "A" EIAs to the CAAs and the Branch offices of the EEAA to pre-empt the high workload and as part of the decentralization of the system.
- Modifications concerning EIA categories which are currently being discussed with the CAAs and should soon be implemented, and these include:

    - Re-categorization of projects: part of the grey list projects are listed under the white list and some projects are listed under the black list. Moreover, some of the white list category will be transferred to the grey list. This step was taken based on the increased experience gained within the agency.
    - Modification of the screening forms A and B to provide more environmental information required to take decisions effectively.
    - Addition of a guiding list for EIA-exempted projects.

Incremental improvements of the EIA system in Egypt include:

- Development of sectoral guidelines for different sectors belonging to C-category (black list) projects. This is to improve the quality of EIAs submitted and facilitate the review process accordingly. This is in addition to encouraging the sectoral EIA's to address the cumulative impacts of a specific sector, regardless of the requirement of the Law, which mandates EIA for developments only.
- Committing conditions for the development in the official EIA approval, as well as including reference to concerned parties whose opinion is essential before granting the license.
- Basing the decision on environmental regulation requirements, conditions for development and the national development plans.
- Adopting the approach of setting meetings with the proponent to clarify vague issues and have a common understanding.
- Establishing communication with concerned entities and, occasionally, the public.

STIMULATION OF ECONOMIC DEVELOPMENTS AGAINST A BACKGROUND OF WEAK EIA IMPLEMENTATION

Reducing the level and stringency of EIA implementation in general, and law enforcement in particular, can lead to several negative impacts that can be devastating to the environment. Historically, stimulating economic development at the expenses of the environment in general has proven to be an unbalanced equation resulting in unsustainable development on the long term. Experience tells us that a good EIA system and practice balances the equation for sustainable development when introduced to economic development. The question that remains is the level of the EIA practice in any given country, which must also be equivalent to the level of economic development in this country. In other words ambitious economic development will definitely require a strong EIA system in order to reach sustainability.

Stimulating economic development in the absence of EIA implementation can impact the environment as well as the economics of the project. Some of those impacts can even appear in the short term, and a few of these are listed here:

- Increasing the pressure on the natural resources.
- Reducing the competitiveness of the products in the international market.
- Increasing the cumulative and the residual impacts.
- Affecting the public health and posses a social impact.
- Reducing the life span of the project.
- Increasing the running costs of the project on the long term.

As explained in the previous sections, the Egyptian EIA system has been set up to match closely other international systems such as those used by the World Bank and the European Union. However, some difficulties have arisen during the implementation of the Law regarding EIA. Among these problems have been the lack of legislation for regional or sectoral Environmental Impact Assessment. This is particularly important when cumulative impacts are of concern. This problem can be temporarily solved if integrated land use and management plans exist, as will be discussed later in this paper.

The Ministry of State for Environment (MSOE) through the Egyptian Environmental Affairs Agency (EEAA) is mandated with the implementation of the Law for the Environment. Balancing the economic development with sustainable development is the main challenge that faces the Ministry and the Agency in Egypt.

Although new, the EIA system has taken large steps in the past three years, and this is mainly attributed to the following:

- Continuous consultations with the international donors in setting up the system before its inception.
- Consultations with the concerned ministries and stakeholders in the process of setting up procedures.
- Relying on international consultants and assistance by national consultants for review.
- Planning for good capacity building programs both for reviewers inside the agency or external consultants in the reviewing system.
- The evolution of the system has relied on experience gained through work, and thus produced practical solutions to fit the Egyptian environment.

The Egyptian system for EIA has started on a strong base, including these main objectives:

- Encouraging sustainable economic development, and demoting developments that can harm the environment.
- Insisting on high quality of the EIAs presented. For these reasons several steps have been taken (e.g. issuing sectoral guidelines, and standard conditions for typical industries).

Tools for achieving the objectives have been explained earlier in this paper. Such tools were extracted mainly from practice, but it is important to mention that the process of decision-making in EIA is always difficult for large projects in the absence of committed and integrated land-use plans. The EEAA is currently facing this challenge and working hand in hand with the concerned parties to develop general guidelines for development of large projects. This will require awareness from all stakeholders to the importance of the land-use plans in the EIA decision-making process. In other cases the agency has intervened in the plans and designs by recommending changes.

