

**United Nations Environment Programme**

**UNEP**

**Division of Technology, Industry and Economics**

**Economics and Trade Branch**

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**Studies of EIA Practice  
in Developing Countries**

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Edited by Mary McCabe and Barry Sadler

**A supplement to the UNEP EIA Training Resource Manual**

#### **EDITORIAL NOTE**

These case studies have been arranged and formatted to accord with the template produced for the 1994-96 International Study of the Effectiveness of Environmental Assessment. They have been edited to conform to standard English usage. For the sake of consistent presentation some rewriting and reformatting has been necessary. The editors accept total responsibility for these changes.

The quality of the graphics is in some cases poor, but they have been included as they give an indication of location even when the keys are not clearly decipherable. The terms 'Environmental Assessment' and 'Environmental Impact Assessment' are interchangeable, reflecting the local usage.

The author details at the end of each case study were those supplied at the initial presentation of the materials to IAIA and may not be current addresses.

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## The United Nations Environment Programme

The United Nations Environment Programme (UNEP) is the overall coordinating environmental organization of the United Nations system. Its mission is to provide leadership and encourage partnerships in caring for the environment by inspiring, informing and enabling nations and people to improve their quality of life without compromising that of future generations.

UNEP's Economics and Trade Branch (ETB) is one of the branches of the Division of Technology, Industry and Economics (DTIE). Its mission is to enhance capacities of countries, particularly developing countries and countries with economies in transition, and to integrate environmental considerations in development planning and macroeconomic policies, including trade policies. The work programme of the Branch consists of three main components: economics, trade and financial services. The Economics component of the programme focuses on enhancing the capacities of countries, particularly developing countries and countries with economies in transition, to develop and implement assessment tools and economic instruments.

UNEP's work on assessments includes the further development and promotion of environmental impact assessment as an effective tool to integrate environmental considerations at the project, programme and policy levels to achieve sustainable development.

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## Preface

This publication is a companion volume to the *UNEP Environmental Impact Assessment Training Resource Manual*. It contains a series of case studies of EIA (and elements of SEA) practice in developing and transitional countries. As with the Manual itself, EIA centres and training institutions in developing countries are invited to take ownership of the case studies, and to further develop them for use in their region or country.

The case studies have been prepared by EIA specialists from developing countries to exemplify how the EIA process is implemented in different parts of the developing world and to identify difficulties that are commonly encountered in EIA practice in this context. No claim is made that these studies are representative of the status of EIA in particular countries or of best (or worst) practice. Their purpose is to provide supporting materials for EIA trainers who are designing and delivering courses based on the various topics covered in the Manual.

It is intended that the case studies will be of use in two main ways: First, they can be incorporated into customised training materials to give them added relevance and realism. Collectively, the compendium of studies can be reviewed to select examples and aspects of interest that correspond to one of the training topics contained in the Manual and approximate to the local situation.

Second, the studies can be used as 'reference points' or 'building blocks' to develop specific cases that reflect experience and issues of EIA practice in a country or region. In using the Manual, EIA trainers are encouraged to prepare locally appropriate materials, including case studies and examples.

### **Case studies as resource aids**

The Manual is a generic tool kit for use by EIA trainers, particularly those in developing and transitional countries. The main objective is to facilitate the preparation of training courses and materials that are specific to a particular country or region. Resource aids are included to help EIA trainers to identify the needs of participants and to custom-design courses to meet them. There is guidance on the sources of EIA information that will be useful when preparing training courses and materials for each topic. EIA reports and supporting documents have been identified as particularly relevant as a resource for preparing locally appropriate case studies.

Case studies based on EIA Reports are one of the best means of relating EIA training to local conditions and realities. In particular, appropriate case studies offer lessons and insights on EIA strengths and weaknesses locally. They are valuable for a number of purposes, including:

- demonstrating the institutional arrangements and procedures for EIA implementation in a given country;
- illustrating how the main steps and activities of the EIA process are carried out locally;
- considering the environmental settings and types of impacts that are typically addressed in EIA practice; and
- highlighting key trends and issues of EIA practice, including areas where capacity needs to be improved.

However, copies of EIA reports are not always readily obtainable in many developing countries or they may be too descriptive to be easily translated into a case study. Indeed, relatively few case studies of EIA practice in developing countries are available in the literature of the field.

This compendium of cases has been compiled to help fill that gap.

## Acknowledgements

*This volume of case studies of environmental impact assessment (EIA) practice in developing countries was prepared in response to a UNEP's initiative to gather and make available country studies on EIA, in collaboration with the International Association for Impact Assessment (IAIA). This initiative is part of the Capacity Building Programme run by IAIA between 1997 and 1999, and funded by the Foreign Ministry of the Netherlands.*

*The Programme enabled over 90 EIA practitioners from developing countries and those moving to a market economy to participate in the Annual Meetings of IAIA during that period. Participants were selected for their professional experience, their demonstrated capacity to both learn and lead, and their ability to use their conference experiences to promote the ongoing development of impact assessment in their respective regions. Each was invited to bring to the meeting a case study demonstrating 'EIA practice' in their region.*

*A selection of these case studies has been included in this volume, which is a supplement to the second edition of the UNEP Environmental Impact Assessment Training Resource Manual. It is intended that Manual users will incorporate into their presentations and training Programmes this first-hand material and other local studies to give added relevance and credibility to the training materials. The cases included here have been chosen because they are appropriate to the various topics covered in the Manual; that other case studies presented by this group are not included does not mean that they are of less merit.*

*There is a separate compendium of case studies of strategic environmental assessment (SEA) in countries in transition. The Regional Environmental Centre (REC) for Central and Eastern Europe published this volume jointly with UNEP as part of the case studies project and work under the Sofia Initiative on EIA and SEA. The paper by Ly Jalakas, Estonian Ministry of the Environment is reproduced in this volume as well because of its possible applicability to developing countries.*

*Our thanks to IAIA for permission to use the materials and to the Director-General for International Cooperation, Ministry of Foreign Affairs of the Netherlands for providing funding for the EIA Capacity Building Programme. Particular mention must be made of the work of Anneke Wevers, Environmental Assessment Advisor for the Department, who was the key link between the Ministry and IAIA, and the driving force behind the Capacity Building Programme.*

*Most importantly we wish to thank all participants in the Capacity Building Programme for the support they gave to each other and to the IAIA meetings in which they were involved and their generosity in sharing their expertise with the wider community of EIA practitioners.*

## Getting value from the case studies

These case studies are organised to correspond broadly with the order of training topics in Section E of the *UNEP Environmental Impact Assessment Training Resource Manual*. For reference, Topics 1 to 3 respectively introduce the EIA process, the legal and institutional framework and public participation; Topics 4 to 11 cover the main stages of the EIA process from screening to implementation and follow up; and Topics 12 to 15 respectively address EIA project management, social impact assessment (SIA), strategic environmental assessment (SEA) and new directions. Each case is keyed to a particular Topic of the Manual.

This initial reference is designed to guide EIA trainers in their primary search for case materials. However, they also are encouraged to conduct a broader review of the studies, working through them systematically if time permits. As will become quickly apparent, many of the studies are relatively comprehensive in that a number of EIA steps or elements are covered. Others are more general in that they emphasise EIA trends or issues related to procedure and methodology in a particular country or project context. Key words at the end of each case indicate the main subjects covered.

Collectively, the 30 case studies in this compendium cover a diverse range of EIA experience from some 25 countries. These include poor, low-income countries where EIA is not well developed and more rapidly developing countries where EIA is on a sounder footing. Approximately half of the case studies relate to EIA of specific projects, with particular representation of hydro and road schemes. Inevitably, the treatment of EIA practice is uneven with respect to topics in the Manual and to aspects that are highlighted. Nevertheless, there is valuable material on the real world of EIA in developing countries, and cues as to how they can be related to Manual Topics.

Although others may find them useful, the case studies are primarily intended for EIA trainers and users of the Manual. Their particular use, in that context, will depend on the results of the training needs analysis (TNA), which is an integral part of the approach outlined in the Manual. When custom-designing EIA training courses, these findings will give pointers to which cases may be helpful and how they could be recast to make them more relevant, useful and interesting to participants. In sum, the compendium of cases is best seen as a menu of options, which can be selected and adapted to purpose.

Wherever possible, EIA trainers are encouraged to develop their own case studies based on local experience. A framework for this purpose, which was used to compile the case studies in this volume, can be found in Section D of the Manual. In the interim, trainers can use the case studies in this volume to

highlight EIA trends and issues of particular interest to their situation and participants' needs.

When selecting cases, trainers are encouraged to:

- compare case study characteristics with EIA experience in their country;
- identify the differences and similarities in the EIA arrangements and elements;
- consider if there are aspects that illustrate lessons that are applicable to issues of EIA practice locally;
- relate these, when appropriate, to internationally recognized standards of EIA good practice (which are set out in the training topics of the Manual); and
- ensure these comparisons are realistic and practicable, leading toward ways and means of improving EIA process and practice that can be implemented.

It may be useful first to incorporate into training materials EIA trends and lessons from neighbouring countries or regions that have similar capacities and issues. There are major differences in the development of EIA systems and standards of practice in the developing world, which need to be taken into account. Some developing countries have considerable EIA experience, predating that of many developed countries. Others have yet to introduce or implement their own EIA legislation, although they may apply EIA to projects that are financed by development banks and agencies.

It may also be useful to evaluate the case studies against internationally accepted EIA principles and standards of good practice. There are various benchmarks that could be used or adapted for such a review. One approach would be to adopt the guidelines of the World Bank or a regional development bank, which apply to borrowing countries for projects financed through their lending activities. Another would be to adapt the *Report Card* of the International Study of the Effectiveness of Environmental Assessment as a checklist. The fold-out at the back of the book provides an easy-use form of this checklist which can be viewed while reading the individual case studies. Most of the case studies include a section on lessons learned, which incorporates the report card approach.

### **Some things to look for**

The Manual underlines the reciprocal relationship of EIA practice and training in the context of capacity building (see Section B). EIA good practice is identified as the basis for quality training. In turn, EIA training has an acknowledged role in improving EIA practice, including strengthening institutional arrangements as well as implementing them more effectively.

What are some of the things EIA trainers might look for in that regard when reviewing the case studies?

Using the yardsticks described above, both positive and negative aspects of EIA practice can be noted from a review of the case studies. Often, the experiences described indicate approaches that are systematic and appropriate, and in some instances, innovative (such as the Environmental Review Fund established in the Philippines). It is evident that EIA procedure and practice in many developing countries has more points of similarity than difference with that in the developed world, and the necessary expertise is available to carry out EIA methodology. Not unexpectedly, the case studies also highlight a number of areas where EIA arrangements are either deficient or their implementation wanting.

Take as an example public involvement in the EIA process, which, typically, is considered to be deficient in developing countries compared to practice in the developed world. Collectively, the cases show evidence of effective practice in this area, as well as examples where lack of public input has resulted in conflict over project implementation (both are described in the Ghana case). Some issues related to public consultation in EIA are distinctive to parts of the developing world, such as being sensitive to cultural and historical traditions and respecting rights and interests of stakeholders. In some cases, social impact assessment (SIA) methodology has proven useful in engaging youth, women and elders in traditional communities (see Nigerian experience).

The areas and aspects of EIA procedure and practice that require improvement can be divided into two categories. First, there are issues that are similar to those experienced in developed countries. Examples include lack of effective monitoring, limited or no analysis of cumulative effects and inadequate mitigation measures – compounded in developing countries by cost constraints (as exemplified in the EIA of the highway corridor in Mexico).

Second, other concerns are particular to developing regions and broadly reflect their stage of development and political traditions. Examples include poor compliance in implementing newly established EIA arrangements (as in the Syrian case), and the openness of decision-makers to taking account of information in an EIA report (as in the Yemen case). In some cases, this brings into question the whole credibility of the EIA process (as in the case of the proposal for prawn farming in Tanzania).

This second category of concerns are particular targets for EIA training and capacity building to strengthen institutions and core competencies. A perennial question in this regard centres on the portability of so called western EIA processes and procedures. With certain reservations, the case studies in this compendium indicate that EIA arrangements used by development banks or other countries can be used, provided that specific

care is taken to adjust these to the situation and circumstances of a particular country. Further guidance on this matter can be found in the Manual and the companion volume on *Environmental Impact Assessment and Strategic Environmental Assessment: Towards an Integrated Approach*, which has particular reference to developing countries.

# Environmental impact assessment from a Sudanese perspective

*Osman Mirghani Mohamed Ali*

## ABSTRACT

Sudan, the largest country in Africa and the Middle East and an independent State since 1956, has witnessed profound climatic and political shifts within the last twenty years. Both have had serious implications for the environment, and natural resources as well as the sociosphere of the country. The major environmental problems befalling Sudan are desertification, depletion of natural resources and social disruption.

The history of the EIA process in Sudan as well as its *status quo* are reviewed. Examples are cited of EIAs conducted and appraised in the light of legislation, participation, environmental sustainability and capacity building. Emphasis is laid upon developmental projects related to the Nile System in Sudan.

Problems negatively impacting the efficiency of the EIA process in Sudan fall into internal and external categories. The former are related to the origin, procedure and fate of the EIA as follows :

- legislation and institutional aspects of EIA;
- lateness of the EIA in the project cycle;
- inadequate time allotted for completion of EIA ;
- composition of the EIA Team and qualification of team members ; and
- fate of the accomplished EIA .

The latter are accentuated by, *inter alia*, globalisation trends, ISOs (9001-14001) requirements and financial aspects.

Recommendations are made to alleviate/mitigate the constraints and increase the efficiency of the process of the EIA in Sudan. Three areas are most important: legislation, training and international collaboration.

## INTRODUCTION

Sudan, the largest country in Africa and an independent State since 1956, has an area of 2,506,000km<sup>2</sup> and hosts an estimated population of 26 million people. It is a country in a continent with mosaic variations in climate, ecological zones and ethnic structures. Within the last twenty years, the country has witnessed profound climatic as well as political shifts. The

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drought of the seventies/early eighties has had devastating effects on the natural environment and has led to reduction of vegetation cover and food production, immigration of people and the upset of the economic as well as the social spheres of many areas. The floods and rains of the late eighties/nineties have been a mixed blessing for both the people and the natural environment. The political regime of Sudan has been an alternation of democracy/multiparty system and military/uniparty system. The implication of this has been reflected on the country's stability, economic policies and developmental strategies. Looming over and exacerbating all this, heavily taxing the natural as well as the human resources, is the 30-year civil war in the Southern Sudan.

Despite the bleak picture depicted above, Sudan has taken considerable steps regarding the issue of the environment. NGOs were active as early as the seventies, raising the Sudanese awareness of, and perception towards, the country's environmental problems. The Hydrobiological Research Unit (1953) and the Institute of Environmental Studies (1979) of the University of Khartoum could be regarded as landmarks in the environmental history of Sudan, the former for pioneering integrated, multidisciplinary research in natural resources management in Sudan, and the later for being the first institute to offer M.Sc. degrees in Environmental Studies in Africa and the Middle East. The State has adopted the National Strategy for Development for the Decade (92-2002). Within this Strategy, the environment has a committee to itself. 1992 saw the establishment of the Higher Council for Environment and Natural Resources (HCENR) to oversee, coordinate and liaise on issues pertaining to, and linked with, the environment. The culmination of these governmental steps occurred in 1995 when the environment portfolio was promoted to ministerial level. The country is currently involved, at the governmental and non-governmental level, in establishing a National Environmental Action Plan (N.E.A.P) (Ministry of Environment and Tourism & SECS, 1996).

### **ENVIRONMENTAL ASSESSMENT IN SUDAN**

A history of EIA in Sudan shows that the report of the Equatorial Nile Project (ENP) of 1954 is probably the first ever environmental impact assessment endeavour carried out in the developing world (Moghraby, 1997). That was an EIA in function but not in name! Recent environmental and socio-economic evaluations were also carried out (Moghraby, 1982; Moghraby & El Sammani, 1985). It is worth-mentioning that EIA requirements were first introduced by the World Bank in 1989 through its Operational Directive 4.01 on Environmental Assessment, now Operational Policy 4.01 (Freestone, 1996). Some of the EIAs undertaken in Sudan are shown in Table I.

<i>Project</i>	<i>Year</i>	<i>Executor</i>	<i>Funding Agent</i>
Sudan's Southern Stock Route	1985	IES*	US-AID
The Locust Control Project	1988	IES	US-AID
UNICEF Hand-pumps Program in Kordofan	1988	IES	US-AID
The hamadab Dam	1991	Monenco Consultant	Government of Sudan
The Heightening of Roseiris Dam	1992	G Karrar and Partners	Government of Sudan
En-Nuhoud-El Fashir Road	1995	W Kirkpatrick and S&S Cons.	African Development Bank

Table 1: Some of the EIAs conducted in Sudan (1984-1995)

Sudan is currently embarking on ambitious developmental programmes such as rehabilitation of agricultural schemes, construction of transcountry roads, digging of irrigation canals, building and heightening of dams and extraction and transportation of crude oil as well as a number of new industries. Each of these projects could have diverse and significant environmental impacts. For each of these projects an EIA is either in progress or is planned.

## FEATURES OF THE PROCESS OF EIA IN SUDAN

### *Legislation*

As most of the developing projects in Sudan are sponsored and implemented by overseas donors, it is the donors who require and usually supervise the implementation of particular EIAs. Sudan itself has not legislated for EIA as a mandatory requirement as is the case, for example, in the German Act on the Assessment of Environmental Impacts (Tier, 1998). Instead, there are over 150 natural resources laws and sectoral regulations dealing with health, water supply, land tenure, game, protected areas, fisheries and marine resources and other sectors of natural resources. More recently, Sudan has taken a remarkable step towards promulgating comprehensive environmental legislation, the *Environmental Protection Policy Act*, awaiting the signature of the President before being implemented, which states that: 'Any large developmental project, which construction might negatively impact the quality of the environment should undergo an Environment Feasibility Study (EFS).'

Stipulated in the EFS is the requirement for the following information:

- effect of proposed project/action on the environment;
- any unavoidable negative environmental impact; and
- available alternatives for proposed actions.)

## **AGENCIES CONDUCTING EIA**

For an effective implementation of an EIA two pre-requisites are vital: proper qualification of the conducting agency and its independence and non-polarity. Unfortunately, these two conditions are not strictly observed. An array of agencies and consultants are available, all claiming to be qualified and experienced in conducting EIAs for all types of projects. As for the second condition, in a particular irrigation project, the constructing firm entrusted with the implementation of the rehabilitation protocol won the tender for carrying out the EIA for the same project. This no doubt undermines the integrity of the bidding authority and blemishes the value and goal of the process itself.

## **THE TIMING OF THE EIA**

The implementation of an EIA has to insure that, should an adverse environmental impact be foreseen, the necessary corrective measures are formulated in the early stages of preparation of the proposed project. The prerequisite of this is that the EIA should be started and accomplished before the proposed date of the project execution. However, this is not always the case. In Zimbabwe the EIA was carried out for the proposed Osborne Dam while the construction of the dam was already under way with the engineers, surveyors and other staff working on the dam site! (ICEA, 1989). In Sudan, the rehabilitation of canals and other irrigation structures as well as the construction of the pump stations in all four schemes of the Northern Province Irrigation Rehabilitation Project were in progress when the tenders for the EIA were opened! This delay in starting the EIA process happened even though the feasibility study of the Rehabilitation Project was conducted 16 years ago! In both cases such efforts cannot be deemed as EIA and can only rank as environmental evaluation studies (EES). The time factor affects the quality of EIA in so far as the lateness of the EIA would not permit meticulous, integrated conduct of the assignment, nor would it allow for application of the recommended mitigation procedures.

## **PARTICIPATION**

The participation of the local people and NGOs will no doubt act as a safeguard ensuring that the EIA has not overlooked the envisaged impacts on the community concerned. This participatory involvement should begin from the point of the project identification and continue throughout the project cycle. However, this is loosely, if at all, adhered to. Similar to the findings of Gutman (1997), public participation, with a few exception, did not rank high among the EIAs. It was either ruled out, omitted by the EIA team or was acknowledged as too late and too limited. Such practices as the coopting of local expertise in the EIA team and in the administration of questionnaires are not enough. This calls for remedial measures such as spelling out in the EIA Act that the participation of the local people is of

equal importance and inseparable from the process itself. Concomitant with that, if not prior to it, is the training of NGOs, CBOs and affected groups to take part in the EIA protocols. Good EIAs are expected to contribute to the final project design, give the public a say in the project, and add to overall environmental awareness among involved parties (Gutman, 1997).

### **THE FATE OF THE EIA**

Bad as it is not to undertake an EIS, it is worse to ignore the results of an EIA once accomplished. The monitoring of mitigation measures calls for a responsible body. Such an agency as the environment management agency (PEA) is lacking in Sudan. The HCENR, if institutionally upgraded and financially supported, could fill that gap. Otherwise, questions as to

- who will implement the findings of the EIA?
- who will supervise the implementation? and
- who will supervise the implementation? remain unanswered.

### **THE FEDERAL SYSTEM**

The federal governing system adopted by Sudan casts heavy shadows over the EIA process. Conflict over natural resources could occur between various States. The devolution of the Comprehensive Environmental Legislation to State levels needs the executive power to make it effective. It is suggested that the Central Government should have a stronger grip on policies, legislation, foreign affairs and coordination.

### **RECOMMENDATIONS**

- The country should hasten its steps towards the adoption of the NEAP and the signing of the EPA.
- Qualified firms, institutions and personnel should be involved in EIA. The quality of EIA should comply with ISO 14001.
- Manuals and EIA software should be available in English and, if possible, in Arabic languages.
- Manuals and software should be tailored to Sudanese circumstances or to similar developing countries.
- The HCENR should be upgraded institutionally and supported financially.
- Research and training institutes such as the Institute of Environmental Studies should be supported to be the focal point of all EIAs in Sudan.
- Popular participation should be an integral part of the EIA.
- EIAs should be open to competition by consultants firms via invitation to tender.

- It should be obligatory for overseas implementing firms to consult with Sudanese experts to enhance the Environment Assessment (EA) capabilities in the country.
- Enough time should be available between the completion of the EIA and the execution of the project.
- Social and economic issues should receive equal weight as the natural environment.

#### LIST OF RELEVANT PUBLISHED PAPERS AND OTHER SOURCE MATERIAL

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**Key words**

**capacity  
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**environmental  
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# Environmental assessment study of the Safir-Hadramout Road project

*Ilham A A Basahi*

## ABSTRACT

This case study is meant to investigate the procedure and format of an EIA study carried out in the Republic of Yemen for a project funded by the World Bank. The project is for a proposed road, 311km long, that will traverse the central part of the country, crossing areas of archeological and prehistoric importance. The EIA study was suggested and funded by the World Bank and it was carried out by a private consultancy company in conjunction with Yemeni experts. The EIA study for this project is considered the most effective EIA in Yemen to date and it resulted in modifying the design and alignment of the proposed road in favour of protecting the areas of archeological and prehistoric nature.

## INTRODUCTION

The proposal is for constructing a road, 311km long, that will traverse the central part of the Republic of Yemen, connecting the Eastern Governorate with the capital Sana'a, by providing a shorter route that can act as a basic infrastructure to serve the developing oil industry and other agricultural/horticultural, social and tourist activities along the road.

The role of the environmental assessment for this project is to determine the baseline environmental conditions and to evaluate and reduce, or prevent, the direct and indirect negative cumulative effects on the biophysical, ecological, social and cultural environment, considering the conservation of archaeological and historical sites. The study also aims to develop a follow-up monitoring plan for management actions during the construction and operation of the project.

The focus of this case study is the investigation of methods and techniques used in the preparation of environmental assessment studies recently applied in Yemen and to identify guiding values and principles for improving the practice.

## NATURE AND SCOPE OF THE ISSUES

The Environmental Protection Council ( EPC ) was established in Yemen in 1990, after the Yemeni Unity. Before its establishment, regulations governing

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environmental issues were scattered in different laws of the previously two republics.

After the establishment of the EPC, it had responsibility for proposing and submitting drafts of environmental laws on all aspects of environmental issues and for specifying standards. The Environmental Protection Law, issued in 1993 after being approved by the Cabinet of Ministers and the Yemeni Parliament, was still awaiting approval at the time of deciding that an EIA study would be essential for this project.

The EIA study was suggested and funded by the donor (The World Bank). The elements of the detailed EIA study were defined in the Draft EIA Law for Yemen, and these were in accordance with World Bank requirements.

The EIA study was carried out in 1992 taking into account the legal framework in Yemen including pertinent regulations and standards governing environmental issues such as environmental protection, rights to property, water and common land. A more detailed description of EIA elements and procedure was approved later within the Environmental Impact Assessment Policy For The Republic Of Yemen, issued in 1996.

#### **PROCESS AND PROCEDURAL CONTEXT**

The process for the EIA study followed more or less the same procedure described in the recently published EIA policy document.

The Terms of Reference (ToR ) for the EIA study were as required under the World Bank Operational Directives 4.01, Environmental Assessment (Environmental Assessment Source Book, 1991 ). The scope suggested by the ToR was that the EIA study should cover the following issues.

#### **DESCRIPTION OF THE PROPOSED PROJECT**

Description of the environment: providing baseline data on the relevant environmental characteristics of the study area focusing on:

- Physical environment including a description of the geology, surface and groundwater hydrology and quality, heavy rains and flash floods, recharge areas, salinity of soils, wind conditions, temperature, and significant landscapes.
- Biological environment covering ecologically important or sensitive habitats, migration routes of wildlife and herds (camels, goats, sheep), location of significant grazing fields and water sources.
- Social and cultural environment covering such aspects as population distribution, community structure, tribal people, land tenure, existing settlements, infrastructure and services, public health and employment.

- Archaeological and historical sites of significance covering prehistoric and historic remains, including artifacts such as flints and ceramic material, monuments such as tombs and hydraulic structures as evidence of early agriculture. The work was to be done in two phases: Phase 1 was to be of 15 days duration and would be a reconnaissance of the full length of the road. Phase 2 extending through another 15 days would be concerned with the recording and fencing of archeological material with agreement with the concerned authorities in Yemen.
- Legislative and regulatory considerations: describing the pertinent regulations and standards governing the environmental issues and the protection of sensitive areas. Special attention should be given to water and land rights and customary law practices.
- Determination of the potential direct and indirect impacts of the proposed project: taking into account the views of the affected social groups, concerned Government agencies and NGOs.
- Development of an Environmental Management Plan: recommending feasible and cost effective measures to prevent or reduce negative impacts and enhance positive ones.
- Development of a Monitoring Plan: through the preparation of a detailed plan to monitor the implementation of environment management actions and the impacts of the project during construction and operation.

The output should be in the form of an Inception Report prepared within one month of the start of the study with the work programme and EIA methodology to be forwarded to the Government and IDA for review and comments. The Draft Final Report should be submitted to the Government and IDA within four months of the start of the study. The Final Report should be submitted within one month of receiving the comments of the Government and IDA.

#### **APPROACH TAKEN**

The methodology of the EIA study can be summarised as follows:

##### *Pre-field stage*

On the basis of available maps and information a base map was prepared at 1:250,000 scale. Thematic maps at smaller scale were presented based on secondary data to highlight important issues noted for reconnaissance.

Satellite images and aerial photographs had been studied to relate their interpretation to field observations/investigations. Thus ground features observed during reconnaissance surveys had been used to prepare the resource inventory. Accordingly maps on land, soil, land use capability and its actual use had been prepared.

Three schedules were prepared to collect information in the field in connection with the study of land unit, soil and nomadic/sedentary population which are essential to study desert ecology to formulate environmental impacts.

### *Field stage*

The field stage was undertaken by all the experts along the entire length of the proposed road corridor for visual assessment and local inquiries and for meeting the critical data gaps, and identifying potential environmental and social impacts. This helped in understanding the regional environmental and ecological processes acting in the project area. This led to the identification and division of the proposed road into environmentally homogeneous segments for each of which the quality of environment was assessed and likely impacts due to road construction and actions for mitigating negative impacts (if any ) were identified.

### *Post-field stage*

Dynamics of desert environment

To assess the impact of the road construction on environment and on land degradation/desertification, studies had been undertaken in the context of natural/biotic ( anthropogenic ) intervention, over-exploitation of resources etc. The presence of desertification/land degradation had been identified with references to: movement of sand in broad terms; deflation of fine material – increase in coarse material; degradation of marginal lands – removal of top soil and grass cover; enlargement of rock outcrops or bare areas to indicate degrees of erosion; decreasing or disappearance of vegetative cover; rise and fall of water tables; and the practice of cutting trees.

### *Geology and hydrogeology*

Objectives of the study, activities were planned as follows:

- collecting and review of existing geological and hydrogeological data and reports covering the study area (IJNDP and Department of Hydrogeology in the Ministry of Oil and Mineral Resources);
- study of topographic maps with ground contours, drainage channels and orientation with heights of sand dunes;
- study of sub-surface geology as obtained through the bore wells for identifying the aquifer zones and their aerial distribution;

- study of water maps to identify the occurrence and depth of groundwater;
- study of water table contour maps to identify the areas of recharge and discharge and also to find out the movement and gradient of groundwater;
- study of hydrochemistry of surface and groundwater;
- study of the aquifer characteristics as determined through pumping tests for various aquifer parameters to work out water balance;
- study of rainfall record for working out the rainfall infiltration;
- study of groundwater development and its effects on the groundwater regime on a long term basis; and
- regional development

For the regional planning and development strategy, the following sequential tasks had been carried out. The initial project objectives were to be seen in the context of the overall policies and programmes of the Republic of Yemen and in particular of the Governorates of Marib and Hadramout as the proposed road passed through these two Governorates.

A resource and data base had been prepared for all natural resources as well as man made features to understand the biophysical, socio-economic and cultural environment in the regional perspective. Major sectoral resources inventory namely water, soils and minerals, agriculture, livestock animal husbandry, flora and fauna, oil and energy had been undertaken along with physical and social infrastructure and linkages and communication systems.

The above was then analysed to determine the environmental status and the settlement systems, whereby identification of the development issues and growth potentials would be possible.

### ***Social and cultural dynamism***

For the social and cultural impacts of nomadic, semi-nomadic and settled Bedouins along the proposed Safir- Hadramout road alignment, the Consultants undertook the following activities through compilation of information from published and unpublished secondary sources as well as computation from selective questionnaires and interviews supplemented by personal observations. The objectives had been seen as follows:

Profiles of the social organisation and cultural patterns of the major nomadic, seminomadic and other settled social groups and their spatial distribution in the project area were done. In addition, a study was undertaken to assess the social perspective on development and response to the changing use of human resources. The analysis of these dimensions would reveal the nature of their expectations and priorities, movement and

settlement patterns. As a corollary to the above, it would be possible to indicate the anticipated clustering of people and activities along the proposed road alignment. This would enable the requirements of social and economic infrastructure, in response to the probable spatial arrangement of people and activities to be determined. Based upon the evaluation of social and cultural impacts, measures for addressing environmental impacts had been formulated.

### ***Institutional study***

Care had been taken to study organigrams of the National and Governmental administration highlighting the powers and responsibilities of the different departments. Law regarding right to land property, access to water, land use controls, etc., were also referred to. The views of the Government of ROY on developmental prospects were also considered. The work done by some of the area developmental authorities and agricultural research stations were studied during field studies, the imperatives of the Environmental Management Plan and tasks of the monitoring unit had been formulated.

### ***Segmentation of road alignment for impact assessment***

Field studies were conducted jointly by all the experts along the entire length of the proposed road corridor. This led to the identification and partition of the road into 22 segments, for each of which the quality of the environment was assessed and actions for mitigating negative impacts were identified. The quality of road-segment environment was reviewed against the regional environmental setting. As a result, the actions required to enhance the environment were identified. This had been used to prepare the Environmental Management and Monitoring Plan.

### ***Prehistoric/archeology resource study***

The following methodology was adopted for this study:

- Pre-field stage  
This stage consisted of a comprehensive literature review of published and unpublished documents relevant to the prehistory and archeology of the general project area. Archival materials, including artefacts and manuscripts, had been inspected at the General Organization for Antiques, Manuscript and Museum (GOAMM) and library in Sana'a.
- Field stage – project corridor study  
This stage consisted of a comprehensive field survey aimed at locating and recording prehistoric and archeological sites within the proposed

corridor. Identified sites were accurately plotted through the use of topographic maps and a Magellan model 5000 GPS (Global Positioning System) unit. A standard form was used for reporting information in all sites to ensure consistency. Artefact collections were carried out, labelled and sent to laboratory for analysis.

- **Site testing**  
Upon completion of the site identification and reporting, limited site testing was required at several sites. The site testing was implemented in order to address site significance through utilising certain criteria such as site integrity and the presence of *in situ* cultural materials of regional, local and academic research importance.
- **Data analysis/report preparation**  
This stage of archeological investigations included analysis of recovered artefacts and preparation of a report. The report included findings at each site as well as a statement of significance for the encountered archeological sites. The report also included the expected impact(s) from the proposed project on the evaluated sites and recommendations.

## **RESULTS AND IMPLICATIONS**

The results were presented in report form and as summary tables. The approaches used were successful in providing excellent information about the environmental features along the road. The division of the road into 22 segments of environmentally homogeneous segments helped in the assessment of the impact on the quality of the environment for each segment. The technique used was successful in describing the environmental features of the full length of the road corridor as well as the adjacent area.

The negative impacts expected to result from road construction activities and construction of camps, and those expected to occur after the completion of the construction of the road, were tabulated with their mitigating measures and actions to be included in the Environmental Management and Monitoring Plan. Similarly, positive environmental impacts were presented with the actions to be included in the Management and Monitoring Plan to enhance those positive effects.

The survey on Heritage Archeological and Prehistoric sites along the corridor of the road resulted in identification of 35 archaeological sites belonging to Bronze Age, South Arabic, Islamic, Modern Bedouins. Tables representing segments of road where archeological sites occur and the different actions necessary for the conservation of different sites ranging from:

- no action
- avoid quarrying.

- protect by fencing
- re-align road
- monitor during construction (GOAMM), and
- prepare maps for further information before road construction (GOAMM).

The survey also identified 50 prehistoric sites belonging to Lower Palaeolithic (Acheulean), Middle Palaeolithic, Upper Palaeolithic, and Neolithic Bronze Age. The survey indicated that 78 per cent of the sites were located in four segments of the road and that alternative sources for building materials should be sought and quarrying avoided in those sites as they could act as a guide for future explorations in the adjoining regions.

The survey also recommended that GOAMM should attach itself to the project to carry out further investigations and to contribute in the Management and Monitoring Plan by associating a Palaeogeomorphologist with a competent Prehistorian.

The EIA study also recommended actions to enhance positive social impacts resulting from the construction of the road leading to the creation of job opportunities and reducing fragmentation between the local groups.

#### **LESSONS LEARNED**

- The EIA study was carried out in 1992 in Yemen. At that time, the idea of implementing an EIA study before a project was still new to decision makers. The World Bank as the donor organisation suggested and funded the EIA study for this project which is considered now as the best available for its effectiveness in modifying the initial design and alignment of the road and its findings and recommendations concerning the conservation of the archeological and prehistoric heritage of the country. This leads to the conclusion that donor Governments and organisations can play an important role in supporting the idea of EIA in developing countries, by making it a condition for funding the project and including EIA study funds in the total cost of the project, emphasising the importance of it being implemented at the feasibility study stage of any project.
- The EIA study was carried out in Yemen at a time when environmental standards and policy were still under formulation. This did not stop the implementation of the study and it was done using guideline values from existing standards in other countries.
- The approach taken needed a wide range of expertise to be involved in the preparations of the studies and field visits. The EIA was prepared making good use of the expertise of local qualified experts

who played a major role in achieving good communication and cooperation between ministries and other specialised organisations using all the existing and available resources.

- The results of the EIA study were of great importance, leading to changes in the design and alignment of the proposed route, thus protecting areas of National Heritage that could have been mishandled causing the country a great loss.
- In Yemen and in many other developing countries, many projects were implemented without undertaking an EIA study. Some of those projects had severe negative impacts on the environment. This can lead to the conclusion that the development of environmental auditing techniques to mitigate the negative impacts over a reasonable time span, can be equally important in developing countries.

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## Current status of the environmental impact assessment system in Ethiopia

*Yonas Tekelemichael*

### ABSTRACT

One of the most ominous of all problems facing Ethiopia is environmental crisis which threatens to precipitate and deepen the country's precarious economic and social state. Among other things, this environmental crisis is due to unwise use of natural resources and unplanned development projects prompted by rapid population growth. In Ethiopia development planning, especially, has in the past been rather rudimentary, and that which existed paid little or no attention to environmental impacts. As a result the country has, over the last few decades, experienced a serious degradation of natural resources and damage to the environment and human health.

In line with Ethiopia's Agricultural Development Led Industrialisation (ADLI) Strategy requirement, the country is currently launching a major programme for the intensification of agriculture, including large-scale development irrigation schemes and industrialisation. If appropriate environmental monitoring and protection is not carried out, the development efforts of these projects could damage the environment and make development unsustainable.

In recognition of this, and of the urgency of the matter, the Environmental Protection Authority (EPA) has taken major action and prepared a draft EIA system, including Procedural Guidelines, which is used for all types of development projects in any sector (e.g. Agriculture, Industry, Transport). The main purpose of this procedure is that it is to be used as a tool for both planning and decision making, with the objective of ensuring that potential problems with projects and other development activities are foreseen and addressed at an early stage in the project cycle or other planning process.

This paper discusses the status of the draft EIA system in Ethiopia and raises a number of fundamental issues regarding the development of EIA procedures (one component of the proposed EIA system) such as the stage in the project cycle at which EIA should be introduced, its scope, the need for opportunities for the public to comment on EIAs and the institutional arrangements for their implementation.

**See Topic 1**

**UNEP EIA Training  
Resource Manual**

*Overview of EIA*

## INTRODUCTION

### *Background*

Past experience has shown that programmes and projects undertaken in different sectors of the country have caused damage to the environment and to public health. This is because traditional project preparations and decisions were mainly based on short term economic and technical feasibilities and neglected the environmental and social as well as the long-term economic dimensions.

Concern for environmental degradation in Ethiopia has been growing in recent years. The Ethiopian Federal Democratic Republic Constitution provides basic and comprehensive principles and guidelines for environmental protection and management. The Constitution states that everyone has the right to live in a clean and healthy environment and the Government will make every effort to provide such an environment. The Constitution also holds the Government and the people of Ethiopia responsible for the preservation of natural resources and maintenance of ecological balances. A number of proclamations and supporting regulations were made that contain provisions for the protection and management of the environment which reflect the principles of the Constitution.

The most important step in setting up the legal framework for the environment in Ethiopia has been the establishment of the Environmental Protection Authority (EPA) by proclamation No. 9/1995. According to this proclamation the Environmental Protection Authority (EPA) has amongst its 'powers and duties':

- To prepare environmental protection policy and laws; and, upon approval, follow up their implementation.
- To prepare directives and systems necessary for evaluating the impact of social and economic development projects on the environment; follow up and supervise their implementation.

These powers and duties are amongst those for which the Environmental Protection Agency has been given particular responsibility by the Government. In this regard, the EPA has taken the necessary steps and embarked on the establishment of an Environmental Impact Assessment System for Ethiopia including the preparation of Procedural and Sectoral Guidelines as a prerequisite for the approval of new development activities and projects.

The purpose of this paper is to highlight the major endeavours undertaken by the Authority in preparing the draft EIA system (especially the development of Procedural Guidelines) in Ethiopia.

## ENVIRONMENTAL POLICY

### *A basis for EPA's EIA system*

The first comprehensive statement of Environmental Policy for the Federal Democratic Republic of Ethiopia was approved by the Council of Ministers in April, 1997. It was based on the policy and strategy findings and recommendations contained in Volume II of the Conservation Strategy for Ethiopia. The Environmental Policy is predicated on a growing concern for the degradation of the natural resource base, and takes into account how that base is affected by, and affects, the overall productivity of the agriculture sector in the country. The 'overall policy goal is to improve and enhance the health and quality of life of all Ethiopians and to promote sustainable social and economic development through the sound management and use of natural, human-made and cultural resources and the environment as a whole so as to meet the needs of the present generation without compromising the ability of future generations to meet their own needs'.

The following extracts are derived from the respective policy objective statements and policy elements within the National Environmental Policy and have been considered as providing essential guidance for EPA's activities in general and for its preparation of EIA Procedural Guideline in particular:

### *Extracts from the Environmental Policy of Ethiopia*

- Incorporate the full economic, social and environmental costs and benefits of natural resources development.
- Appropriate and affordable technologies which use renewable resources efficiently shall be adopted, adapted, developed and disseminated.
- When a compromise between short-term economic growth and long-term environmental protection is necessary, then development activities shall minimise degrading and polluting impacts on ecological and life support systems.
- Regular and accurate assessment and monitoring of environmental conditions shall be undertaken.
- Ensure that environmental impact assessments consider not only physical and biological impacts but also address social, socio-economic, political and cultural conditions.
- Recognise that public consultation is an integral part of EIA and ensure that EIA procedures make provision for both an independent review and public comment before consideration by decision makers.
- Establish the necessary institutional framework and determine the linkages of its parts for undertaking, coordinating and approving EIAs

and the subsequent system of environmental audits required to ensure compliance with conditions.

- Develop detailed sectoral technical guidelines in EIA and environmental audits.
- Ensure that preliminary and full EIAs are undertaken by the relevant sectoral ministries or departments, if in the public sector, and by the developer, if in the private sector.

The above policy objective statements and guiding principles were very important as they have shaped the draft EIA system formulation and their implementation.

## **OVERVIEW OF EIA SYSTEM IN ETHIOPIA (STATUS)**

### *Approaches taken in developing the EIA system*

The EIA Procedural Guideline is derived from a range of other sources and has been adapted, where appropriate, to suit the environmental and social situation of the country. As mentioned in the introductory part of this paper, however, the primary source is the Environmental Policy of Ethiopia.

Most of the issues which are raised in establishing the mechanism for the effective implementation of the EIA procedure in the development projects of all sectors are essentially similar. For this reason one set of procedures has been prepared which is relevant to all development projects. But the proposed procedure does not show detailed aspects of technical issues that are pertinent to projects in particular sectors. Such details have been covered in technical guidelines specific to the sectors.

### *Application of the proposed procedure*

The prepared Procedural Guideline is applied only to those projects whose location, nature or scale mean that they are likely to have significant impact, not to every small-scale development project. In this regard, therefore it is believed that the prepared procedure is simple and does not create bureaucratic obstacles to progress but is making a positive contribution to development by ensuring that those development schemes that go ahead will be healthy, acceptable and successful.

As addressed in the Procedural Guideline, smaller projects will only require an EIA study if their impact is likely to be significant by virtue of their location or other special feature (e.g. a scheme with a dam and reservoir is more likely to require an EIA than a run of river scheme).

According to the proposal, the project proponent (developer) is responsible for undertaking an 'Initial Environmental Examination' (IEE) in order to determine whether or not a given project requires full EIA. The IEE report would have importance in setting out relevant details of the project (location, size of the project, likely impacts and proposed mitigation

measures etc). On the basis of the IEE report, the Competent Agency (e.g. EPA) will approve the project (with conditions if considered necessary), request a full EIA study, or reject the project outright.

The EPA can assist developers in addressing environmental issues related to development projects and in meeting environmental impact assessment requirements by preparing sectoral EIA guidelines that provide relevant information and making them available to the developers.