The Egyptian Government has also realized the importance of the EIA and its implementation for large development projects. It has taken a step in that direction by consulting with the MSOE and EEAA in the planning of such projects. Now a new law is under preparation for the new economic zone. This law requires that a representative from the MSOE to participate on the board of directors of any new entity. Another example is the formation of an Integrated Coastal Zone Management (ICZM) Committee, which has been active in the past year. The main role of the committee is to reach a National ICZM plan (EEAA, 1996b). The framework of ICZM in Egypt was set in 1996, but actually started to take action only a year ago. These are some examples

of the experience in promoting strong EIA practice to balance the increased development mandated by the economic needs in Egypt. A third example is the initiation of the Egyptian Water Partnership (EWP) in December 2001, as part of the Mediterranean and Global Water Partnerships to ensure good water governance and consisting of different stakeholders and representing users from different sectors.

MANAGEMENT MECHANISM AND MITIGATION OF TRANS-BOUNDARY ENVIRONMENTAL IMPACTS

Egypt has limited experience in the issue of Trans-boundary Environmental Impact Assessments. This section presents attempts that have been made to study trans-boundary environmental impacts in Egypt.

Recognizing the scope and the urgency of their shared problems, the Nile riparian countries have taken a historic step towards cooperation in the establishment of the Nile Basin Initiative (NBI, 1999). Formally launched in February 1999, the NBI is a transitional mechanism that provides an agreed framework to fight poverty and promote economic development. The initiative is guided by a shared vision "to achieve the sustainable socio-economic development through the equitable utilization of, and benefit from, the common Nile basin water resources" and a set of policy guidelines that provide a basin-wide framework for cooperation action.

A Trans-boundary Environmental Analysis has been developed by the Nile riparian countries (Burundi, Congo, Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania, Uganda) in cooperation with the Global Environment Facility, UNDP and the World Bank, and supported by a USAID-financed scoping study. The priority issues to be addressed at basin-wide, national, and local levels have been identified and analysed. The elements of an agenda for environmental action in the Nile Basin have also been identified, for implementation over the next decade or more under the NBI's Strategic Action Program in coordination with other development activities.

Most efforts to understand and safeguard the natural resources and environmental systems of the Nile basin have traditionally been carried out within the boundaries of individual riparian countries. Many environmental studies, programs and projects have been implemented by the national governments with support from international partners. More recently, there has been increasing recognition that key environmental issues are often not limited to single countries, but are regional or global in scope.

In this project, environmental trans-boundary issues are identified as issues that have immediate proximity and / or impact on neighbouring states, or on their shared water and / or natural resources as well as issues that are common to the Nile riparian states and that are linked to the management of the shared water and / or natural resources.

Several trans-boundary environmental issues have been identified in the Nile Basin:

- Physical or chemical impacts that can cross national boundaries downstream. Deforestation and soil erosion can lead to increased sedimentation and greater flood risk downstream, while sediments also accumulate in wetlands and reservoirs. Urbanization, industrialization, and increased use of agriculture chemicals lead to increased runoff and pollution that harm downstream water users.
- Water-dependent ecosystems throughout the Nile Basin contribute to the stability, resistance, and resilience of both natural and human systems to stress and sudden changes. Significant trans-boundary benefits derived from various ecosystems' roles in maintaining water quality, trapping sediment, retaining nutrients, buffering floods, stabilizing micro-climate and providing storm protection
- Many key plant and animal species have habitats in adjoining countries, often requiring cross-border protected areas and other conservation measurers for effective management. For example, the Nile is a principal flyway for birds migrating between central Africa and Mediterranean Europe, and Nile wetlands in a variety of countries provide indispensable habitats for these birds.
- Water hyacinth and other invasive aquatic weeds have spread throughout many parts of the Nile basin, impairing the functions of natural ecosystems, threatening fisheries and interfering with transportation.
- Water-borne diseases such as malaria, diarrhoea and bilharzia (schistosomiasis) are prevalent throughout the basin and thus of major concern the Nile countries. Actions to curb these remain a priority in most of the Nile countries.

Solving or mitigating the impacts of such trans-boundary environmental issues is most likely to result from carefully coordinated international efforts emphasizing broad consultations, awareness raising and information sharing as well as sound management that includes a combinations of prevents and curative measures.

Moving from potential conflict to cooperation.

The Nile holds great potential to foster regional social and economic development through power generation, food production, transportation, trade, and environmental conservation, and other related development activities. However, the control and use of Nile waters has long been a source of dispute and potential conflict among and between the riparian countries. These tensions have been compounded as growing populations and economic developments have led to greater demands for water.

The Nile countries recognize that future development of the basin must be environmentally sustainable. Identifying the environment and development synergies, and thus the sustainable development opportunities in the basin is now a major priority. This consensus among the riparian states has been reinforced by international agreement that the Nile's environment and development issues are of global concern.

Cooperative management of the Nile River Basin is one of the greatest challenges of the global international waters agenda. Focusing on trans-boundary issues provides the riparian countries with a major opportunity to make significant progress towards their economic and environmental goals in ways that have proved difficult to achieve independently.

The Nile Basin countries have taken a historic step towards cooperation in the establishment of the Nile Basin Initiative (NBI). Formally launched in February 1999, the Initiative is a transitional institutional mechanism, which includes most of the riparian countries and provides an agreed basin-wide framework to fight poverty and promote economic development.

To translate the shared vision into action, the NBI has initiated a Strategic Action Program made up of two components: the "Shared Vision Program" and the " Subsidiary Action Programs".

The Shared Vision Program will develop and sustain and shared vision and define and undertake a limited range of essential activities to create a coordinating mechanism and enabling environment for implementation of the vision. The shared Vision Program will include confidence building and stakeholder involvement, a broad range of socio-economic, environmental and sectoral analyses, development and investment planning and applied training, institution and capacity building.

Trans-boundary environmental analysis

Consensus has emerged in support of a set of activities in the riparian countries to:

- Provide a strategic framework for the environmental sustainable development of the Nile Rive Basin as part of the Shared Vision Program.
- Improve the understanding of the relationship of water resources development and the environment in the Basin, and
- Provide a forum to discuss development paths for the Nile with a wide range of stakeholders.

To take this process forwards, a Trans-boundary Environmental Analysis was initiated in December 1999. The main objective was to help translate existing national environmental commitments and interest into regional and basin-wide analytical frameworks, and eventually basin-wide actions. The Global Environment Facility (GEF) has provided funding for this set of activities.

This Trans-boundary Environmental Analysis presented an overview of the basin-wide environmental trends and threats and recommends a program of complementary preventative and curative actions to address current and emerging issues. The emphasis throughout is on:

- Stakeholder awareness and involvement,
- Water and environmental management,
- Training and education,
- Capacity building,
- Information sharing,
- Institutional development,
- Mobilization of resources to support the recommended program

THE NEED FOR REGIONAL HARMONIZED EIA POLICY

The question of harmonization of environmental standards has emerged at the heart of trade and environment discussions for the last few years. The task of harmonization of EIA in the region appears to be difficult due to the sheer scale of past environmental negligence, fragmentation, liabilities and the wide gap in the level of EIA standards within one region. In all cases the general objective of harmonization should not achieve identical sets of standards among the region, but rather increase both the regional and possibly global compatibility in developing an administrating the EIA standards, where differences are not essential to protecting the environment or public health.

In order to develop and manage an economically and environmental sustainable framework at the regional level, it is obviously fundamental to:

- Develop a regional cluster of EIA guidelines and standards between countries in one region as a platform to harmonize with.
- Develop and adapt environmental standards in the process of harmonization. This is to ensure the complete alignment of national EIA standards of the countries in the region and the corresponding administrative systems that comply with the prevailing systems in the region or globally.

One of the successful cases of regional EIA harmonization is the Egyptian participation in the ''METAP EIA Institutional Strengthening Project". This project has been sponsored by METAP and managed by the World Bank. The project started in 1999 by studying the EIA system in 14 Mediterranean countries, and arranged several meetings to introduce the basic concepts of EIA and to allow for each country to present its current status. The project also made a comparative study for the EIA system in Egypt with that system used in the World Bank and the European Union (METAP 2000). Several workshops were arranged for decision-makers, reviewers for EIAs, consultants conducting EIAs, and NGOs. The aim of the meetings and workshops was to build the capacity and harmonize the EIA policy in the different countries.

RECOMMENDATIONS

This concept paper has presented an overview of the EIA system in Egypt since its inception in 1994, and the evolution of the EIA system through the past few years. Problems facing the EIA system were also discussed together with the approaches for solving these problems. Impacts of stimulating economic development by reducing the level and stringency of the EIA implementation were been assessed. The Egyptian experience in the trans-boundary environmental impact issue was presented for the Nile Basin. The need for harmonization of EIA policies in the region is essential to avoid problems such as migrating of investment to other countries or even within geographical areas in the same country.