### **STATUS OF THE EIA SYSTEM AND KEY ISSUES RAISED IN THE PROCEDURE**

With its limited experience with initiating and completing environmental impact assessment studies of development projects, the EPA also has only very recent experience on the establishment of the EIA system (Procedural and Sectoral Guidelines). The proposed EIA system is at a draft level and is expected to be refined by the input of comments and/or suggestions from different stakeholders.

The draft EIA Procedural Guideline raises a number of fundamental questions regarding the development of EIA procedures in Ethiopia, such as the stage in the project cycle at which EIA should be introduced, the need for giving opportunities for the public to participate on EIAs, and the institutional arrangements for their implementation. Proposals have been formulated for these elements and are briefly discussed in the EIA Procedural Guideline document. A brief discussion of these elements is in the section of this paper which addresses some of the important aspects of the Procedural Guideline. In the Guideline there is also a recommendation for developing some outlines for EIA procedures which include an Initial Environmental Examination (IEE) for categorisation of projects which require EIA. The scope of EIA procedures is also presented. As briefly discussed in the document, the main purpose of the procedure is to guide the developer, competent agencies (EPA at the federal level and environmental agencies at the regions) and other stakeholders through the EIA process.

Sectoral Guidelines (eg. Agriculture, Industry and Transport) contain in great detail technical aspects that are pertinent to projects in particular sectors. These sectoral guidelines will benefit the developer and the country by steering the projects into sustainable development and by avoiding the careless use and destruction of Ethiopia's fragile environment and precious natural resources on which present and future generations depend.

However, this draft EIA system in Ethiopia is not yet legally binding and is used on a voluntary basis. It is hoped that after experience is gained in implementing the EIA, the EIA system will be formalised by way of backing it with the necessary legislation and regulations. To this effect, the Environmental Policy of Ethiopia has already been adopted and the preparation of a framework environmental law is under way.

## **SOME OF THE IMPORTANT ASPECTS (ELEMENTS) OF EIA PROCEDURAL GUIDELINES**

### *EIA procedures and the project cycle*

In the proposed guideline it is suggested that the environmental consequences of a proposed project should be recognised early in the project cycle since this makes it easier and less costly to expand, reject or sustainably modify the proposal. As projects pass through successive stages of the cycle and are not 'rejected' however, it is proposed that their scrutiny should go into more detail. In this aspect the draft EIA system has recommended an element of monitoring of the actual environmental impact of a project once implementation takes place in order to check that:

- there has been compliance with environmental standards;
- mitigation measures have been implemented; and
- no unexpected impacts have arisen.

## **OUTLINES OF THE PROPOSED DRAFT EIA PROCESS (MAIN STAGES)**

The main stages in the proposed draft environmental impact assessment process include:

- Screening which will be undertaken to decide which projects should be subject to environmental impact assessment. Criteria used include size of project, nature of project and sensitivity of the environment. As clearly mentioned in the proposed guideline, screening will be undertaken by the Competent Agency. This will be done by reviewing the Initial Environmental Impact Statement of the proposed project.
- Scoping: the process which defines the key issues should be included in the environmental assessment. The intent of this process is to focus the environmental impact assessment on a limited number of environmental issues and to identify these issues through proactive public consultation which ensures that a wide number of stakeholders are to be involved. As stated in the guideline document, these key issues will be clearly described in the Terms of Reference (ToR) which will be prepared by the project proponent. According to the proposal, the ToR will be submitted to the competent agency for approval.
- Study phase: As stated in the procedure, paying the cost of, and undertaking, the study is the responsibility of the project proponent. The output of the study (EIS) will be reviewed by the Competent Agency.
- Review: As environmental impact statements are normally produced by the project proponents, it is usual for a review to be undertaken by the concerned Competent Agency. The concerned Competent Agency is also

responsible for reviewing and approving the Initial Environmental Examination reports and ToRs of the proposed projects.

- Monitoring is normally adopted as a mechanism to check that any conditions imposed on the project are being enforced or to check the quality of the affected environment. The responsibility for undertaking this activity is with the project proponent. However, the Competent Agency is also involved in this process as is deemed necessary.
- Auditing is used to test the scientific accuracy of impact predictions and as a check on environmental management practices. It is stated in the guideline document that the project proponent and the Competent Agency are actively participating in undertaking this major activity.

These broadly defined stages in the proposed procedure reflect what is now considered to be good practice within environmental impact assessment. However, it should be noted that there are other key elements which have been included in the Procedural Guideline. Among these are consultation with the public, government and non-government agencies as an integral part of the process.

## **BENEFITS AND CONSTRAINTS OF THE IMPLEMENTATION OF THE DRAFT EIA SYSTEM**

### *Benefits*

The EIA system has helped the EPA and other decision makers to anticipate potential impacts of proposed development activities, both beneficial and adverse, assisting in the identification of optional alternatives which maximise beneficial impacts and mitigate adverse impacts on the environment.

The proposed procedure is found to be useful in that it enables individual projects to proceed only when it has been determined that they will not cause unacceptable environmental damage and that mitigation measures will be taken, whenever feasible, to minimise any damage which is considered to be unavoidable.

With the formation of local governments and devolution of decision making to grassroot echelons of communities, these proposed procedures and guidelines have given more emphasis to new directions to address specific local needs and opportunities.

The draft EIA system has evolved in a way that is attracting the grassroots people to participate in project planning and design as well as decision-making. The EIA system developed by the authority is spearheading such an initiative which will lay the requisite basis for public participation in environmental and developmental planning and monitoring of projects.

Recently, two workshops on the proposed EIA system were held. The comments and/or suggestions collected from the participants during the workshops have served as a basis to refine the guideline documents and when adopted and implemented at a later stage will create a sense of ownership by all concerned stakeholders.

The EIA process allows project developers to have sufficient information regarding environmental impact so that they can make sound development choices.

### *Constraints*

Major constraints which have been recognised as the result of implementation of the draft Procedural and Sectoral guidelines are:

Even though there have been some sectors which considered the requirement of EIA in their laws, there is as yet no law or regulation that applies to all proposed development projects. And this would make the proposed EIA guidelines at present not enforceable.

Although the guidelines are fairly comprehensive, they are limited in their applicability. Those limitations which need further due considerations are:

- setting indicators for threshold values for selecting development projects which require partial detailed EIA;
- setting criteria for defining adverse significant impacts of a project;
- developing appropriate standards (environmental requirements) for reviewing environmental impact statement reports;
- reviewing checklists and Initial Environmental Examination (IEE) format; and
- auditing procedures and using audit checklists.

There is a shortage of trained practitioners for the implementation of EIA.

Past experience has shown that most of the EIAs undertaken by many of the proponents have been at a late stage during the study phase rather than early in the screening phase. And this does not fit the EIA objective of influencing the choice of project alternatives.

There needs to be a way of addressing appropriate mechanisms to ensure adequate and useful public involvement throughout the project cycle.

Pending issues such as institutional arrangements so as to effectively execute the EIA, setting the time frame for various stages of EIA process, and the incorporation of workable appeal and grievance procedure have not yet been settled.

LIST OF RELEVANT PUBLISHED PAPERS OR OTHER SOURCE  
MATERIAL

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**Key words**

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# State of the environment in Sudan

*Asim I El Moghraby*

## ABSTRACT

Sudan is an example that projects the environmental plight of Africa, south of the Sahara – drought and desertification, floods, deforestation, loss of biodiversity, tribal and ethnic conflict and poverty are only too common. As a result, interest and commitment to environmental impact assessment practices have become mandatory by donors when executing new development projects. Older projects, however, continue to escape notice. New projects compile their own ‘EIA’ with no genuine efforts to legalize and institutionalize EIA.

## INTRODUCTION

No doubt accumulating indigenous knowledge and cultures are influenced by natural resources and the intensity of their use. In this respect Sudan could be taken as an example of the whole Sudano-Sahelian Belt, across Africa south of the Sahara. Historically tribal communities were well organized in mitigating natural disasters like fire and the invasion by the desert locust. Managing natural resources became more institutionally efficient after the re-conquest of Sudan in 1898. The first environmental law enacted was the Forestry Act of 1901, followed by the Land Tenure Law of 1908. The early 30s witnessed several environmental initiatives. The 40s produced the ‘Stepping Report’ on desert encroachment in Sudan and neighbouring African Countries. The Forestry Law came into force in 1932, the Wildlife Act and the proclamation of several National Parks came in 1935. The Land Use Committee was also established in 1944. It was a good record! Management of resources, however, was focused on exporting raw materials to the benefit of colonial countries.

Many years ahead of its time was the establishment of the Jonglei Investigation Team to look into the probable impacts of the Equatorial Nile Project. The four-volume report, submitted in 1954, is perhaps the first Environmental Impact Assessment endeavour ever carried out prior to a development project in Africa. The project was subsequently abandoned due to its monumental environmental and social repercussions.

After independence in 1956 the National Governments took several initiatives to manage and rehabilitate natural resources. Several specialized departments and units were created to conserve soils and program water

**See Topic 2**

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*Law, policy and  
institutional  
arrangements*

etc. Massive projects were launched like the anti-thirst campaign of the 1960s, expansion in rain-fed and irrigated agriculture, building dams across the Nile and other rivers, overstocking livestock, deforestation etc. This resulted in large-scale population movements, environmental degradation, dam siltation etc. It must be stressed that the outlook had always been that natural resources are renewable and infinite. The value put on the soils, waters and natural vegetation covers for example was zero in the calculations of cost and benefit of new projects.

Professional and sectoral tribalism and population explosion as well as cyclic droughts increased synergetic pressures on the natural resources culminating in chronic poverty, repeated famines and near total collapse in life-supporting production systems. Sudan is at this point in time one of the poorest countries in the world; in spite of the fact that it is vastly rich in natural resources and highly qualified professionals. It is a typical situation of 'scarcity among the plenty'.

Firm political commitment and understanding of the environmental dimensions of resource management does not exist. Many examples could be cited. The new adoption of the federal laws divided the country into 26 states. The division of old administration areas into northern and southern states neglected the ecological need to draw management plans on regional bases.

## **BACKGROUND**

With an area of around 2.5 million square km Sudan stretches between latitudes 4 and 22 North. It is mostly flat plains with a few mountain areas, the highest of which is Jebel Marra massive in the west. It is bounded by nine countries and a coastline around 650km on the east. Sudan has around 2000 million ha of surface water the most important of which is a 4000 km stretch of the Nile and tributaries. Rainfall ranges between almost nothing in the barren deserts of the north to about 1400mm in the southern sub-humid parts of the country. The climate is tropical and is one of the hottest in the world with vast daily and seasonal variations in temperature. According to the 1993 census Sudan is inhabited by almost 25 million people of whom 25% live in the capital, Khartoum. They belong to about 700 tribes speaking more than 300 dialects and languages. The rate of growth is around 2.9%. About 80% of the population depend on agriculture for their livelihood. Cotton, oil seeds, gum arabic and livestock are the main exports of the country.

Harrison and Jackson classified the ecological zones of Sudan in 1958 as:

- Deserts: cover almost 30% of the northern parts. Annual precipitation is less than 50 mm; soils are sandy. Sparse vegetation grows on seasonal 'waddis' and the banks of the Nile.
- Semi deserts: cover above 20% south of the desert belt. Rainfall

between 50 and 300 mm. It is speckled with few Acacia trees and thorny bushes and zerophytes.

- Low rainfall woodland Savannah: covers about 27% of the area of Sudan with rainfall less than 900 mm. A nine-month dry period. Annual grasses are dominant. Heavy clay soils lie on the east of the Nile and the west is sandy. Most of the 36 million feddans of rain-fed agriculture and the 4 million irrigated lands fall within this heavily populated belt.
- High rainfall woodland Savannah: 13% of the area with rainfall more than 900 mm and with broad-leafed trees in the Southern parts of Sudan
- Swamps: are probably the largest in the world and cover about 10% and fall in three main areas around the tributaries of the White Nile.
- Highlands: are less than 0.3% of the area of Sudan and are scattered along the Red Sea coast, the south and the west of the country.
- The Red Sea Cost-Marine ecosystem, mangrove swamps, coral reefs and associated fauna.

The ecological diversity is reflected in the richness of biodiversity; out of 13 mammalian orders in Africa, 12 occur in Sudan. Cave and Macdonald (1958) recorded 971 species of birds. Setzer (1956) reported 91 genera and 224 species and sub-species of mammals other than bats. The Nile is the home of 106 species of fish and the swamps are considered as a major gene reserve (Moghraby 1982). One water sample taken by Prowse in 1958 'contained 211 species and varieties of desmids of which no less than 21 were entirely new species and 48 are new varieties and formae' (Hammerton 1964). World Research Institution Annual Report 1995 recorded 3112 flowering plants in Sudan.

Biomass makes up more than 80% of the energy used, 12% are petroleum derivatives while hydropower is only 1%. Oil reserves have recently been discovered in the western and southern parts of the country. Sudan is currently suffering from a chronic energy crisis (Callaghan *et al* 1985).

### **THE STATE OF THE ENVIRONMENT**

At the beginning of the 20th century the population of Sudan was only three millions and the economy was a subsistence one. Modernization of the economy and social progress started with education well before World War One. Massive agricultural schemes like the Gezira (2.5 million feddans) were launched after the War. This involved building dams and irrigation works (10 thousand km of canalization in the Gezira scheme).

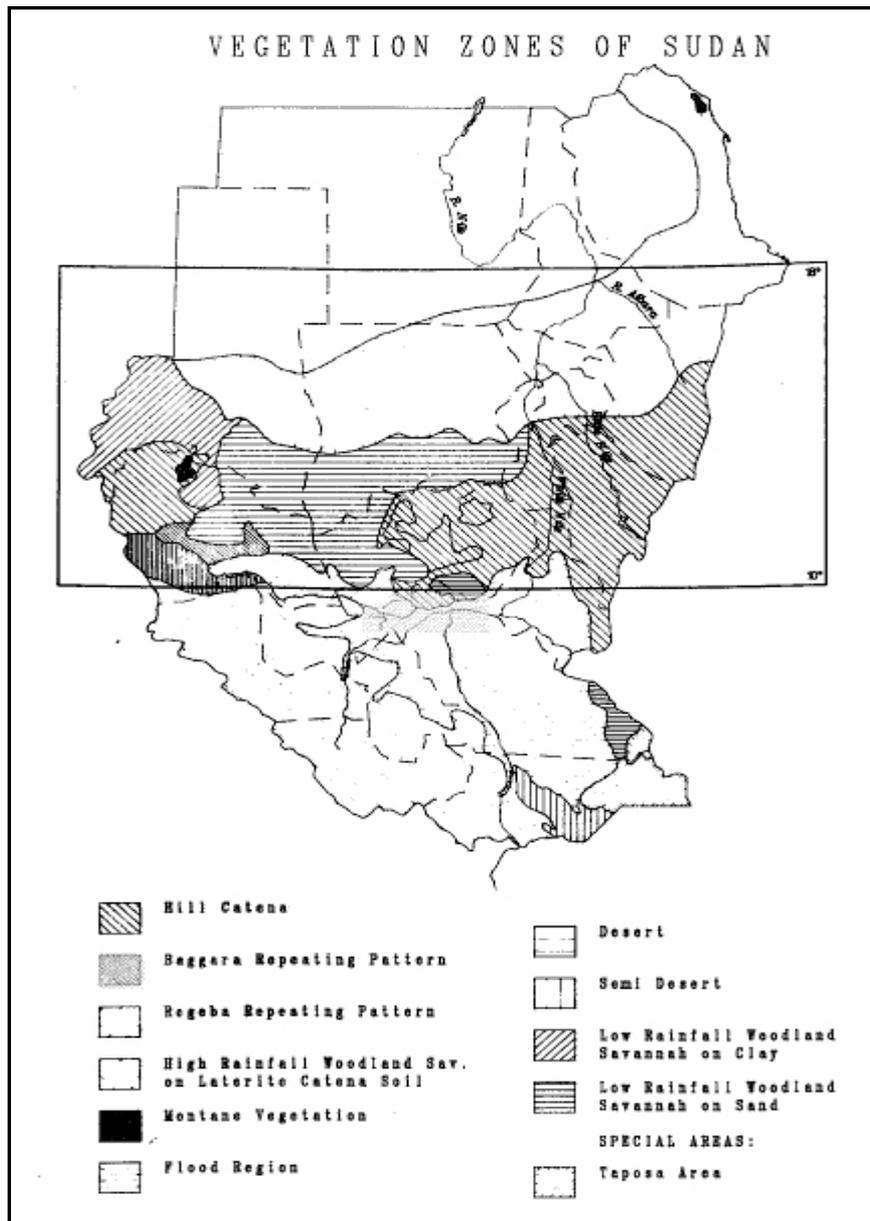
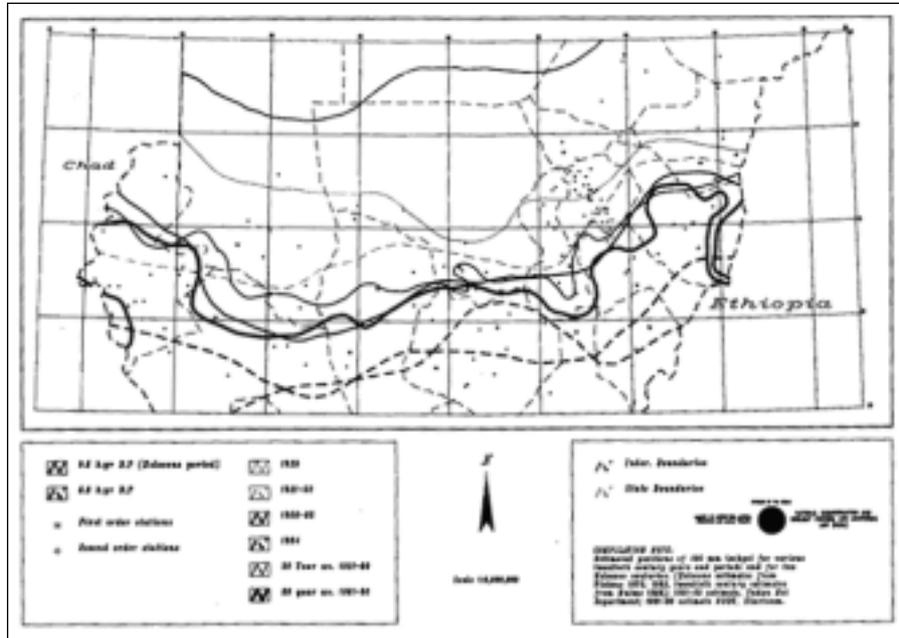


Figure 1: Vegetative zones of Sudan

Although pilot projects, to test production techniques, preceded the full scale launching of the project, environmental impacts, like deforestation, population movements, Stalinization and water related diseases, were not even considered. The goal of the scheme was the production of long-stable cotton for export. Economic progress followed in many directions, influenced by the colonial powers, trying to bridge the gulf between production growth and a stagnant economy.

At this time the general picture is as follows:



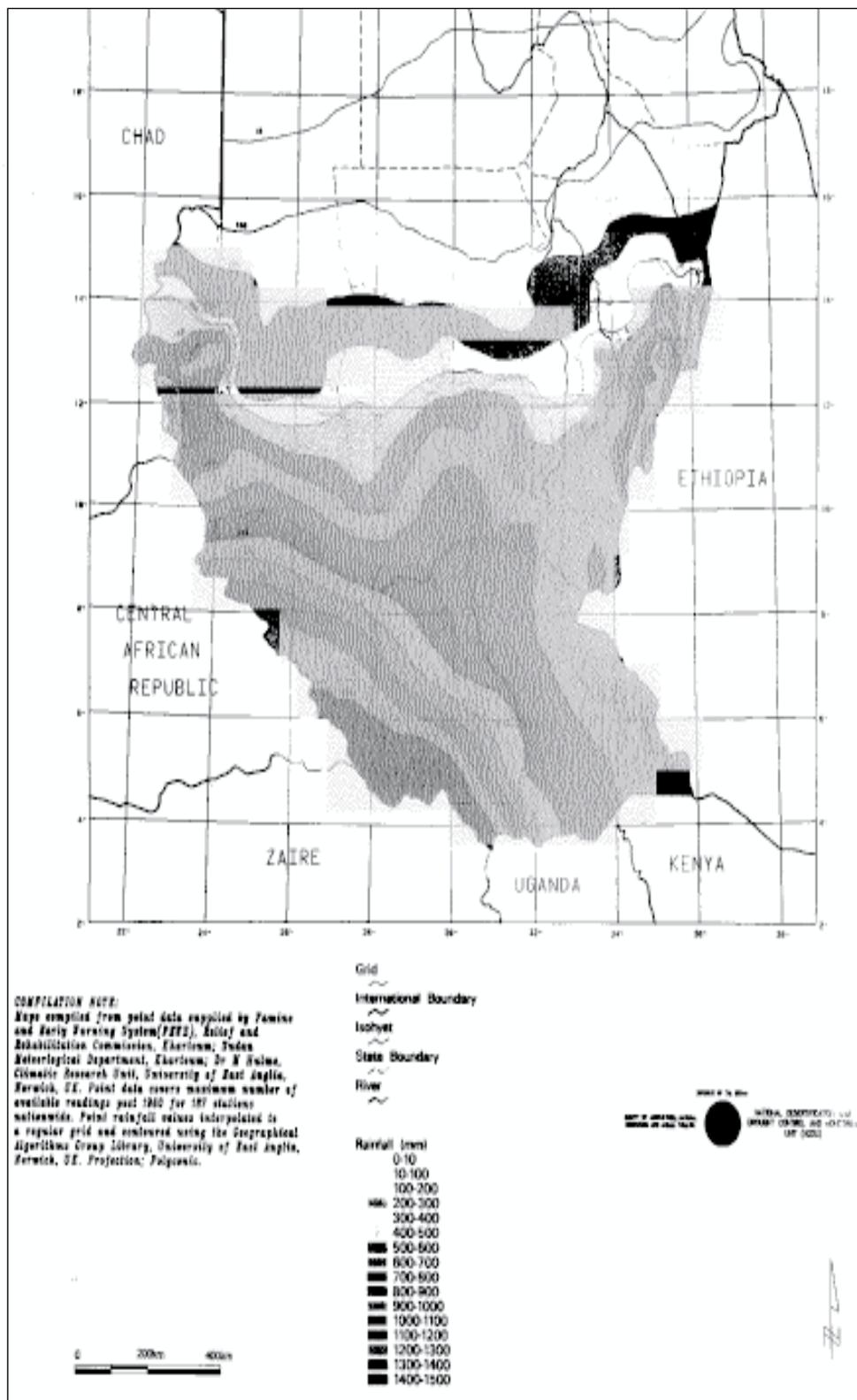


Figure 3: Rainfall 1961-1990

Dams across the Nile in Sudan have serious siltation problems. This is due to the high load transported down from the Ethiopian Plateau as well as from degraded watersheds. Lower water current velocities are a consequence of decreased volume of discharge. This makes Sudanese rivers vulnerable to invasion by weeds and water-related diseases. Perhaps the Nile is one of the least polluted rivers in the world. Sources of contamination include sugar estates, power plants and agricultural chemicals. The infrastructure of rainwater drainage systems has deteriorated of late. Incidences of malaria and enteric diseases are prevalent during the rainy season. The wide use of domestic water storage tanks has also made malaria a domestic disease.

### **DETERIORATION IN BIODIVERSITY**

The annual rate of deforestation is close to 504 thousand hectares. Only 30,000 ha are reforested. We lost a number of wild life species in the last two decades; many more are endangered or vulnerable. This is mostly due to habitat destruction. Several grasses and herbs have disappeared due to overgrazing, repeated droughts and fires. Fires are responsible for the annual loss of 30% dry fodder otherwise available to wild life and the 103 million heads of livestock.

Awareness and sensitivity to environmental issues is weak among the public and the policy makers.

It must be stressed that the overwhelming limitations of land use in Sudan are the periodic droughts experienced in the Sahelian Belt. Population distribution is inversely proportional to vegetational cover in such a way that 78% of the Sudanese inhabit northern areas with only 33% of cover (which already decreased to 18%). The remaining 22% inhabit the southern parts with 67% of the forest area.

Most of the economic development was established in northern parts of the country. Horizontal expansion in large-scale rain-fed mechanized agriculture replaced the traditional subsistence one. The areas under plough are currently 36 million feddans for the rain-fed sector and 4 million for the irrigated sector. Productivity is very low notwithstanding the use of agricultural chemicals and hydrocarbon fuel. Farming marginal lands (with precipitation less than 300mm) is particularly disastrous. Farming and distorting flood plains seasonal watercourses have far reaching effects.

### **ENVIRONMENTAL PROBLEMS**

Environmental problems of Sudan can be summarized as follows: Recurring droughts and desertification have led to an increase in environmental consciousness. The fact that environmental issues affect all aspects of life in the country is gaining acceptance.

The basic environmental problems of Sudan are related to the absence of an acceptable strategic master land use plan, the growing conflicts in land use policies, the depletion of natural resources and the unchecked population growth (due to lack of a coherent Population Policy).

These problems are made worse by the limited perception of the environmental issues as well as the total neglect for the impacts of agricultural policies. The adoption of 'modernization' in agriculture (which is actually not modernization but horizontal expansion in agricultural practices with very little vertical direction) has become an instrument of interference in the traditional sector and takes away from its resources the lands, forests, ranges, pastures and wildlife.

A listing of environmental problems include:

- horizontal expansion in rain-fed and irrigated agriculture ;
- the complete absence of the environmental dimensions in policies, strategies, plans and programs of management of resources;
- development is random and environmental evaluation does exist before or after execution of projects;)
- the economy and society, in spite of the century-long attempts at 'modernization' are still dominated by subsistence way of living;
- the economy is still affected seriously by the yearly, seasonal and geographical variability of rainfall for crop and livestock production;
- dependence on imported seeds and agricultural chemicals has increased cost of production;
- loss of land productivity and marketing policies decreased cash surplus;
- the civil war in the South has grave economic and social costs;
- population distribution and rural-urban migration due to desertification and civil strife has led to deterioration of natural resources, indigenous knowledge and loss of local culture and dignity;
- problems of poor sanitation, limited industrial pollution and food hygiene have become more complex;
- the energy crisis is aggravating desertification and affecting climate charge;
- vast water resources are badly managed;
- environmental education has only been recently incorporated in school curricula; and
- laws and legislation concerning the environment are not effective and law enforcement measures are not integrated.

## CONCLUDING REMARKS

Colonial powers followed two main approaches to guiding development policies and investment. The first could be called the 'transformation approach' which meant the total restructuring of societies and ecosystems. The second is the 'improvement approach' where change was gradual. After independence many African countries fell into the grave trap and misconception of adopting the western model of development. Many were encouraged to choose capital-intensive, large-scale food production schemes as a way out. This has ultimately led to food scarcity. Sub-Saharan Africa is perhaps the only region in the world where food production has declined in the past 30 years. Per capita food consumption in 1980 for example was 15% below that at the start of the 1970s and almost 2% below that at the start of the 1960s.

Sudan is perhaps a classic example of a developing country trapped in the so called western model of development. After independence, the slogan was to 'catch up' and to achieve a revolutionary jump. We only attained a harvest of dust. What Africa needs is an alternative pattern of development.

It is no help that industrialized countries also depend on tropical resources, to a great extent, without a genuine involvement in conservation or payment of the environmental costs of overexploitation. Only recently have interest and commitment to Environmental Impact Assessment practices become mandatory by donors when executing new development projects. Of these is the development of a massive infrastructure to cope with the newly discovered oil wealth. Some of these efforts, I am afraid, are not taken very seriously.

Brain drain, poor infrastructure and attempts to rapidly modernize the economy have resulted in mismanagement of the vast resources and consequently in unsustainable social and economic development.

Gloomy as it seems, nevertheless, there is still light at the end of the tunnel! Recurring environmental disasters have made Sudanese both conscious and sensitive to environmental issues. Environmental curricula are now taught in schools. The Institute of Environmental Studies, of the University of Khartoum, is the proud father of more than 3000 Masters of Science, over a span of almost 20 years. Several Sudanese universities teach environmental curricula and management courses of natural resources. On the official level, a Higher Council of the Environment and Natural Resources has been established recently. Subsequently a Ministry of The Environment and Tourism was created.

Voluntary work is deeply rooted in the Sudanese culture. Thus the sprouting numbers of NGOs and CBOs came naturally after the Sahelian drought of the early 70s. Traditionally the 'Naffer' (during the harvest times and tasks like building homes) becomes a seasonal collective task of the

communities. The 'Fazza'(facing calamities or livestock theft or apprehending aggressors) is occasional.

A leading NGO is the Sudanese Environmental Conservation Society (SECS), established in 1975. It has more than 80 branches across the country with a membership of over 8,000. Following the INCD sessions a desertification network was established (RIOD). The Network connects national NGOs across the country, Africa and the Globe. The Sudan Women's Network is one of them.

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#### Key words

Sudan  
environmental  
mismanagement

EIA awareness

developing  
institutional  
framework  
procedures

# Institutionalization of environmental assessment in the public sector – a strategic approach

*Arshad Samad Khan*

## ABSTRACT

Under the Pakistan Environmental Protection Ordinance 1983, Environmental Assessment is a requirement for all developmental projects in the country. After the approval of the Pakistan Environmental Protection Act in 1998 it is now mandatory for all developmental projects to carry out environmental assessment before approval, thus making environmental assessment the most direct and effective means of combining development and conservation. To integrate environmental procedures and results in policy and decision making, the North-West Frontier Province (NWFP) is the leading province to have identified/indicated environmental planning, management and assessment as an immediate priority under the auspices of Sarhad Provincial Conservation Strategy (SPCS), a sustainable development agenda for the province. Under the SPCS, various measures have been taken for institutionalizing environmental assessment in the operations of government departments. These measures include: modification of PC-I to include environmental impact; and the use of PC-II for financing EIA (PC-1 and II are the main planning documents of the government for project appraisal and approval); building capacity in environmental management and assessment of the planning staff of the government departments through various training courses such as policy analysis using strategic environmental assessment; public participation; and the establishment of an Environment Section and Environment Wing in the Planning & Development Department, the sole provincial department where all developmental projects go for approval. Moreover, an Environmental Cell has been established in the Local Government Department.

Recognizing the need for environmental assessment and its use as a comprehensive and versatile instrument for achieving sustainable development, this paper will discuss how environmental concerns and assessments are being incorporated in policy and decision making processes of the provincial government of NWFP, and what efforts and measures have been taken so far in this area.

**See Topic 2**

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## **INTRODUCTION**

The North-West Frontier Province (NWFP) of Pakistan is richly endowed with natural resources including prime agricultural land, scenic landscapes, abundant forests and wildlife, a vast mineral resources base, a rich ancient culture, a network of rivers and streams, and a diverse climate. Some of these resources, such as forests protecting the watersheds, are of vital national importance. NWFP has established, and is maintaining, a high profile in the environmental arena in Pakistan. In many respects, this province is considered as the environmental conscience of the country. The province was the first to begin the implementation of Pakistan's National Conservation Strategy when it decided to prepare the Sarhad Provincial Conservation Strategy in 1992. Other provinces are now following this lead and setting up similar strategic planning processes.

Keeping in view the continuing degradation of the environment, the government of NWFP is in the process of incorporating environmental procedures into developmental policies and plans. Presently, as in the past, the main focus of the provincial government is on institutionalization of environmental planning, management and procedures. Also there is an emphasis by the government on capacity building, as there is a need to build the capacity of professionals both from the public and private sectors in environmental planning, management and assessment.

## **NATURE AND SCOPE OF ISSUES**

The most pressing environmental problems in the NWFP can be listed as increasing population; narrow rural economic base; exodus to urban centres; congestion and pollution; brunt of Afghan refugees; water-borne diseases; deforestation; lack of awareness, education and research; and inadequate institutional infrastructure.

With the enactment of the Pakistan Environmental Protection Act in 1998, it is now mandatory to conduct environmental assessment for all developmental projects. However, like other developing countries, Pakistan did not have the institutional mechanisms or the professional capacity to effectively undertake environmental assessments, and this was particularly the case in government departments. In the public sector, there are very few organizations with an exclusive environmental mandate, including the Environment Section of the Planning, Development and Environment Department (PE&D) and the Environmental Protection Agency (EPA). Both organizations are relatively new and still trying to establish their position in the provincial and national bureaucracy.

## **PROCESS AND PROCEDURAL CONTEXT**

To secure economic, social and ecological well being of the people of NWFP through conservation and sustainable development of natural resources, the

government of NWFP in collaboration with The World Conservation Union (IUCN), developed the Sarhad Provincial Conservation Strategy (SPCS). The main aim of this strategy is to integrate environmental concerns in the development agenda to ensure sustainable development of natural and renewable resources for human survival.

Environmental assessment is becoming the primary means of managing the approval of new development proposals in NWFP. Under the 1998 legislation, along with new private sector projects and industrial projects to obtain approval, public sector projects now unambiguously require environmental assessment. Under the government policy decision, there are certain institutions which will be responsible for the processing and review of environmental reports, such as EIA & IEE. In addition, the Pakistan EPA intends to delegate its responsibility for the review of environmental reports to the Provinces. Guidelines have been developed for this. In addition, the government of NWFP with the assistance of donor organizations, has started projects that should lead to the strengthening of these two essential organizations as well as other line departments.

The following are the main institutions involved in environmental planning, management, and assessment of projects in the province of NWFP:

- The Planning Environment and Development Department (PE&DD) Environment Wing and Environment Section;
- The NWFP Environmental Protection Agency; and
- Government Line Departments.

### **INSTITUTIONALISATION MECHANISMS, MEASURES AND APPROACHES**

Since the Province of NWFP is also faced with several environment-related problems various legislative, institutional, fiscal, policy and supportive measures have been initiated by the government to integrate environmental procedures into its developmental plans in order to improve the environmental situation of the Province. The mandate of the environment portfolio was given to the Planning and Development Department which changed its name to the Planning, Environment and Development Department so as to integrate environmental concerns into the government developmental policies and plans.

The following are the various measures being undertaken in order to institutionalize the environment into developmental work of the public sector by the government of NWFP.

#### **Institutional measures**

To initiate and expedite environmental planning, management and assessment processes in the public sector, various institutional measures have been taken. These include:

#### *Establishment of NWFP Environmental Protection Agency*

To enforce environmental laws, National Environmental Quality Standards (NEQS), to create mass awareness and to conduct environmental research, the provincial government of NWFP created a provincial Environmental Protection Agency in 1989 through an administrative order, under the control of PE&D Department. This is the prime regulatory agency in province, mandated to institutionalize EA process.

#### *Creation of the Environment Wing*

In order to streamline, strengthen and clarify the roles of the provincial EPA and the Environment section, an Environment Wing was created in 1996 within the PE&D Department. The Environment Wing headed by an Additional Secretary is to look after the environmental affairs in the Province. The Wing has responsibility for planning, implementing and monitoring all environment-related activities in the NWFP – including the supervision of the EPA. This measure ensures much better coordination among environment sector projects and expedites the various initiatives of the GoNWFP to improve the environmental scenario.

#### *Establishment of an Environmental Protection Cell in the Local Government (LG) Department*

To adopt the Pakistan Environment Protection Act (PEPA) 1998, an Environmental Protection Cell has recently been established in the LG Department. The main purpose of this Cell is to integrate environmental concerns in the developmental plans of the department and to build the capacity of the departmental staff in environmental planning and management. In addition, this Cell provides coordination for environment related projects to expedite the various initiatives of the GoNWFP in improving the environment. This is the first local government department in the country to have a unit dealing with environmental issues.

#### *Provincial Environment Protection Council*

A Provincial Environment Protection Council has been constituted with representation at the Ministerial level. The Council is headed by the Chief Minister. Public participation is also ensured through representation from the NGO Sector, Industrial sector and Agriculture sector.

#### *Establishment of SPCS Round Tables*

Considering the usefulness of broad-based public consultations, Round Tables have been established in various government departments. The primary objective of these Round Tables is to incorporate public input into the planning process of the government. So far, Round Tables in the following sectors have been established and made functional: Urban Environment; Industries; Education; NGOs; Communication; and Agriculture. These Round Tables provide a forum for civil society input into public sector development planning process.

*Establishment of an Environmental Planning and Management Department,  
University of Peshawar*

To introduce and improve university curricula in environmental science, of which environmental assessment forms an integral part, an Environmental Planning & Management Department has been established in the University of Peshawar.

*Legislative measures*

Proper legislation is needed to provide the legal framework within which various fiscal and policy measures can be effectively undertaken to ensure large-scale adoption of supportive measures aimed at improvement of environment. Initiatives in this critical area are described below.

*NWFP Environment Protection Act*

A draft Environment Protection Act for the NWFP has been prepared. The Act is based on the outcomes of active public participation in a workshop on Environmental Legislation as well as through the key recommendations of the SPCS.

*Policy measures*

Provincial policy, coordination and the screening of development projects for environmental impact are the responsibilities of the PE&D Department through its Environment Section and the Environmental Protection Agency (EPA). The Environment Section's main tasks are: to address urgent concerns through the formulation of appropriate pilot projects in support of the SPCS; to subject the development planning process to environmental impact screening; and to develop provincial environmental legislation.

A number of policy-level steps have been undertaken to facilitate the process of incorporating environmental measures into the sectoral priorities of relevant line departments, these are:

*Sarhad Provincial Conservation Strategy (SPCS)*

In response to the need to implement the National Conservation Strategy (NCS) which was adopted by the Government of Pakistan in 1992, the Government of NWFP, in Collaboration with IUCN, developed a strategic environmental planning document known as Sarhad Provincial Conservation Strategy (SPCS).

*District conservation strategies*

While the SPCS is a broad-based sustainable development agenda for the Province, due consideration is also being given to the expedition of the Local Agenda 21 process through the formulation of district conservation strategies. Work has commenced on Chitral and Abbottabad Conservation Strategies.

### Capacity building

In order to gain acceptance of the implementation of environment-related initiatives from policy-makers, bureaucrats, decision-makers, implementers, private sector developers, NGOs, and concerned citizens, a series of awareness raising seminars/workshops have been organized, together with short-term modules/courses in environmental planning and management for the planning officers of various government agencies.

### Supportive measures

Besides undertaking the above policy and regulatory steps, the GoNWFP has also taken numerous supportive measures, as detailed below, to institutionalize environmental protection into its development process:

#### *'Greening' of the Annual Development Plans*

Key recommendations of the SPCS action plans, pertaining to different sectors, have been incorporated in the respective Annual Development Plans (Ads) of various line departments and the Environment Wing. Besides SPCS projects, almost all relevant departments have endeavoured to include environment-related projects into their respective Ads.

#### *Environmental Impact Assessment (EIA) Unit*

The capacity of the EPA to carry-out EIAs has been enhanced under the World Bank funded project, i.e. Environmental Protection and Resource Conservation Project through establishment of an EIA Unit. This will enable the GoNWFP to review all public development projects for conformity with the GOP's environmental policies.

Various factors are involved in the institutionalization process of environment and EA in the developmental plans, policies and procedures of public sector. The following are the main causes of the environmental movement in the province of NWFP:

- interest and support of the pro-environment bureaucrats;
- support from some senior politicians;
- demand and support of the donor agencies;
- availability of funds; and
- availability of local experts.

### **LESSONS LEARNED/CONCLUSION**

As environmental assessment is increasingly undertaken as a planning tool and mechanism for decision-making processes to address environmental issues, the system developing in NWFP public sector has to some extent been successful in integrating environmental considerations into various development projects.

Although a new focus of attention, environmental management and assessment is rapidly gaining recognition and popularity in North-West Frontier Province (NWFP). As mentioned earlier, the Government of NWFP has started to formulate the Sarhad Provincial Conservation Strategy (SPCS), which has resulted in a comprehensive policy for managing the environment in NWFP. Organizations responsible for initiating proper environmental management have been created and are in the process of strengthening.

Donor organizations can play an important role in pushing government agencies to formulate environmental procedures as part of identifying projects, in order to contribute in the improvement of environmental management.

The development of the required institutional capacity should be understood to be an ongoing process. This implies that environmental problems cannot be solved (only) by applying a technical solution, which has been introduced from the outside. Development of capacity in the environment should, among other things, be process oriented with strengthened institutional support and be owned by the local society, in this case NWFP.

The success and effectiveness of environmental management policies will depend on the availability of effective policy instruments. Successful attempts to develop environmental capacity in order to improve environmental management will require a strong commitment, both from the government and the main donor organizations; the two most important actors in the development process in NWFP.

With the emergence of new institutions, policies and programmes for the environment, there is a need for thoughtful assignment of institutional roles. For example, which functions belong to the government, which to the NGOs, and which can be addressed by the private sector? Traditional roles need reiteration as well as review within Government.

Improvement of environmental management in a province or region will depend on the financial scope that exists for strengthening capacity in the environment, carrying out environment-oriented research, and implementing environment-oriented projects.

In general, to integrate environmental assessment/concerns into the developmental plans, policies and projects, there need to be a number of critical elements in place, such as:

- support and commitment from bureaucracy;
- political support and will;
- development of such mechanisms through which environmental concerns could be incorporated institutionally ;

- support from the international donor agencies;
- a clearly enunciated legislative mandate for Environmental issues; and
- a body of policy makers, planners, and decision makers well-versed in Environmental planning,

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#### Key words

**sustainable  
development**

**strategic  
environmental  
assessment**

**capacity building**

**institutionalism**

# Devolution of environmental regulation: EIA in Malaysia

*Ali Memon*

## ABSTRACT

Until very recently, environmental impact assessment in Malaysia has been a federal government responsibility. The situation is changing now with the States of Sarawak and Sabah having adopted independent impact assessment procedures for natural resource management and it is possible that other States may follow suit. This paper will examine the factors which have culminated in this trend towards devolution of environmental regulation in Malaysia and comment on possible implications for environmental management.

## THE FEDERAL ENVIRONMENTAL IMPACT PROCEDURES

The Malaysian federal EIA requirements have been in operation now for ten years within the framework of the Environment Quality Act 1974 (EQA). The EQA was enacted in 1974 as the major federal environmental statute and a new Department of Environment (DOE) was established to implement this statute. The need for better environmental management was formally endorsed in the Third Malaysia Plan (Government of Malaysia, 1976). The EQA is the basic instrument for achieving national environmental objectives. During the first ten years of its administration emphasis was put on curbing pollution by means of regulations gazetted under the Act. The emphasis on control of pollution and the taking of remedial actions was a reflection of the magnitude of environmental pollution problems then and increasing public concerns. During the 1970s and 1980s, wastes from agrobased industries (palm oil and rubber) were major problems.

It was not until 1987 that environmental impact assessment (EIA) procedures were introduced under the EQA to emphasise the importance of preventative controls. Once again, this action was a response to the increasing magnitude of environmental problems in Malaysia. The shift from raw material production to manufacturing as the basis of the country's economy became evident in the 1970s, and the rate of industrialisation and urbanisation has accelerated since then. Between 1960 and 1990 real GDP increased sevenfold, at an annual growth rate of 6.8 percent. Manufacturing now accounts for over 30 percent of GDP and 60 percent of exports.

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Together with the benefits of development have come negative environmental impacts and cumulative environmental degradation.