It is important to point out that the differences of EIA systems will make harmonization of EIA policies not an easy task within the region. Creating a more efficient trading and economic regime in the region has now become essential not only for the welfare of the region but also for its survival in the future. This is not an easy task, but the benefits for public health, preservation the natural resources, social welfare, and the economy in the region will

outweigh the costs in order to reach the ultimate goal. The following points summarize the steps that are needed towards a successful harmonization in EIA policy in the region.

- Improvement in collaboration between government institutions involved in EIA to reduce the time needed for EIA process and minimize the potential increase in the total costs of projects.

- Post-project monitoring and reporting requirements should be included and defined as an inherent part of the EIA. In addition to other issues, EIA should clearly indicate: what, when and where to monitor, who is responsible for monitoring tasks and to whom, how often and in what form the monitoring should be presented.

- Public engagement in EIA should be further encouraged by disclosure of the environmental performance indicators of the project to the media and / or the concerned parties and NGOs.

- The cumulative impacts resulting from the interaction and interdependency of the proposed project with other existing and potential projects should not be overlooked and should be embodied in the project's screening and scoping process.

- EIAs should involve a package of alternatives and various mitigation measures, each with a different cost estimate. The cost element of certain alternatives that sound efficient from the environmental point of view might be inefficient from the economic perspective. Therefore, coordination between the EIA process and the economic assessment of the proposed projects is recommended.

- Capacity for EIA assessors should be built at a regional level. Creating a regional EIA network and linking it to other regional networks should also be encouraged. Specialists from national or regional research centres and universities can compensate for the lack of specialized assessors within national agencies. Local researchers and academic institutions have the advantage of being completely aware of the legal structure, institutional framework, ecosystems, resource bases, as well as national historical, cultural, and social fabrics.

- Environmental authorities are advised to prepare a database of accredited and certified national and international EIA experts and consulting firms. Such information is to be disseminated to all environmental focal points in line ministries who get into direct

involvement with the planned projects. The choice of experts and consulting firms must be based on the professional competence, managerial ability, adequacy of resources, professional impartiality, integrity, fairness of fee structure, and quality assurance.

- Given the globalisation of the World Market, strict implementation of EIA policies will become inevitable. It would be better if the countries act fast to take appropriate and effective steps towards:
  - Harmonization of environmental policies, in general, and EIA practice, in particular, as a way of confronting intensifying international environmental restrictions.
  - Preventing, reducing and controlling significant adverse trans-boundary environmental impacts from development activities taking place in various parts of the region.

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Chapter Seven

PROPOSED GENERIC APPROACH TO ASSESSING CUMULATIVE IMPACTS

By: Aah Sekhesa

INTRODUCTION

Since the late 1970's, there has been increasing interest in the assessment of cumulative environmental effects due to disenchantment with the traditional project-by project assessment approach. As environmental resources become more stressed due to excessive development pressures, cumulative impact considerations have become even more important in the EIA process. Despite this increasing interest, the identification of cumulative and transboundary effects is still complex and remains a challenge for Environmental Impact Assessment (EIA) practitioners (de Villiers Brownlie and Associates and EEU, 2000). Cumulative impacts may be a consequence of many interacting factors, both in the past and present, and their combined effects are not always understood.

Cumulative impacts may occur

- When the affected system is being disturbed repeatedly by the same local agent with sufficient frequency so that it does not have time to recover between events; or the affected system is affected by several similar or different activities producing a similar effect, in an area too small to assimilate the combined effects.
- Impacts from one activity combine with those of another to produce a greater impact or a different impact, referred to as a synergistic effect. These synergies may be positive or negative.

These effects can be local, regional or global in scale and typically across jurisdictional boundaries (Fuggle and Rabie, 1994). When impacts are transboundary, it often becomes difficult to manage adverse effects due to different national policies, laws, standards and institutional capacities (Sowman, pers. comm.).

Approach/methodology to assessing cumulative impacts

Cumulative impact analysis tries to assess the whole environmental system in which development occurs to ensure that critical ecological and social issues are not neglected. In cumulative impact analysis, the role of the analyst is focus on important issues of global, national, regional or local significance (Fuggle and Rabie, 1994). This narrowing can only occur after a thorough scoping process. Not all potential issues need be included in the Environmental Impact Statement as some of the issues may be irrelevant. A critical principle of cumulative impact analysis is to determine whether the resources, ecosystem and human communities have already been affected by past and present activities and whether other agencies have plans that may affect the resources in the future (Council on Environmental Quality, 1997).