The Malaysian EIA procedures are comparable to the National Environmental Policy Act 1969 (NEPA) model in the United States. The Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987 was gazetted as a project planning tool for new projects or the expansion of existing ones. Section 34A of the Environmental Quality (Amendment) Act 1985 requires anyone who intends to undertake a prescribed activity to first conduct a study to assess the likely environmental impacts that will occur from that activity and the mitigating measures that need to be undertaken. The Environmental Quality (Prescribed Activities) (EIA) Order 1987 specifies some 19 categories of activities requiring EIA reports prior to implementation. The EIA procedure is shown in Figure 1.

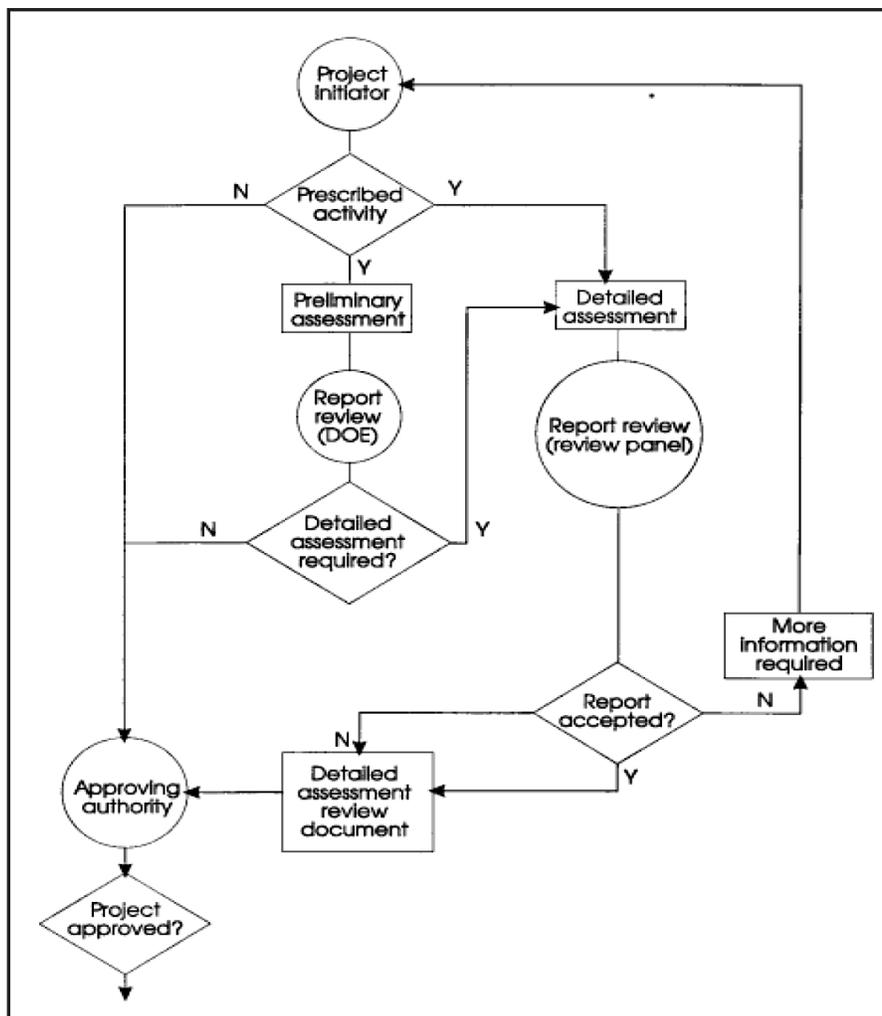


Figure 1: Federal environmental impact assessment procedures, Malaysia

EIA reports submitted to the DOE by project proponents are reviewed by special technical panels comprising individuals from government agencies, the universities, the private sector and non-governmental organisations.

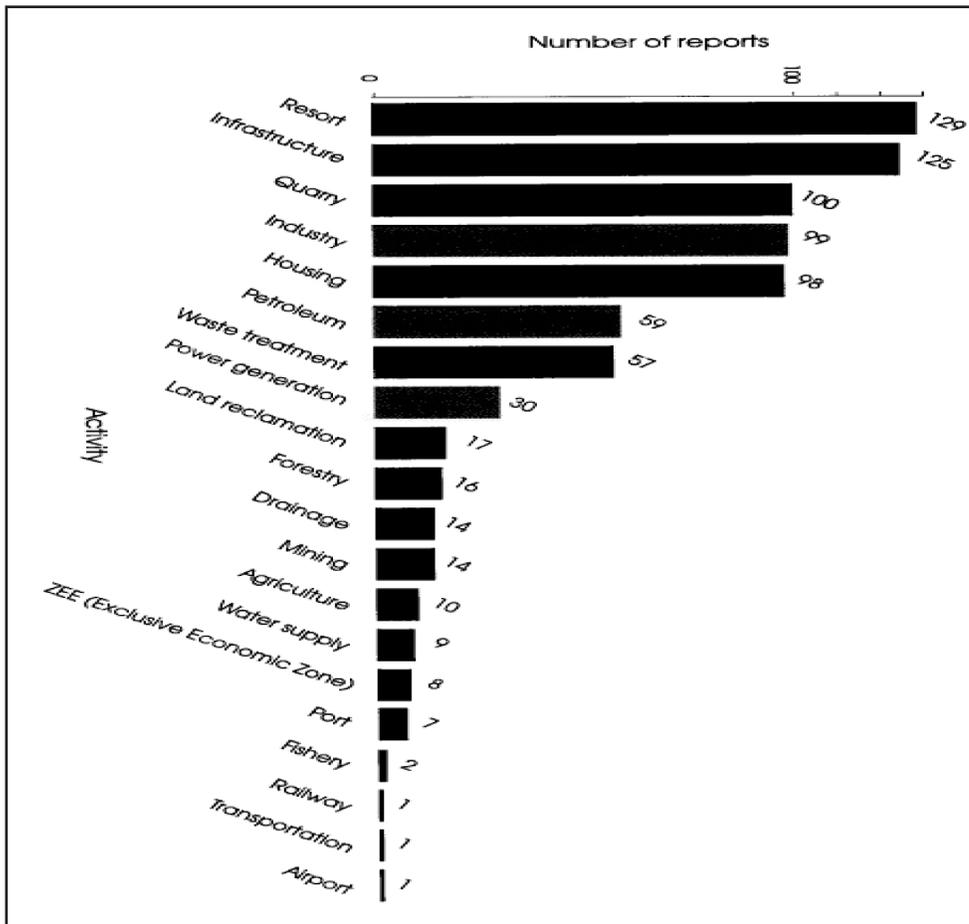


Figure 2: Federal EIA reports according to prescribed activities, Malaysia 1988-93

It has taken considerable effort on the part of the DOE to improve the understanding and acceptance of the EIA requirements on the part of state and federal agencies and private sector developers. The Department has established offices in state capitals to promote more effective co-ordination with state government bureaucracy and developers and the processing of EIA reports has been progressively decentralised to these regional DOE offices since 1993. Figure 2 above shows the distribution of EIA reports according to the type of prescribed activity specified in the EIA Order, with recreation and resorts, infrastructure and quarries as the dominant categories. Figure 3 shows the geographical distribution of EIA reports, with Selangor and Johor in Western Malaysia as the focus of most development activity. In the Sarawak State on the island of Borneo in Eastern Malaysia the

majority of the EIA reports have been related to petroleum and related industrial development projects in Bintulu region (Rasol, 1994) (Figures 4 & 5).

The major constraint on the effectiveness of the Federal government EIA procedures in Malaysia pertains to constitutional limits on its jurisdiction with respect to environmental management. Under the Malaysian Federal Constitution land and water are under the purview of State governments. Each State is empowered to enact laws on forestry, water resources, mining, wildlife and fisheries. The management of these resources is beyond the scope of the EQA and the role of the DOE. State government decisions over the allocation and management of these resources tend to be politically sensitive issues and the Federal government has to tread warily to avoid being perceived to interfere in State matters. As discussed below, this is particularly the case with the two Borneo States of Sarawak and Sabah in Eastern Malaysia on account of their distinct ethnic identity and the special provisions in the Malaysian constitution when they became members of the Federation in 1963.

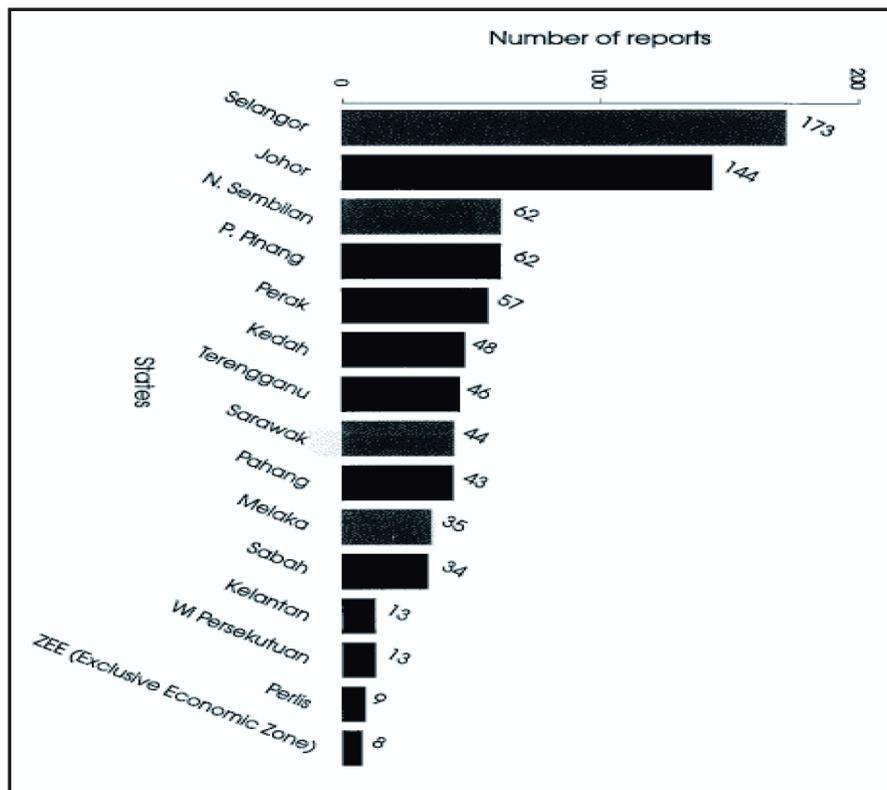


Figure 3: Federal EIA reports by States, Malaysia 1988-93

A number of other EIA issues and problems have been identified in Malaysia (Harun, 1994), and these are comparable to those in other developing countries:

- Lack of awareness of the strength of EIA as a planning tool. Many still perceive EIA as a stumbling block to development.
- Perception that carrying out an EIA study would delay project approval and implementation.
- EIA not carried out prior to final project design, so that issues such as siting and technology are not considered.
- Lack of base-line data on environmental quality.
- Poor prediction of impacts.
- Limited public participation.

### **CONSTITUTIONAL JURISDICTION OVER ENVIRONMENT**

The Ninth Schedule of the Malaysian Federal Constitution provides for the general distribution of legislative powers between the Federal and State governments as follows: List I (Federal List) List 11 (State List) and List III (Concurrent List). In addition, the Ninth Schedule includes list 2A (Supplement to State List for Sabah and Sarawak) and List 3A (Supplement to Concurrent List for the States of Sabah and Sarawak) which accord even greater control to the two States over natural resources when Sabah and Sarawak joined the Federation in 1963. The State of Sarawak has exclusive jurisdiction to make laws affecting land use, forestry (which includes the removal of timber and biomass), impounding of inland water, diversion of rivers, electricity and the production of electricity generated by water, and local government. Items not enumerated in the Ninth Schedule fall under State jurisdiction under the Residual category.

As a reflection of the dependence of the Sarawak economy on the export of natural resources coupled with its distinctive ethnic identity, the State has over the years zealously guarded its constitutional autonomy against perceived encroachment by the Federal government. Thus, the scope of many federal statutes is limited to Eastern Malaysia while the bulk of the natural resource legislation in Sarawak comprises State enacted laws. The jurisdiction of the majority of federal laws does not extend to Sarawak as these matters are in the State List or the Concurrent List in the Federal Constitution.

During the last three years Sarawak has been successful in partially wresting from the Federal Government control of environmental impact assessment procedures specifically for resource based development projects. On the strength of its legislative powers under Article 77 of the Malaysian Constitution the State has recently amended its Natural Resources Ordinance 1949 as the Natural Resources and Environment Ordinance 1993 and established the Natural Resources and Environment Board (NREB) to

enforce the Ordinance. The purpose of the Ordinance is to enable the State Government to promote sustainable management of natural resources, specifically items that are enumerated in the State List: land use, forestry, agriculture and inland water resources. It is an enabling statute that is implemented by making subsidiary legislation or by cross-referencing it in other statutes which it over rides.

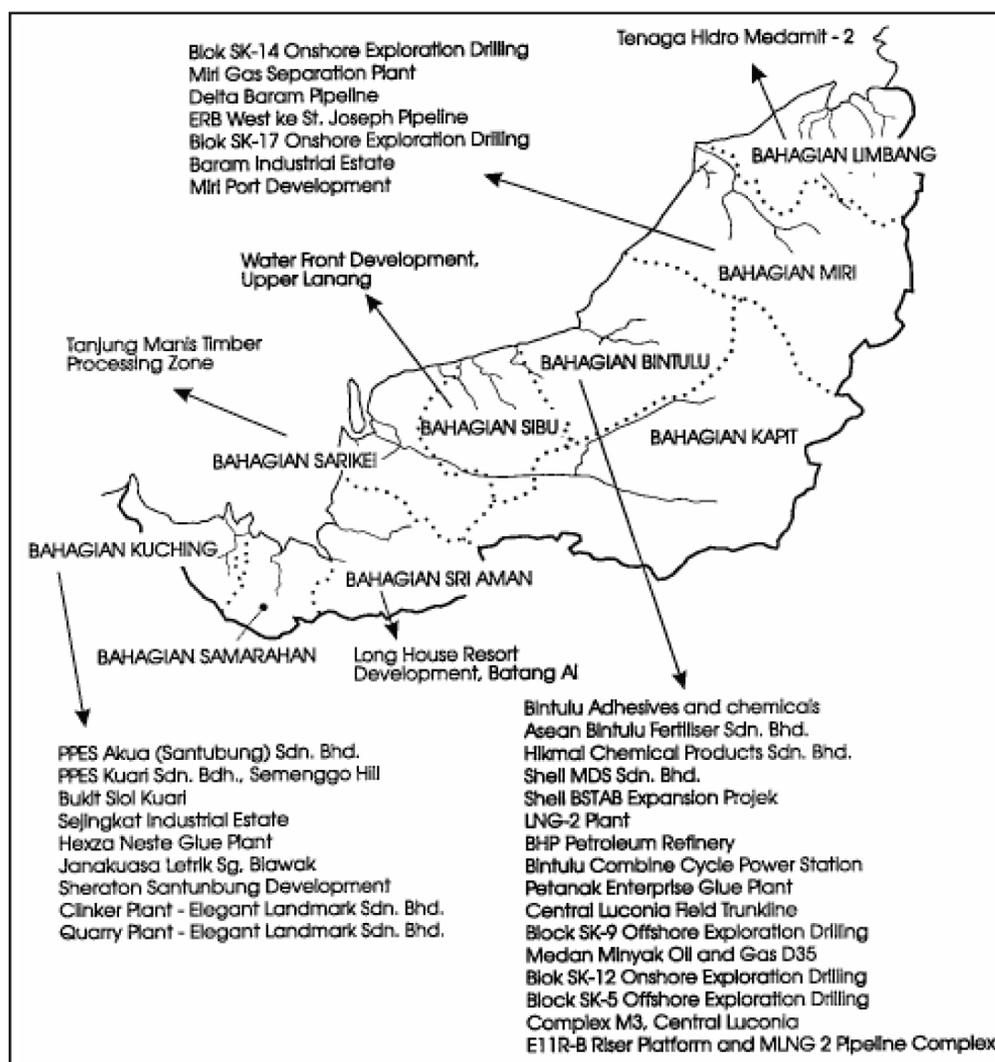


Figure 4: Geographic distribution of Federal EIA reports in Sarawak, 1988-93

The State of Sarawak has recognised that ‘Environment’ is not enumerated in any of the Legislative Lists and thus comes under the Residual category under state jurisdiction. The Natural Resources and Environment Ordinance is a pre-Malaysia statute enacted in 1949 when Sarawak was governed by

the Brook colonial administration. Under this Ordinance, a state Natural Resource Board could prescribe certain activities which 'may injure, or damage or have adverse impact on the quality of the environment or the natural resources of the State' to require the approval of the Board before it could be implemented. However, these powers were not exercised until 1994. The Natural Resources and Environment (Prescribed Activities) Order 1994 besides prescribing certain activities which require the Board's approval, also lays down procedures for the application for such approvals.

The statutory functions and powers of the NREB to promote sustainable management of natural resources are quite wide ranging but its specific responsibilities so far have focused on the administration of the newly gazetted environmental impact assessment procedures. The Natural Resources and Environment (Prescribed Activities) Order was made under Section 11 A(l) of the Ordinance. The Order contains provision directing project proponents to protect and manage the environment within their project sites through the mechanism of the EIA procedure. The prescribed activities in the Order relate specifically to those that fall under the State jurisdiction in the Federal Constitution. The Federal government has removed these activities from the ambit of the Federal EIA order made under the Environment Qualities Act (EQA) in 1987.

The process for preparing and evaluating EIA reports is parallel to that under the federal EQA statute with one significant departure. The scope for public participation is limited under the state EIA process compared to the federal EIA process. The EIA reports submitted to the NREB are evaluated by a panel of experts drawn primarily from relevant government agencies, and the recommendations from the panel are taken into consideration in the approval process by the Controller of Environmental Quality. In granting approvals to project proponents, the NREB prescribes environmental conditions for protection and management. Project proponents must undertake (in writing to the Board) to comply with all the conditions. Post-EIA monitoring is carried out by the project proponents and the NREB secretariat. The fundamental difference between this Sarawak order and the Federal Guidelines is essentially the entitlement in the Federal EQA to a copy of the EIA report by the public and the subsequent public comments to the Review Panel before an approval can be granted by the Director-General. The Sarawak Order excludes these provisions.

The NREB comprises a committee made up of ex-officio members drawn primarily from State government ministries and departments which have responsibilities for natural resources management. The committee is formally responsible for charting the policy and direction of environmental protection and management in Sarawak. Following a recent (1997) amendment to the Ordinance, most of the management responsibility has now been delegated to the Controller of Environmental Quality and his or her staff.

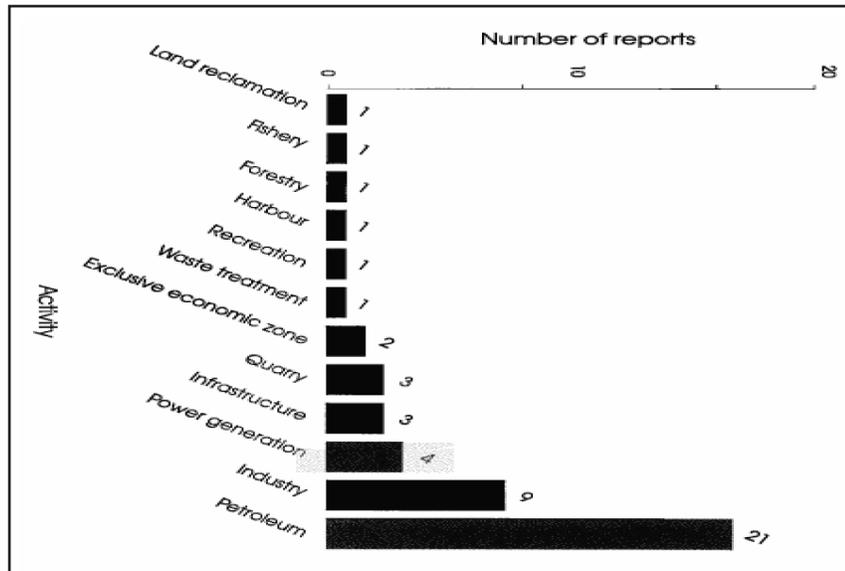


Figure 5: Federal EIA Reports according to prescribed activities, Sarawak 1988-93

### DEVELOPMENT OF RECENT EIA CASE LAW

The constitutional jurisdiction of the State of Sarawak to undertake an EIA role has proved to be a controversial issue and has been recently tested in the Malaysian Courts. The cases discussed below relate to the proposed Bakun Dam which was reviewed under the new Sarawak EIA procedures. It was alleged that the State Government, with the apparent collusion of the Federal Government, had used the State EIA procedures to facilitate the path of the controversial Bakun Hydroelectricity Project on the upper Rajang River in the heart of the remaining vestiges of the tropical rainforests.

Credence to this view was provided by the manner in which the amendment to the Federal EQA was enacted to exempt the State of Sarawak from its purview and the consequent confusion that arose subsequently about the manner in which the Bakun EIA reports were reviewed. The Court of Appeal, however, has rejected this Machiavellian explanation in favour of bureaucratic ineptitude within federal government.

The Federal Cabinet of Malaysia announced in September 1993 its approval of the proposed development of the Bakun Hydroelectric Project in Sarawak. This was to be one of the most ambitious development projects ever undertaken in South East Asia and was designed to meet the long term energy requirements of the nation with the possibility of export to the neighbouring Philippines. The project comprises the creation of a reservoir, construction of a dam, and the transmission of the generated electric power from Sarawak to Western Malaysia by a transmission cable submerged across the South China Sea. There has been considerable concern within and

outside Malaysia about possible environmental and social impacts of such a large dam. With the support of international environmental groups, three local native longhouse residents lodged a High Court action because the project entailed the destruction of their longhouses, and ancestral burial sites as well as land and forests which provided shelter, livelihood, food and medicine – to all of these they claimed to have a strong cultural attachment.

The EIA for the Bakun HEP was commissioned by the project proponent on the March 1994 and subsequent to this there were various public pronouncements by the Federal Government that the EIA report would be made available to the public for their comments before approval. The Minister had assured certain public interest groups that all EIA procedures under the Federal EQA had to be complied with by the proposed project and that public views would be considered. According to the Handbook of Environmental Impact Assessment Guidelines, a detailed EIA prepared by the proponent of the project must be made available to the public, as noted earlier (Fig. 1). The public are invited to comment on the proposed project to a Review Panel which is an independent body of experts and representatives of interested organisations appointed to review an EIA report and to evaluate the environmental and developmental costs and benefits to the community. The Review Panel makes recommendations to the Director General for his or her consideration and decision on project approval.

Large scale hydroelectric power generation and transmission projects are listed as a prescribed activity under the EQA. However, on 27 March 1995, the Federal Minister of Environment exempted resource development projects in Sarawak from the ambit of the EQA and made this exemption retrospective from 1 September 1994. The explanation given for this was that the State of Sarawak had enacted the Natural Resources and Environment (Prescribed Activities) Order 1994 about that time (August 1994).

The High Court had treated the Amendment Order as the focal point of the case. The Court of Appeal changed the focus of deliberations from the validity or otherwise of a Federal or State law to a much narrower ‘question of interpretation of the Federal Constitution in relation to the applicability of the EQA to Sarawak.’ (Court of Appeal Judgement, page 23). Since the place where the power is to be generated is land and water, and thus the ‘environment’ in question lies wholly within the legislative and constitutional province of the State of Sarawak, it concluded that the State has exclusive authority to regulate by legislation, the use of it in such manner as it deems fit.

On the strength of this reasoning, the Court of Appeal has accepted the appellants’ argument that the Sarawak Ordinance co-exists with the EQA, each operating within its own sphere based on the constitutional authority of the State of Sarawak to regulate by legislation those components of the environment that fall within its domain. The Judge concluded that ‘[in] my judgement, Parliament, when it passed the EQA, did not intend, and could

not have intended, to regulate so much of the environment as falls within the legislative jurisdiction of Sarawak.’ (Court of Appeal Judgement, page 243 He agreed with the submission of the Senior Counsel that the Amendment Order was made ‘not for the purpose of cutting the ground from under the feet of the respondents as suggested by their Counsel, but for the purpose of making it abundantly clear to all concerned that the 1987 order was not, for constitutional reasons, meant to apply to Sarawak.’ (Court of Appeal Judgement, page 24).

While it has cleared the statutory hurdles and some aspects of the project are in the implementation phase, the ultimate completion of the Bakun Dam is uncertain at this stage on account of the recent economic crisis in Asia. In hindsight, it is ironic that economic uncertainty is much more effective compared to environmental regulation instruments such as EIA in determining the fate of large scale development projects with significant environmental impacts.

One can only speculate why the Bakun project applicant chose in the first place to seek consent under the State EIA procedures instead of the Federal procedures. Apart from the size of the venture, this project is distinctive because it was conceived as the first private sector hydroelectric power project in Malaysia. As noted earlier, the role of hydro development is reserved to the Sarawak State under the Malaysian constitution.

Hitherto, electric power generation and supply has been undertaken by SESCO, a statutory corporation owned by the State. The recent move to deregulate the Malaysian economy, including the electricity sector, created the opportunity for the Bakun project as a private sector initiative and the contract to build and operate the dam was awarded to a Sarawak based business consortium. Ostensibly, the manifest advantage of the Sarawak EIA procedures from the applicant’s perspective was that they offered a faster track since the right to obtain and make submissions on the EIA report was denied to those opposed to the project. But, after all, this factor could not possibly have weighed so heavily on the minds of the Federal and State governments simply because it was not such a big hurdle to cross. Those concerned about the dam’s environmental impacts could have been given the opportunity to have their say as a token gesture and the project could have been still granted approval. It would appear that the desire on the part of the Sarawak business and political elite to ‘manage’ their own affairs was equally significant a factor as the desire for a fast track approval when the decision was made to seek consent under the State EIA procedures. The Federal government has been recently sympathetic to some degree to such aspirations in Sarawak. Even though it is not visibly Malay dominated, the current political regime in Sarawak enjoys the tacit support of the Federal government.

While the constitutional right of the two Borneo States to regulate by legislation aspects of the environment that fall within their constitutional

domain is now unquestionable, there are aspects of the Court of Appeal decision which are arguable. These concerns relate to the role of judiciary in developing countries such as Malaysia in helping to provide guidance on how environmental concerns should be addressed in the development planning process. The Appeal Court has demonstrated in its decision scant regard for the issues of environmental justice by rejecting the finding of the High Court that the longhouse applicants had vested rights under the Federal EQA which were denied to them under the Sarawak EIA Order. Even though it may have been correct in its ruling in this respect in a strict legal sense, it could have nevertheless encouraged or recommended to the Sarawak government that it amend its EIA Order to make provision for public participation comparable to the Federal provisions. The Appeal Court had ample opportunity to do this since the Federal EIA Order and Guidelines are quite explicit about the importance of citizen involvement as fundamental to the exercise of *evaluating* impacts. The Appeal Court decision reflects a very conservative stance on the right of Malaysian citizens to participate in environmental decision making. This case may act as a precedent to hamper the development of a vibrant participant democracy in Malaysia. The Appeal Court's rationale is that participant democracy is not appropriate in the particular cultural, political and economic context of the present Malaysian society. Such views reflect the perspectives of the elite in many Asian countries that generally discourage disagreement with decisions made by those elected to govern and emphasise the tradition of consensual decision-making in Asian societies. The activities of environmental NGOs are still frowned upon as a luxury that developing countries can ill afford.

The Appeal Court decision also reflects a lack of understanding of environment as a holistic concept and the need for integrated approaches to environmental management in Malaysia. Federal as well as state government bureaucracies in Malaysia are characterised by a sectoral approach to public administration, with limited lateral co-ordination between the activities of different agencies. This is a reflection of the predominance of economic emphasis in planning and implementing development projects. The Appeal Court took a simplistic approach when it defined the environment of the Bakun project as 'the land and river on which the project is to be carried out' (Court of Appeal Judgement, p. 17). It ignored the fact that the project is also located within social and cultural space.

## **DISCUSSION**

The case law relating to intergovernmental jurisdiction over EIA in Malaysia reviewed here poses a number of interesting questions for the direction of development of EIA as an environmental management tool. The recent case law discussed here has affirmed the constitutional right of the Borneo States to enact their own environmental regulation instruments such as EIA for

managing natural resources independent of the Federal government statutory controls. To what extent this case law has established a precedent for the Peninsular States in Western Malaysia to follow the example of Sarawak and Sabah is open to conjecture at this stage. There is no doubt that those states in Western Malaysia which perceive themselves as relatively economically disadvantaged on account of their peripheral position and poor resource endowment may harbour similar aspirations.

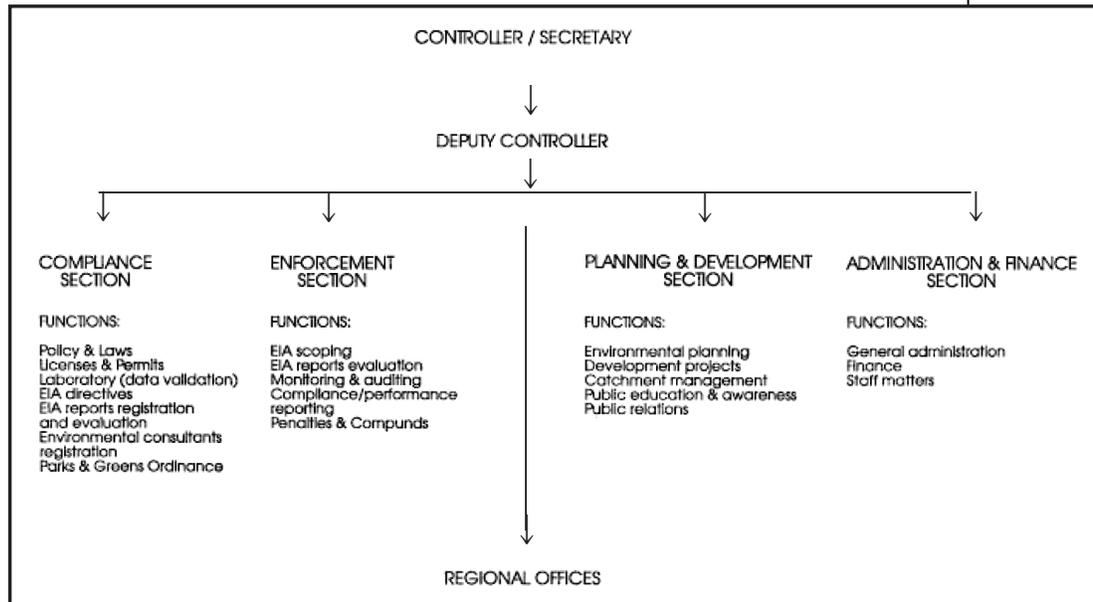


Figure 6: Organisation and function of the NREB

However, while Western Malaysian States also exercise significant control over natural resources within the framework of the Federal Malaysian constitution, their situation differs in a number of important respects. They do not enjoy the degree of relative political autonomy within the Malaysian federation as the Borneo states do. Moreover, Western Malaysia is more closely integrated within federal bureaucracy which was inherited from the British colonial administration in 1957. For example, while Sarawak and Sabah have their own separate agencies for irrigation and drainage and for public works, in Western Malaysia these services are provided by Federal government employees seconded to state agencies. Politically, Malay ethnic interests exercise a strong dominance in Western Malaysia while the Eastern Malaysian population is ethnically more plural and the Malay influence is less clearly apparent. The federal state interrelationship is not as tense on the Peninsula as it is in Borneo. On account of these factors, Western Malaysian States may not find it as easy to break away from federal environmental regulation instruments such as environmental impact assessment.

One can debate the merits of the recent developments in Malaysia to devolve administration of EIA procedures from federal government. One may argue that one of the manifest advantages of the federal Government undertaking EIA and other forms of environmental regulation is that the process is relatively secure from political interference by state development interests. This is a legitimate concern in developing countries because quite often the line between politics and business is blurred. For this reason, critics may be tempted to question the motives on the part of state governments desirous of adopting and administering their own environmental regulation instruments. It also may make good sense to have a uniform national system for environmental regulation for a number of other reasons. For example, in a country where institutional capability is lacking, it is more effective and economic for a single national agency to undertake such a role instead of a number of state jurisdictions replicating one another. International investors may find it more convenient to operate within such a national system and there is less opportunity for them to play off one state against another. Fragmentation of environmental regulation within Malaysia may also make it difficult to address environmental problems such as air pollution which transcend state boundaries.

One has to balance such concerns with the ability of central governments to adequately resource and effectively administer EIA and other environmental regulation instruments in developing countries such as Malaysia. Malaysia is geographically a very large territory to administer while the DOE has had limited resources to undertake its functions. Partly because of their control over natural resources, some States in Malaysia have access to wider sources of funding. The situation in Sarawak today is that the NREB is a functioning environmental agency within the State government bureaucracy (Figure 1). It has been relatively well resourced by the State Treasury and has developed a strong profile, in no small measure due to the efforts of the Controller of Environmental Quality (the chief executive of NREB). The federal DOE office in Sarawak has a staff of less than 20, all based in a single office in the state capital of Kuching. The NREB has a staff of over one hundred, based in Kuching and in the regional office in Miri in the Northern region while a second regional office in Sibu in the Central region is expected in the very near future. A recent amendment has established the office of the NREB Controller as a statutory position with wider powers to give specific directives or orders to any individual to carry out the protection and enhancement of the environment, including the conduct of EIA for development activities that are not prescribed in the Order or below the minimum size required in order to protect the environment. While the threat of political interference is always there, the Board has been also given more effective enforcement powers, including specific powers to investigate offences. During its three year term of office the NREB has evaluated over 150 EIA reports. A number of development projects have either been

rejected, abandoned, given alternative sites or reduced in coverage and size (Mamit, 1997).

There are also a number of procedural weaknesses in the EIA system now in place in Sarawak: The most glaring omission is lack of provision for public participation under the State EIA procedures. The State government justifies this policy on the strength of the argument that existing channels of electoral democracy provide ample opportunities for people to have their say. The tradition of participant democracy is weak in Sarawak and there is manifest need to support the development of institutions for local governance.

Administering two parallel procedures for EIA in Sarawak necessitates close consultation between the Department of Environment and the Natural Resource and Environment Board to avoid duplication of authority that now exists. Coordination is facilitated by the fact the head of the regional DOE office in Sarawak is a member of the NREB. Nevertheless, it would be useful to find out the views of developers on ways to achieve greater co-ordination. One possibility is for the two agencies to be located under the same roof or close by.

The absence of a framework for environmental planning at a regional (catchment) level and on a local (urban) level in Sarawak is a major constraint on the effectiveness of the Federal as well as State EIA procedures. Because EIA is administered essentially as a project based tool, its ability to anticipate and manage cumulative impacts is limited.

The other major drawback of the current dual EIA procedures is that a number of activities which may impact on the environment fall outside their respected ambits. Not all activities which have significant environmental impacts come in the purview of the respective lists of prescribed activities for reasons of the limited scale or the type of project activity being proposed. As noted above, a recent amendment to the Sarawak Ordinance enables the Controller to review any project, irrespective of size.

There are a number of State natural resource statutes, particularly those for forestry or mining which have, as one of their objectives, the mitigation and regulation of detrimental environmental impact of particular activities. However, environmental protection is a subsidiary objective of these statutes in relation to the overriding objective of facilitating the utilisation of natural resources. A drawback of such statutes and organisations which combine conflicting environment and development objectives, is that decision making about environmental concerns is internalised, within a predominantly development oriented agency and therefore it lacks transparency and accountability. For a number of reasons, it becomes difficult for such an agency to give adequate consideration to its environmental responsibilities. This an important issue in Sarawak since the state is the biggest land owner and developer. Now that the State EIA procedures are in place, it would be appropriate to relocate the

environmental provisions in these statutes within the Natural Resources and Environment Ordinance.

## CONCLUSION

The discussion of the Malaysian situation in this paper exemplifies some major administrative difficulties in undertaking effective environmental regulation. Institutional arrangements for environmental regulation in a particular country are dependent on the distribution of power and functions between different tiers or levels of government. With the exception of states such as Singapore, environmental regulation functions in most unitary and federal states are shared between the central and sub-national levels of government. This may give rise to problems of fragmented and overlapping jurisdiction and lack of effectiveness of environmental legislation.

Environment is a holistic concept and one of the major objectives of environmental management is to achieve greater integration of decision-making by taking account of environmental interdependencies. Difficulties of integrated environmental management are compounded in federal states such as Malaysia and Australia where intergovernmental relationships are constitutionally defined and issues relating to jurisdiction over environmental management functions are often politically controversial on account of their broader implications for access to, and allocation of, natural resources.

There are arguments for and against centralisation versus decentralisation of environmental regulation. Thus, for example, in New Zealand central government played a key role in environmental impact assessment until recently. This situation has changed dramatically during the last ten years as a consequence of wide ranging reforms (Memon, 1993). Environmental management responsibilities including EIA have now been decentralised to elected regional and local councils while central government has tended to assume a more passive role. While there are strong arguments which justify decentralisation of environmental regulation in New Zealand, achieving this objective has proved to be much more difficult than was anticipated earlier. There are growing concerns about the capability of local and regional councils to effectively implement an environmental statute which is quite demanding in terms of political commitment and managerial skills, the need for greater uniformity of environmental regulation practices at a national level and the need for stronger central government direction.

The trends towards devolution and decentralisation of environmental decision making are currently manifest in many other developed as well as developing countries. However, this should not absolve central government from providing leadership and direction to, as well as ensuring uniformity of practice within, sub-national jurisdictions.

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**Key words**  
policy and  
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decision  
making



# Environmental impact assessment in Nigeria: regulatory background and procedural framework

*Nerry Echefu and .E Akpofure*

## ABSTRACT

As a consequence of the illegal dumping of toxic wastes in Koko, in the former Bendel State, in 1987, the Nigerian Government promulgated the Harmful Wastes Decree which provides the legal framework for the effective control of the disposal of toxic and hazardous waste into any environment within the confines of Nigeria. This was immediately followed by the creation of a regulatory body, the Federal Environmental Protection Agency (FEPA) in 1988. FEPA is charged with the overall responsibility of protecting and developing the Nigerian environment. To put this into action a National Policy on the Environment was developed. This is the main working document for the preservation and protection of the Nigerian environment. States and Local Government Councils were also encouraged to establish their own environmental regulatory bodies for the purpose of maintaining good environmental quality as it applies to their particular terrain.

The EIA Decree No. 86 of 1992 is an additional document with the same aim of protecting the Nigerian environment. It is particularly directed at regulating the industrialization process with due regard to the environment. By this Decree, no industrial plan/development/activity falling under the FEPA's mandatory list can be executed without prior consideration of the environmental consequences of such a proposed action, in the form of an environmental impact assessment.

The Department of Petroleum Resources (DPR), an arm of the Ministry of Petroleum Resources, recognizing the national importance of the oil and gas industry sector to the continued growth of the Nigerian economy and realizing that the continued exploitation, exploration and production of the oil resources has serious environmental impacts, also decided to set out comprehensive standards and guidelines to direct the execution of projects with proper consideration for the environment. The DPR Environmental Guidelines and Standards (EGAS) of 1991 for the petroleum industry is a comprehensive working document with serious consideration for the preservation and protection of the Niger Delta, and thus the Nigerian

**See Topic 2**

**UNEP EIA Training  
Resource Manual**

*Law, policy and  
institutional  
arrangements*

environment, in the course of searching for and producing crude oil. The EIA tool is also mandatory for a greater part of the oil E&P activities.

But a detailed examination of the various statutes, and the framework for the EIA process in particular, and the entire environmental regulatory process in general, reveals that many of the statutes are very much at variance with intentions, especially as they affect the execution of functions. There is duplication of functions and overlapping responsibilities in the processes and procedures guiding the execution of the various impact assessment tasks. Consequently, serious bottlenecks and bureaucratic confusion are created in the process. The result is a waste of resources, financially and materially.

This paper examines the statutory regulatory framework for the EIA process, and the inadequacies and misinterpretations of the various statutes, which have often led to delays in the execution of EIAs in Nigeria. An attempt will be made to streamline these various responsibilities through a reorganization of the regulatory environmental framework. This way, it is hoped that the bottlenecks and wastage of resources will be eliminated.

## **INTRODUCTION**

Nigeria (Africa's most populous nation), independent since 1960, occupies an area of 923,768 km<sup>2</sup> with varied climates and seasons. Presently, its estimated population is over 100 million people.

Prior to oil, agriculture (before 1970) was the economic mainstay. With financial resources available from oil and no development policy, unguided urbanization and industrialization took place. Uncontrolled population growth, desertification, and deforestation led to degradation and devastation of the environment.

As desirable and necessary as development is, it became an albatross not of itself but because of the lack of appropriate policies to guide it.

There were several sectoral regulations aimed at controlling environmental degradation which were unsuccessful due to the absence of effective sanctions. Economic considerations and fundamental lack of knowledge of interdependent linkages among development processes and environmental factors, as well as human and natural resources, resulted in an unmitigated assault on the environment. However, the environment and the need for its preservation (in spite of all efforts by United Nations Environment Program [UNEP] and International Conventions which Nigeria ratified), took centre stage after the momentous and singular event of the secret dumping of toxic waste in Koko Port, Bendel State (now Delta State) in May 1988 by foreign parties. This was followed by the promulgation of the Harmful Wastes (Special Criminal Provisions) Act 1990. In its wake, international seminars and workshops were held in Abuja and Lagos and the consensus was for

appropriate environmental legislation to discourage short-term plans and 'fire brigade' approaches to environmental issues.

An institutional framework was set up to deal with the problems of our environment. The Federal Environmental Protection Agency (FEPA), established by Decree 58 of 1988 of the same name and amended by Decree 59 of 1992, was given responsibility for control over our environment and for the development of processes and policies to achieve this. Apart from publishing the National Policy on the Environment (NPE) in 1989, with the policy goal of achieving sustainable development, it published other sectoral regulations including the National Environmental Protection (Pollution Abatement in Industries and Facilities Generating Wastes) Regulation 1991 wherein EIA was made obligatory only when so demanded by FEPA and compliance was within 90 days of such demand. However in the oil industry the principal legislation is the Petroleum Act 1969 and all derivative regulations charged DPR among others with pollution abatement.

States and Local Government Councils (LG) which comprise the second and third tiers of government were encouraged under Decree 59 of 1992 to set up their own environmental protection agencies.

Separate EIA legislation, the EIA Decree 86 of 1992, was promulgated establishing FEPA as the apex regulator, making EIA mandatory for all developmental purposes (although with some exceptions). Under it FEPA has published various sectoral EIA procedures together with EIA procedural guidelines in 1995.

### **INSTITUTIONAL AND REGULATORY FRAMEWORK**

Prior to the establishment of the FEPA there were sectoral environmental regulations with various significant responsibilities relating to environmental protection and improvement. Also in existence were commissions with advisory capacity in environmental matters and environmental NGOs.

Due to various activities and the complex combination of interdependent operations of the oil industry it, more than any other sector, adversely affects the environment.

In the oil industry DPR adopted remedial, though inadequate, enforcement tools which included compliance monitoring and the issuing of permits/licences. Studies indicated the extent of devastation the oil industry has caused to aquatic and terrestrial ecosystems and cultural and historical resources. This, coupled with the community's dissatisfaction and agitation, especially in the Ogoni and Ijaw homelands, reinforced the need for the sector to plan, protect and enhance prudently the environmental resources for a better environment.

The need to control new installations or projects with capacity to degrade the environment was also identified. This compelled DPR to issue updated Environmental Guidelines and Standards (EGAS) in 1991 providing for the first time, together with pollution abatement technology, guidelines and standards and monitoring procedures, a mandatory EIA report as enforcement tool. There are other regulatory bodies within the sector.