Some of the key questions that should be asked in scoping for cumulative impacts1 are:

- Do the potential impacts of the action, as well as other existing stressors, occur so closely over time that the recovery of the system is being exceeded?
- Are the potential impacts of the action, along with stresses from other sources within a geographical area2 so close together that their effects overlap? Identifying geographical boundaries and actions should be iterative within the scoping process.
- Could the impacts from the action interact among themselves, or interact with other existing or known future stressors, either additively or synergistically?
- Do the potential impacts of the action affect key components of the environment? Have those components already been affected by other stresses from the same or other actions, directly, indirectly or through some
- Can the action one of many impacts, which are individually insignificant collectively become significant over a longer period of time?

  If the answer to any of these questions is yes, there is a potential for cumulative effects. The following are then also asked:
- What are the potential impacts of the action that could give rise to cumulative effects?
- What is the appropriate scale to consider for these impacts?
- What is the time frame for the analysis? Time frame of the project should be considered and the analyst should try and identify actions that could reasonably be expected within that period, and possibly beyond.

Table 1 provides a generic checklist that can be used in scoping cumulative impacts, addressing detailed impact issues and summarising the results of cumulative impact considerations in an impact study. The items proposed on the checklist will not be applicable to all projects and impact studies. However, use of this approach would provide a consistent beginning for systematically addressing cumulative impacts. A generic approach to how cumulative effects of development projects with potential significant impacts could be considered in the EIA process is proposed in box 1.

Box 1: Approach to cumulative impact analysis

Step 1. Scoping

- Establish the geographic boundaries for the analysis. The appropriate boundaries will depend on the resource or system
- Establish the timeframe
- Identify significant cumulative effects associated with the proposed action
- Identify other actions that may affect the resources, ecosystems and human communities of concern

Step 2. Description of the affected environment

- Description of the environment highlighting important environmental characteristics of the area. Develop baseline information and environmental (ecological and socio-economic) indicators that will be used in monitoring and evaluation
- Identify how existing conditions of key resources, ecosystems and human communities have been altered by human activities
- Identify natural resource and socio-economic issues that arise as a result of cumulative effects

Step 3. Assessment

- Identify important cause and effect relationship between human activities and resources, ecosystems and human communities
- Identify additive, interactive and synergistic effects
- Address the sustainability of resources, ecosystems and human communities

Step 4. Alternatives and mitigation

- Consider the possibility of alternatives or modification of project to avoid, minimise or mitigate significant cumulative effects

Step 5. Evaluation and monitoring

- Use indicators to monitor possible changes

CONCLUSION

While the main purpose for addressing cumulative impacts is to provide information that will allow decision-makers to manage the rate of development or the total amount of development in any geographical area or region so that resultant impacts remain within prestated or preconceived threshold levels, the main challenge for environmental practitioners is how to rigorously consider these impacts within the EIA process. Although the evaluation of potential cumulative impacts may be speculative, it is essential that they form an integral part of the impact assessment process. Where consequences of the impacts may be severe or irreversible or there is uncertainty regarding the levels of change or threshold values of values, the precautionary principle should be applied (de Villiers Brownlie and Associates and EEU, 2000).

Table 1: *Generic questionnaire checklist for addressing and/or summarising the cumulative environmental Impacts of projects (Kamath 1993)*

Source: Canter, L. W. and Kamath J. 1995. Questionnaire Checklist for Cumulative Impacts. Environmental Impact Assessment Review, Vol. 15: 311-339

Environmental Category	**Will the Project Result in**				**Will the Cumulative Impacts of Projects Result in**			
	Yes	Maybe	No	Comments	Yes	Maybe	No	Comments
Physical environment landform: • Fractures on geologic strata? • Landslides and land subsidence? • Seismic activity? • Compaction and settling? • Deposition (sedimentation, precipitation)? • Erosion of soil due to increased wind, floods, removal of vegetation? • Impact to unique physical features (due to destruction, modification, or covering)? • Impact to land classified as prime or unique farmland? • Change existing topography (ground contours, shorelines, river banks)? • Extensive use of existing mineral resources (mining, oil, and gas)? • Disposal of construction debris? • Excessive fields and radiation (magnetic fields, electromagnetic radiation)? • Changes in hydrology (water table, gradient, infiltration)?								
Air/Climatology: • Impact on air quality due to gases, particulates and fugitive dust? • Air pollutant emissions, which will exceed federal or state standards or cause deterioration of ambient air quality? • Objectionable odours? • Changes in climate due to alteration in humidity, air movement, or temperature? • Emissions of hazardous air pollutants (VOCs, SOCs and other toxics) regulated under the Clean Air Act? • Acid rain?								