FEPA, charged with the protection and development of the environment, prepared a comprehensive national policy, including procedures for environmental impact assessment for, amongst others, all development projects. Enforcement powers were also prescribed. In the National Policy on the Environment (NPE), FEPA adopted a strategy that guarantees an integrated holistic and systemic view of environmental issues that leads to prior environmental assessment of proposed activities.

The other regulators including State EPAs (unnecessarily charged with similar and identical responsibilities to those of FEPA) rather than cooperating with FEPA undermine its efforts as they demand a role in the state of the environment within their areas. This occurs particularly where FEPA involves them only at the review stage in the EIA process. This creates a lot of confusion and bureaucratic delays in implementing the EIA process leading to enormous cost and unnecessary waste of time.

## **ENVIRONMENTAL IMPACT ASSESSMENT SYSTEM**

### *Features*

The principal legislation is Decree 86 of 1992 which made EIA mandatory for both public and private sectors for all development projects. It has three goals and thirteen principles for how these are to be achieved. The goals are:

- Before any person or authority takes a decision to undertake or authorize the undertaking of any activity that may likely or significantly affect the environment, prior consideration of its environmental effects should first be taken.
- To promote the implementation of appropriate procedures to realize the above goal.
- To seek the encouragement of the development of reciprocal procedures for notification, information exchange and consultation in activities likely to have significant trans-state (boundary) environmental effects.

FEPA categorizes mandatory study activities into three categories. (see Figure 1 below):

Category 3 activities have beneficial impacts on the environment. For Category 2 activities (unless within the Environmentally Sensitive Area) full EIA is not mandatory, while Category 1 activities require full and mandatory EIA. Either listing or an initial environmental evaluation (IEE) system is used to determine projects requiring full EIA.

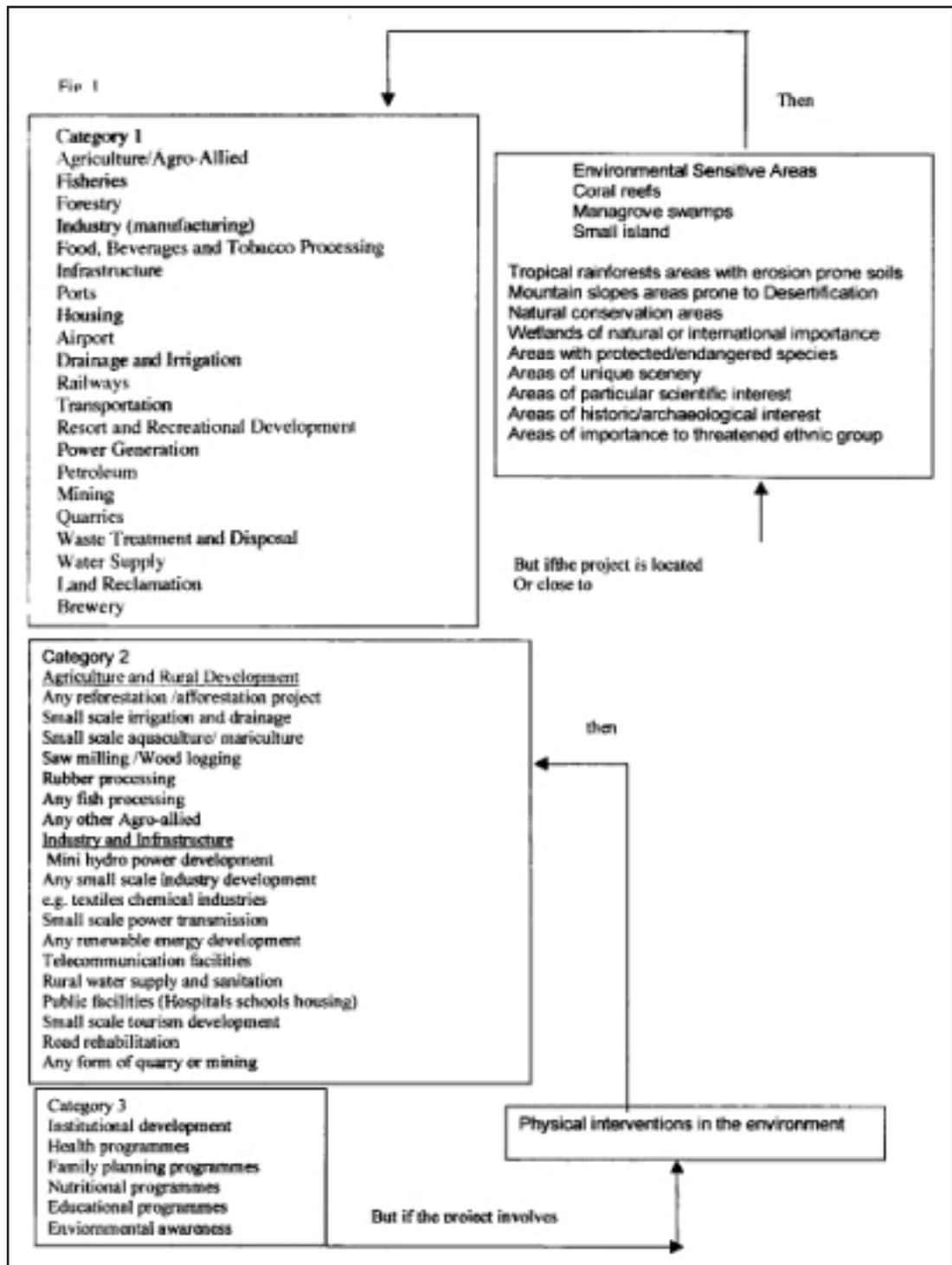


Figure 1: Category of mandatory EIA studies

The minimum requirement of an EIA report includes not only the description of the activity, potential affected environment, practical alternative, and assessment of likely or potential environmental impacts, but also identification and description of the mitigation measures, indication of gaps in knowledge, notification of trans-state adverse environmental effects (if any) and a brief non-technical summary of all the above information.

Impartial and written FEPA decisions indicating mitigation measures based on a detailed examination of environmental effects identified in the environmental impact assessment (after an opportunity within an appropriate period had been given to the stakeholders and the public for their comments) is made available to interested person(s) or group(s). It provides, where necessary, that potentially affected States or Local Government Areas are notified.

#### PROCESS AND PROCEDURAL FRAMEWORK

The EIA process is the various stages a project undergoes from proposal to approval for implementation, resulting in the issuing of an Environmental Impact Statement (EIS) and certificate.

The term encompasses several stages, viz:

- determining if FEPA environmental laws/regulations have been triggered;
- screening a project for potential environmental effects;
- scoping to determine the spatial and temporary dimension of environmental effects;
- carrying out detailed base line studies to determine the environmental condition prior to project implementation;
- preparing a detailed assessment report;
- carrying out a panel review of the EIA report if this is necessary; and
- obtaining authorization/approval, where appropriate.

For FEPA, the Director General/Chief Executive is the responsible officer.

The National Procedural Guidelines show practical steps from project conception to commissioning (see Figure 2). The steps are:

- project proposal
- initial environmental examination (IEE)/preliminary assessment
- screening
- scoping
- EIA study
- review
- decision making
- monitoring, and

- auditing.

The proponent initiates the process in writing to the responsible officer. A notification form is duly completed with all relevant information on the proposal. Using the criteria of :

- magnitude – probable severity of each potential impact;
- prevalence/extent and scope – extent to which the impact may eventually extend;
- duration and frequency – is activity short term, long term or intermittent;
- risks – probability of serious environmental effects;
- significance/importance – value attached to a specified area; and
- mitigation – measures available for associated and potential environmental effects

FEPA does internal screening (IEE) to determine the project's category under the mandatory study activities list.

Where no adverse environmental effects exist, the EIA is issued and the project commences with appropriate mitigation and monitoring measures. Otherwise within ten working days of receipt of the proposal, the screening report is sent to the proponent for scoping and the preparation of Terms of Reference (ToR). The ToR embodies the scope of the proposed EIA study and this is examined and the scope of the study defined accordingly by FEPA. The proponent carries out the study, generally using consultants, and the draft EIA report in 15 copies is submitted to the responsible officer. For this draft report to be complete it must as an annex record the results of public participation in a public form.

Within 15 working days of the receipt of the draft report, FEPA concludes evaluation of the draft and determination of the review method which it communicates to the proponent in writing. The four methods are:

- In-house review.
- Panel review (sitting may be public).
- Public review – an elaborate display of the report for 21 working days with appropriate display venues chosen by FEPA for the convenience of the public stakeholders and communities. Through newspaper advertisement FEPA invites interested groups /persons to participate.
- Mediation.

Within one month of the review process, review comments are furnished to the proponent. In this review stage, the public participates only when FEPA's chosen method of review guarantees its participation.

The final EIA report, addressing and proffering answers to review comments, is submitted within six months to the responsible officer. At this early stage, and on mutual agreement, FEPA and the proponent set

conditions establishing a follow-up program (mitigation, compliance and monitoring plan), a monitoring strategy and audit procedure. A 'no project' decision is communicated to the proponent if the review comments are adverse and/or improperly addressed in the final report and the final EIA report is unsatisfactory. The decision-making body is the FEPA technical committee chaired by the Director General/Chief Executive.

Within one month of the receipt of a final EIA report which has been adjudged as satisfactory, the committee approves and issues the Environmental Impact Statement (EIS) followed by certification by the responsible officer complete with appropriate conditions and with a validity period. Armed with the certificate, the proponent commences the project subject to the conditions and specifications contained in the EIS. If the project is not commissioned within the validity period on the certificate a revised and updated EIA report becomes necessary for revalidation.

The progress of the project is monitored to ensure compliance with all conditions and mitigation measures. Environmental audit, assessing both positive and negative impacts of the project, is carried out periodically. In its exercise of discretionary powers, FEPA refers any project likely to cause significant environmental effects that may not be mitigated (or where public concern about the project warrants it) to the FEPA council for mediation or panel review.

The EIA study team usually is a multi-disciplinary panel of experts and the report is prepared using a systematic, interdisciplinary approach incorporating all relevant analytical disciplines to provide meaningful and factual data, information and analyses. The presentation of data should be clear and concise, yet include all facts necessary to permit independent evaluation and appraisal of both the beneficial and adverse environmental effects of alternative actions. The detail provided should be commensurate with the extent and expected impact of the action and the amount of information required at the particular level of decision-making.

FEPA certifies consultants and reviewers. Only research institutions and limited liability companies of proven competence are so certified.

Sadly in the oil sector, there is confusion as a result of multiple regulators. The Department of Petroleum Resources and the State Environmental Protection Agencies have enabling instruments which permit them to conduct EIA without limitation. DPR's instrument is its regulation, EGAS 1991, which empowered it to conduct EIA, but there is no legislation so empowering it directly. The States instruments are subject to Federal enactment and other than inordinate show of relevance they are to merely monitor the process for, and on behalf of, FEPA. FEPA should as early as possible inform the relevant State EPA at its secretariat stage.

## CONCLUSION AND RECOMMENDATIONS

We acknowledge that Nigeria has taken serious steps to develop effective environmental strategies by the promulgation of the EIA Decree and all the procedural guidelines. Yet there are too many regulators with similar and identical responsibilities. Harmonization and clear allocation of responsibilities has become necessary. FEPA is the apex regulator, and DPR in reliance on regulations can not usurp the responsibility of FEPA nor the State EPA when under our canon of legal interpretation, any Edict (law) in conflict with the Decree (Act) to the extent of the conflict is void. Recognition of this, and an eschewing of rivalries among the administrators, will encourage co-operation among them.

To be relevant the regulators (administrators) should be better supported and, for effective compliance monitoring and enforcement, stiffer sanctions and penalties should be prescribed and strictly adhered to. This way environmental requirements will be met and maintained. Compliance should be tied to renewal of licenses and consents and proponents should ensure that staff are highly motivated with adequate equipment and capacity building programs vigorously pursued not only by the administrators but also the proponents. The administrators should invest more in capacity building, staff motivation and provision of conducive work environments together with the necessary facilities. The government in this regard should make funds available to the secretariat. Otherwise, they become exposed to monetary inducements leaving compliance in the hands of the proponent. This is unhealthy. With basic knowledge of their responsibilities they could become more efficient and effective in improving the quality of EIA report.

The administrators should set up a databank and provide baseline data. The EIA process is in transition in Nigeria, and may take years or even decades to develop and this depends on a strong and continuous political commitment at the highest levels within and among our administrators, on the active role of an informed and involved public and on some pragmatic programs of national action and sub-regional and regional co-operation (Kampala Declaration 1989).

The natural consequence, therefore, is that experience is increasing and the need for sufficient information in the transition period is met, as has recently been undertaken by some oil companies, government and international organizations in the Niger Delta Environmental Survey (NDES). This will provide environmental baseline data for the area. We hope that it extends to other areas of the Federation.

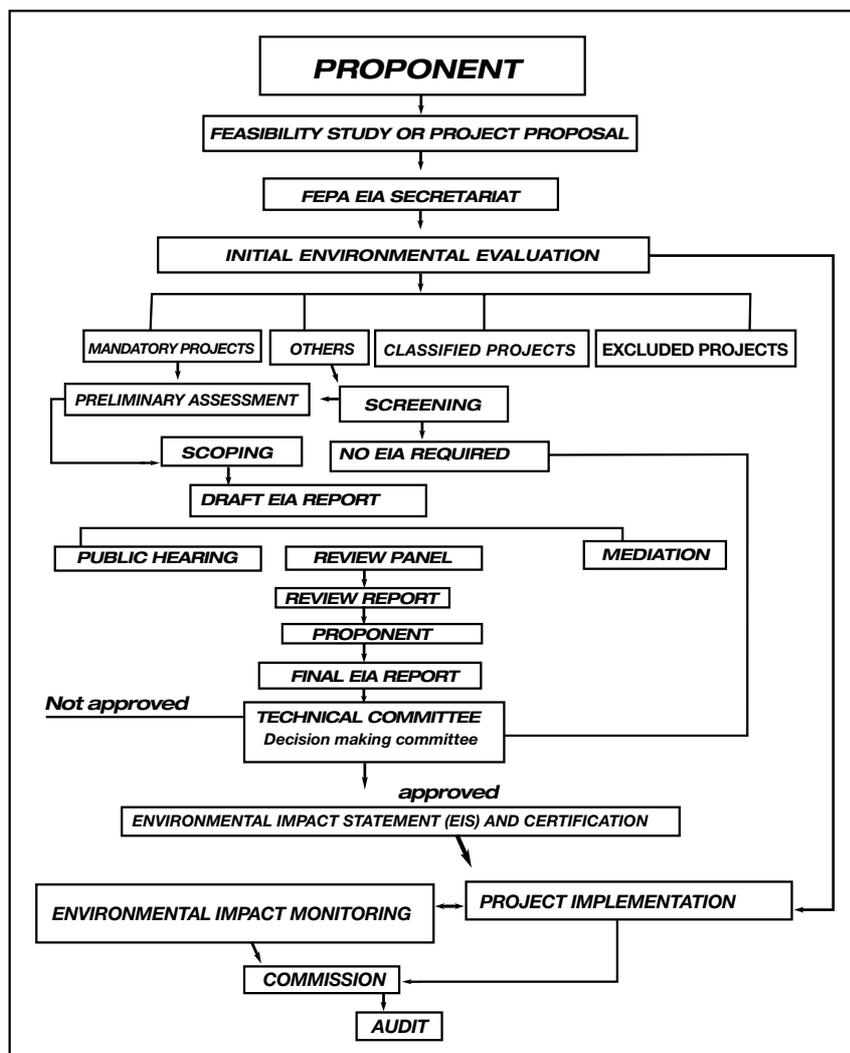


Figure 2: Flow chart of FEPA EIA procedures

Public participation is not statutorily protected yet current realities have encouraged public involvement as the communities have become aware of the need to protect the environment. Though largely illiterate and poor, and thereby vulnerable to monetary inducement in the hands of unscrupulous proponents, nevertheless their knowledge of the locality can enhance the process. In this regard the law should be reviewed.

FEPA usually involves the State EPAs only at the review stage and it has been observed that this angers them, prompting a demand for a repeat of the EIA study by the proponent, with its attendant resources wastes. Often they refused to attend public forums as FEPA officials are usually absent from these. The illiterate public, left to the mercy of the proponent, is misled. It is suggested that FEPA should involve the relevant State EPA at the secretariat stage i.e. when the proponent submits the proposal so as to enable them to monitor and participate actively in the entire process and not only in the review. In this regard, on receipt of the project proposal, FEPA should send

a copy to the other relevant agencies liaising effectively from that stage and involving the proponent. The proponent should provide assurance that the required regulations are met, using concepts of self-regulation, goal-setting and negotiated agreements to complement prescriptive legislation.

The process of accreditation by FEPA, apart from being time-consuming, cumbersome and arduous, encourages fraudulent companies to engage the services of mercenaries for the purpose of answering interview questions. We suggest that a more pragmatic and result-oriented approach should be adopted with sporadic checks of such companies. Some States insist on their own accreditation exercise despite FEPA's creating multiple accreditation. We suggest that for the process of accreditation to be accepted by all States, which should be involved in the exercise. The efforts of the environmental NGOs ought to be stepped up in the area of continuous capacity building of their members so that they can participate efficiently and meaningfully in public forums thereby enhancing the quality of the EIA report and the decisions taken arising from them.

The Law Reform Commission and Federal Ministry of Justice in conjunction with the States, environmental NGOs and interested groups and companies, should develop an integrated, co-ordinated and comprehensive legislation on the environment, removing rivalries, bureaucratic bottlenecks and areas of overlapping, duplication and confusion.

We venture, however to add that the EIA process in Nigeria if adequately handled, with the consultants involved in capacity building and the administrators highly motivated and with the Government making funds available, will result in environmental issues being built into taxation, prior approval procedures for investment, technology choices and into all components of development policies (Kontagora 1991).

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**legislative  
framework**

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support**

# Public participation in Indonesian EIA

*Sudharto P Hadi*

## INTRODUCTION

Public participation is a process of involving the public in a programme, project or policy. The inclusion of public participation in such processes is considered as a requirement:

*all people and all human beings....shall have the right to live in dignity and freedom and to enjoy the fruits of social progress and should, on their part, contribute to it. (U.N, 1975:1).*

Social progress and development require the full utilization of human resources, including the encouragement of creativity under conditions of enlightened public opinion. Environmental Impact Assessment (EIA) is an instrument of environmental policy defined as a study to assess the environmental impact of planned activity. EIA is a tool for decision making about the perceived feasibility of the planned activity. Thus, the public is encouraged to take part in the EIA process.

In Indonesia, the Environmental Management Act 23 of 1997 ( a revision of Act no. 4 of 1982) states that

*every person has the right to have environmental information related to environmental management.*

This is applied to a proposed project in a certain location for which an EIA is required. Local people do have the right to have information about proposed projects to be built in their area. With such information, people can provide suggestions and comments and can raise concerns. Article 6 of the Act states that

*every person who proposes a project is obliged to provide right and accurate information.*

This means that the project proponent must provide information about the project description. This paper reviews the practice of public involvement in the EIA process and proposes new mechanisms and techniques which are socially and culturally appropriate in the Indonesian context.

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## NATURE AND SCOPE OF ISSUES

Based on the observation on the practice of Indonesian EIA since 1986, the issues of public participation include lack of public participation, the formality of the process and the inappropriateness of the techniques employed. These result in poor quality EIA documents. In other words, most EIAs fail to address the actual issues in the community.

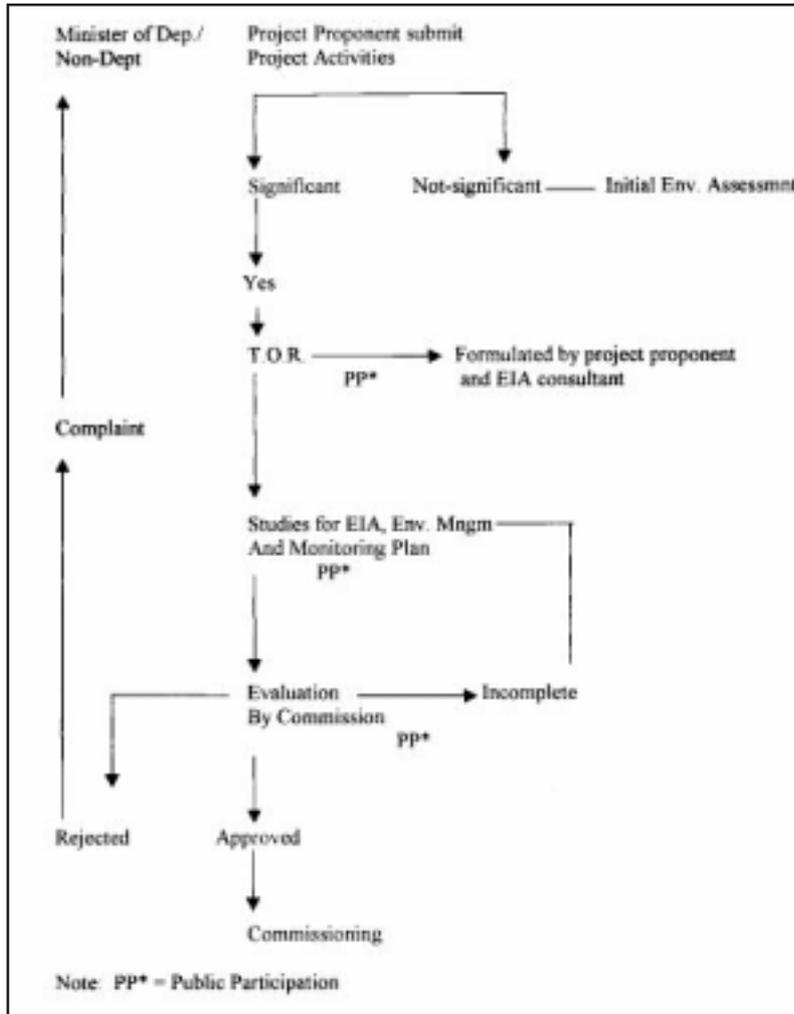


Figure 1: The procedure of public participation in EIA

## THE PROCEDURE AND THE FORM OF PUBLIC PARTICIPATION

Figure 1 shows the procedure and the form of public participation in the Indonesian EIA process. The procedure is divided into three stages. These stages include the formulation of terms of reference (ToR), the EIA process and the process of evaluating or reviewing EIA.