Environmental Category	Will the Project Result in				Will the Cumulative Impacts of Projects Result in			
Water:	Yes	Maybe	No	Comments	Yes	Maybe	No	Comments
• Changes in the quality and quantity of surface water? • Discharge of wastewater to potable drinking water systems? • Alter flows due to construction? • Increase tendency to flooding? • Salinate water bodies? • Eutrophication? • Increase in temperature and turbidity due to impoundment? • Destruction of streams? • Considerable effects on conventional water quality parameters (that is, DO, fecal coliforms, pH, BOD5, NO3, PO4, temperature deviation, turbidity, total solids)? • Alter the rate or direction of ground water flow? • Alter the quality and quantity of ground water? • Introduce pollutants to ground water due to land application of wastes? • Contamination of public water supplies? • Impact to recharge area or recharge rate? • Make ground water vulnerable to contamination (due to wells, boreholes, cracks, etc.)? • Impact on or construction in a wetland or inland floodplain? • Thawing snow, ice and permafrost? • Impact to a wellhead protection zone? • Impact on fisheries?								
Solid Waste: • Generation of significant solid waste? • Impact existing landfill capacity?								

Environmental Category	Will the Project Result in				Will the Cumulative Impacts of Projects Result in			
	Yes	Maybe	No	Comments	Yes	Maybe	No	Comments
Noise: • Increase existing noise levels? • Expose people or wildlife to excessive noise? • Vibrations?								
Hazardous waste: • Generation, transport, storage, or disposal of regulated hazardous wastes?								
Biological environment flora: • Change to the diversity or productivity of vegetation (namely trees, shrubs, grass, crops, microflora, and aquatic plants)? • Impact to riparian habitat? • Impact to rare or endangered plant species? • Introduce new plant species into the area or create a barrier to the normal replenishment of existing species? • Reduce acreage or create damage to any agricultural crop? • Impact forests?								
Fauna: • Reduce the habitat or numbers of unique, rare or endangered species of birds or animals? • Affect to land animals, benthic organisms, insects, and microfauna? • Attraction, entrapment or impingement of animal life? • Impact to existing fish, wildlife habitat, and nesting areas? • Introduction of new species of animals into an area or create a barrier to the migration or movement of animals or fish? • Cause emigration resulting in human-wildlife interaction problems? • Affect to food chain?								

Environmental Category	Will the Project Result in				Will the Cumulative Impacts of Projects Result in			
	Yes	Maybe	No	Comments	Yes	Maybe	No	Comments
Socio-economic environment land use: • Substantially altering existing or proposed land use of an area? • Impact to wilderness qualities and open-space qualities? • Impact to or destruction of wetlands? • Impact to Special Management Areas (SMAs)?								
Public utilities: Need for a new or alterations to the following utilities: • Electricity? • Natural gas? • Potable water? • Wastewater treatment and disposal? • Storm water control? • Solid waste collection and disposal? • Communication systems? • Transmission pipelines? • Other utilities?								
Population: • Alteration of location or distribution of human population in the area? • Change to demographic characteristics in the area? • Change to housing and household?								
Economic: • Adverse effect on local or regional economy? • Changes in per capita income? • Changes in the standard of living? • Employment?								

Environmental Category	Will the Project Result in				Will the Cumulative Impacts of Projects Result in			
	Yes	Maybe	No	Comments	Yes	Maybe	No	Comments
Transportation: • Change to existing rail, road, waterway and/or air traffic? • Increase in movement? • Increase in accident and traffic hazards? • Affect to transportation network? • Construction of new roads? • Change in existing patterns of movement of men and materials?								
Natural resources: • Deplete natural resources? • Destruction of natural resources?								
Energy: • Substantial use of fuel or energy? • Increase in demand for existing sources of energy?								

Notes: Due consideration has to be given to the time and space scales. The projects may have short-term or long-term impacts, and the geographical extent of the impacts may be either the vicinity of the project or considerable distances away.

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1 Questions are derived from the Canadian Cumulative Effects Assessment Practitioners Guide February 1999. Prepared by The Cumulative effects Assessment Working Group. P.70

2 A project impact zone should be used to determine appropriate geographic boundaries. Project impact zones will vary for different resources and environmental media. A project impact zone could also be transboundary.

3 The process should be participatory and public involvement should occur at all stages. Participatory development techniques should be used whenever possible.