### Terms of Reference

The figure suggests that if the proposed project is categorized as a project which causes significant environmental impact, the project proponent (assisted by a consulting firm) must provide the terms of reference. To provide the terms of reference, in addition to a project description, the consulting firm requires data regarding the area of the proposed project. The consulting firm gathers the data regarding the issues. This should include an investigation of local attitudes towards the project. So there is room for the public to participate in formulating the terms of reference. Unfortunately, at this stage, local people generally do not have detailed information about the project. The project proponent usually does not provide information about the project description. The consulting firm generally relies on the secondary data gathered through village offices. Consequently, the Terms of Reference which are formulated through the scoping process, (see Figure 2) are still too broad and too general and do not address the actual issues in the community.

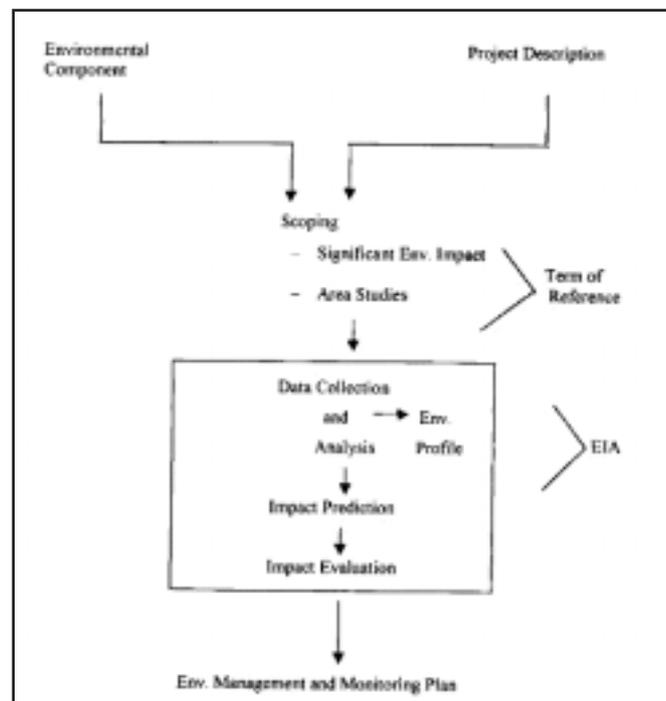


Figure 2: EIA studies process

Actually, the project proponent, as stated by government regulation and the revised draft of that regulation on EIA, is obliged to make known to the public any proposed activity which requires an Environmental Impact Assessment. When this is announced people should be able to make

comments or complaints and to provide suggestions regarding the proposed project. However, such announcements are rarely made by project proponents.

#### *EIA studies*

At this stage, local people could take part in the study by providing information through questionnaires administered through surveys. The data gathered could include socio-economic (people's income, occupation) and socio-culture (education, social relation patterns) and community health (type of diseases, health services available). The people's perception of the proposed project should also be sought. Again, because of lack of information about the proposed project, local people have difficulty in figuring out the impacts likely to be caused by the project. The most common response given by local people is that the proposed project will generate employment and job opportunities.

#### *Evaluating EIA documents*

When the draft EIA document is ready, it will be reviewed or evaluated by the EIA Commission. The task of the Commission is to comment on, and evaluate, the Terms of Reference, the EIA document and the environmental management and monitoring plan. There are three possibilities for recommendations given by the Commission including:

- the EIA is considered incomplete and will need to be revised ;
- the EIA document is approved and the project can go ahead; or
- the EIA is rejected because it is considered that there is no technological management adopted to deal with the significant impacts likely to occur. In this latter case, the project proponent can submit a complaint to the relevant Minister of Department/other agency.

According to Ministerial Decree 13 of 1994 and draft of government regulation of EIA, local people can be non-permanent members of the EIA Commission both at central and provincial levels. In practice, at the Provincial Commission, local people are frequently represented by the head of the village or district head. In the Federal (Central) Commission, local people are represented by the head of the Environment Division or the Local Government Development Planning Board. This raises the question of representativeness. Limiting participation to village or district heads does not fully meet the principle of public participation. In addition, their opinions may not substantially represent the concerns of the local people. The head of the village or district often tends to favour the project proponent.

## RESULTS AND IMPLICATIONS

### *Formulating the Terms of Reference*

There are two weaknesses in the practice of formulating the Terms of Reference. The first is lack of information about the proposed project because the project proponent does not provide information about the project. The second is the perceived over-formality in the procedures employed in gathering the data.

With little knowledge about the proposed project, people cannot identify the likely environmental impacts. When the EIA researcher collects the data, people cannot raise their concerns and issues. With regard to the procedure employed, EIA researchers rely on formal approaches such as visiting the head of the village and gathering local people in the village hall. This formal method is not appropriate. The method used is categorized as non-participative and the intensity of contact is considered low.

### *Undertaking EIA studies*

The survey administered through face-to-face interviews theoretically produces the best information and may be necessary for a long complex questionnaire. The interviewer can see that the questions are properly understood and that the answers are properly expressed. The interviewer can probe the answers, find out why people answer the way they do, and ask open-ended questions. The interviewer also serves as a motivating force for completing the questionnaire even if it is long and difficult. However, in the Indonesian context, the face-to-face interview also has a disadvantage. Respondents will tend to answer in ways that they believe the interviewer will approve of. The respondents tend to provide the 'right' answer in order not to disappoint the interviewer. For instance, when respondents had difficulty providing information about the amount of his/her income, he/she tended to let interviewers calculate it. Whatever the result of interviewer's calculation, a respondent would agree with it. Another example was when the respondents were asked about their involvement in the community they usually said something nice, although the reality may have been different. This is because they did not want other people (moreover outsiders as interviewers) to know something bad about their community.

It can be concluded that questionnaire surveys through face-to-face interviews are only adequate for gathering 'hard data' such as educational attainment, number of households, social institutions and other services and facilities available in the community. Under the cultural circumstances of this case, this method fails to discover the real attitudes, concerns and perceptions of people; data that are essential for sound assessment, evaluation and recommendation.

### *Evaluating EIA documents*

The evaluation of EIA is done by either the Central EIA Commission or the Regional EIA Commission. Membership of the Central Commission consists of departments related to environment, the Environmental Impact Management Agency, departments/agencies related to the proposed project, representatives of provincial and local government, the Environmental Research Centre, relevant experts, NGO and affected people. The Regional EIA Commission consists of the regional Development Planning Agency, regional Environmental Impact Management Agency, Investment Coordinating Board, other relevant departments, representatives of local government, the Environmental Research Centre, relevant experts and affected people. The evaluation of the EIA document is too formal. It is difficult for local people to participate in such a formal atmosphere. People feel powerless sitting down with high ranking officials.

### **LESSONS LEARNED**

The effectiveness of public participation is measured by the degree of communication, the intensity of contact and the degree of influence for decision making. At the stage of formulating the terms of reference with the methods of collecting data such as field visit to informal leaders, the degree of communication and the intensity of contact are considered low. The input from informal leaders has little influence on the Terms of Reference. At the stage of the EIA studies, the survey method employed does not address the specific issues such as concerns and perception of local people regarding the proposed project. Surveys are also considered as one way communication. People only respond to the questions raised by interviewers. In other words, the method does not address the real issues. In the evaluation process, the formal meeting is not good for local people. They cannot comfortably air their concerns. They cannot actualize their concerns and aspirations. It is hard to incorporate the people's input into the EIA decision.

### **TOWARDS SOCIALLY RESPONSIBLE PUBLIC PARTICIPATION**

#### *Formulation of Terms of Reference*

In line with the Environmental Management Act 23 of 1997, under which the project proponent has the responsibility to inform local people about proposed projects, the project proponent is obliged to provide a forum which enables people to have information about the project. The forum proposed for this is public displays and public meetings. With public displays, the project proponent provides visual displays illustrating where, when and how the proposed project will be built. Such project visualization describes clearly the purpose of the project, its location, and activities at the pre-construction, construction and operational stages. Local people (the host community) and other interested parties visit the displays and learn about the project. These public displays are then followed up by public meetings.

In these meetings people could voice their opinions, and raise concerns, complaints and questions related to project. Their input will be more directed because they have learned about the project through public displays.

The purpose of conducting public displays is to provide information about the proposed project. The strength of public displays as mentioned by Canter (1991) is that they create intensity of communication and the degree of communication is two way.

Public meetings provide forums in which the intensity of contact and the degree of two way communication is high. To apply this in the Indonesian context, the public meeting should be designed with small groups of 10 to 15 people and take place in several different locations. Such a format enables each participant to take part in the process. The participants should be divided into several homogeneous groups such as formal leaders, informal leaders, lay persons, etc. This grouping will help create an intensive discussion. Public meetings provide the opportunity to successfully identify issues and to gather feed back. In the public meeting, the EIA practitioner and project proponent can also gather ideas for formulating an environmental management and monitoring plan.

*Improving EIA studies*

At this stage, people have the opportunity to convey, through interviews, their opinions and perceptions regarding the proposed project. The EIA practitioners can make use of contacts that have been made during public displays and public meetings. To gather data regarding perceptions it is suggested that a conventional instrument such as a questionnaire not be used but rather that there should be an interview guide for in-depth interviewing. Respondents need to be selected through a snow balling technique by utilizing contact people. It is important to note that the quality of information is more important than the number of information providers. In other words, selecting respondents through snow balling techniques will create valid and accurate data.

The Stages of EIA Studies	Public Participation Techniques	Objectives	The Scope	Participants
Formulation of ToR	Public Displays	To inform about the project	Informative	Affected people and other relevant interests
	Public Meeting in Small Group (10-15 people) in some places	To identify issues and to solicit feed back	Consultative	Affected people consisting of village officials, informal leaders and local people



EIA studies	1. In-depth Interview  2. Focus Group Discussion	To identify feed back  To get ideas for Environmental management	Informative and consultative  Partnership	Affected people
Evaluation of EIA document	Public Review	To evaluate EIA document and to get feed back	Partnership	Affected people and other relevant interests

In addition to interviews, it is suggested focus group discussions be employed. Each group consists of five to seven people with similar backgrounds – for instance informal leaders, formal leaders, lay persons etc. The discussion topic is focused to solicit perceptions and opinions of local people and to seek their suggestions. The objective of collecting data is to identify the impacts, to obtain the feed back and to get suggestions for environmental management.

#### *Evaluating the EIA*

In addition to the EIA Commission Forum, the project proponent is obliged to provide a forum for public review. After the EIA document has been reviewed by the Commission, but before a decision is made, the general public including affected people have an opportunity to air their opinions, concerns and complaints about the document. Because people have been involved since the initial stage of the EIA studies, they are aware of whether their ideas have been incorporated in the EIA document. In the Indonesian context, the public review must be conducted in an informal atmosphere. Community input should not be submitted in written form, because not all people are used to writing down their ideas. Given this, the project proponent is obliged to open a *hot line* in an accessible place such as village hall or neighbourhood hall. The objective of the public review is to evaluate the document and to obtain feed back from the people.

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**Key words**

**public  
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processes**

# Public hearing within the environmental impact assessment review process

*Ebenezer Appah-Sampong*

## ABSTRACT

The integration of public participation/involvement of stakeholders in Environmental Impact Statement (EIS) Review is very important in terms of its implication for sound decision making and the sustainability of development activities. In this regard, the Ghana EIA Procedures provide for the involvement of stake holders in the assessment and review of proposed undertakings. This is achieved through a number of mechanisms, particularly the holding of public hearings.

In public hearings within the context of the Ghana EIA Process shareholders and proponents are brought together in a forum to express their opinions and offer suggestions on a proposed undertaking in order to influence the decision-making process. This process has been applied selectively in Ghana and this paper explores why some of the projects were subject to public hearing, and the objectives, form and outcomes of this process. It concludes that stakeholders' involvement in review is essential and may lead to enormous benefits for the proponent, stakeholders and the nation. Where this is ignored, conflicts and problems may be created for project implementation and sustainability.

## INTRODUCTION

The Environmental Protection Agency (EPA) has as its mandate the EPA Act 1994 (Act 490) to ensure compliance in planning and execution of all development activities with the Environmental Impact Assessment (EIA) Procedures in order to promote environmentally sound and sustainable development in the country.

This led to the implementation of the Ghana EIA Procedures in 1995 which, among other objectives, seek to provide an avenue for the involvement of the public, private proponents and agencies in the assessment and review of proposed undertakings. This is to ensure that the concerns and needs of the affected population are considered and addressed.

In addition, the Environmental Protection Agency (EPA) has responsibility for involving the public in the review of Environmental Impact Statements (EISs). This is achieved through mechanisms such as the serving of a 21 day public notice of an EIS publication through newspaper advertisements

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inviting comments from interested and affected parties. Where strong public concerns are raised over an undertaking, and its potential impacts are extensive and far reaching, the Ghana EIA Procedures provide for public hearing to be conducted as part of the review of the project's EIS.

Between 1995-1997 a total of 72 EISs were conducted in Ghana and eight of these were the subject of public hearing. This paper attempts to explore why some projects were subjected to public hearings, and the objectives and purposes, form and outcomes of public hearings.

### **PUBLIC HEARING PROCEDURE AND FORM**

Public hearing is a form of participation in which stakeholders and proponents are brought together in a forum to express their opinions and offer suggestions on a proposed undertaking in order to influence the decision-making process. It is usually organised by the Environmental Protection Agency within the project area of influence and moderated by an independent panel. The procedure adopted during public hearings includes the following steps:

- the introduction of panelists, traditional leaders, government department staff, representatives of all community groups, non governmental organisations and individuals;
- the purpose and objectives of the public hearing are then made clear to the participants;
- the proponent is then given an opportunity to make a presentation on the project EIS. This must be done in the local language to facilitate better understanding of issues and should pay particular attention to those issues that are likely to affect the local community directly (the presentation should include a summary of the project proposal, outline of the main benefits and negative effects of the project to the local people, district and the nation, and an indication of how the key negative impacts would be mitigated);
- representatives of the affected communities, and other stakeholders, also present their opinions and concerns about the proposal;
- the proponent is then given the opportunity to react to the substantive issues and concerns raised; and
- the panel members collate all the concerns raised and make their findings and recommendations known to the forum and then to the Environmental Protection Agency.

Most public hearings last for a period of about five hours and are well attended. In a particular case, as many as 600 people attended the meeting. These included chiefs, community representatives, government officials, and the proponent's representatives.

### **OBJECTIVES AND PURPOSE OF PUBLIC HEARING**

The main objectives for organising these public hearings as part of the EIA review process are:

- to provide a forum for the proponent to inform the entire community of the outcome of the Environmental Assessment of proposed undertakings;
- to verify the accuracy of the EIA findings in relation to the situation on the ground;
- to confirm that all the affected parties and stakeholders have been adequately consulted and have been part of the various decision-making processes;
- to offer the affected and interested parties, as well as other stakeholders, the opportunity to express their opinions on any issues considered outstanding; and
- to promote effective public participation and ensure confidence in the Ghana EIA process as well as support for the proposed undertaking.

### REASONS FOR PUBLIC HEARINGS

Generally the Ghana EIA Procedure requires the EPA to hold a public hearing as part of an Environmental Impact Statement review where:

- the expected environmental impacts are considered extensive and far reaching;
- there is great adverse public reaction to a proposal; and
- there will be relocation or dislocation of communities.

<i>Reasons for Public Hearing</i>	<i>Coldstone Supermarket Recreational Development</i>	<i>Ewaase Gold Mine</i>	<i>Damang Gold Mine</i>	<i>Tankwa Gold Mine</i>	<i>Skell Service Station</i>	<i>Adirimona Road</i>	<i>Mpeasem Gold Mine</i>	<i>Bibiiani Gold Mine</i>	<i>Akyempim Gold Mine</i>
Relocation/Resettlement of communities		•	•	•			•		•
Strong public concern about Environmental impacts	•	•	•	•	•	•	•	•	•
Proximity to Settlements in the case of mining	•							•	
Diversion of Railway lines, Streams, Power lines			•	•					

Table 1: Reasons for public hearings

In practice, four main reasons have accounted for the holding of public hearings on eight projects in Ghana. These reasons are summarised in Table

1 which also indicates that a majority of the projects were gold mines. This can be attributed to the need to relocate or resettle affected communities as well as the strong public concerns expressed about the overall impacts of these projects. The only exceptions were the recreational/supermarket /coldstore development and the Shell Service Station. Both attracted a lot of public concern principally due to the scale of the coldstore facility and the siting in close proximity to the Volta River Authority Electricity Sub Station in Achimota-Accra respectively.

### **ORGANISATION OF A PUBLIC HEARING**

Prior to the holding of public hearing on any given project the following activities are undertaken:

- the selection of site for the meeting;
- posting of notices;
- invitation of stakeholders;
- selection of panelists; and
- a reconnaissance trip to the project area of influence.

The selection of the proposed site and date for the public hearing is done in close consultation with the proponent, the local authority and the affected communities. It is important to achieve a consensus on the site.

Notices are served through:

- advertisement in all the national newspapers which draw attention to the publication of the EIS and public comments within 21 days of the notice ( it is required that the notice appears three times);
- announcements made on the National Radio and Television of an impending public hearing;
- advertisement in the affected area using local advertising media like the beating of 'gong gong'; and
- pasting of public notices in areas where impacts are likely to be directly felt.

Letters are also sent to all statutory government departments informing them of the public hearing and inviting them to participate. For instance in the case of a mining project the Ministry of Mines and Energy, Minerals Commission, Mines Department, Regional Administration and the District Assembly that has planning and management responsibility over the area where the activity is located would be invited. In certain cases specialised agencies or departments are invited to comment on the proposal, depending on its nature. For instance where a proposed activity would result in the diversion of railway lines, the Ghana Railway Corporation would be invited to the forum. Non Governmental Organisations which express concerns about the activity under consideration are also specially invited.

In addition, traditional authorities, chiefs, elders and identifiable groups such as farmers' associations in the affected communities are notified and invited to participate in the public hearing.

It is essential that, as part of the preparation, a reconnaissance visit is made by a team of officers to the affected communities to inform these communities and interact with their leaders and identifiable groups. During such visits invitation letters are formally served and notices pasted. Interactions during these visits give indications about the key areas of concern that are likely to come up during the hearing. The conditions that would prevail at the hearing are easily predetermined during the reconnaissance visit.

Where people feel very strongly about a project and there are potential signs of serious public disturbance arising from the meeting, the agency at this stage would be informed and will provide the necessary security. The outcome of the public hearing depends to a very large extent on the quality of the reconnaissance exercise.

As part of the preparation a panel must be constituted. In practice the membership includes a representative of a relevant professional body like the Ghana Institute of Engineers, Architects and Planners, the EPA and the District Assembly. A chairman, who must not be resident in the project area of influence, is appointed by the panelists. The panel may have a membership of three or five and a third of its members must hail from the affected project area.

### **OUTCOMES OF PUBLIC HEARINGS**

At the end of any public hearing the panel submits a report making its findings and recommendations to the decision-making authorities (principally to the Environmental Protection Agency) as an input to the overall project EIA review process. The Agency, in arriving at its final decision, will consider these concerns and recommendations. When the final decision is made on the project EIS, the Agency notifies the proponent, the Minister of Environment, Science and Technology, the appropriate sector Minister, the appropriate District Authority, and relevant government departments.

It is important to state that the findings of public hearings have had considerable influence on the EIS Review. In some cases certain aspects of the project proposal had to be altered, additional mitigation proposals and commitments were made and final decision on projects delayed until substantive issues were addressed. For instance the coldstore/supermarket and shopping mall proposal was advised to reduce the scale of the cold store facility in the proposal by about 50% of its storage capacity.

Again, Shell Ghana Limited was advised principally to relocate its Achimota Service Station in view of the potential problems that might arise in siting it in close proximity to the Volta River Authority Sub-Station in Accra.

In the case of the six gold mining projects there were substantial revisions of certain portions of the proposed mitigation proposals. Where involuntary resettlement was involved a detailed plan and time table for resettlement which was to be agreed upon by all affected parties was submitted among other requirements prior to the granting of environmental approvals. In four of the six mining projects it was evident that consultations were inadequate and therefore proponents were requested to consult adequately and submit evidence of this consultation with the communities and other relevant personalities and institutions. For instance in the case of Tarkwa Gold Mine project, the public hearing showed that an important dominant group, (tenants), was not represented on the community negotiating team and therefore were creating problems for the Company in its negotiations.

### **BENEFITS AND HINDRANCES TO EFFECTIVE PUBLIC HEARING**

While it is a statutory requirement within the EIA review process, public hearings have been beneficial in terms of:

- providing an avenue for public information and interaction between the proponent and all interested groups;
- allowing people to articulate their views about a given project and make inputs which eventually enhance the quality of the project environmental assessment;
- leading to social acceptability of projects and promotion of harmonious relationship between the proponent and affected communities;
- creating confidence in the newly established Ghana EIA (this is evident by the level of participation in these hearings);
- unearthing issues that may be hidden from the reviewing authority; and
- resolving conflicts during public meetings since every party is given the opportunity to express concerns before an independent panel.

In spite of these benefits the effectiveness of public hearings have been hampered by:

- The inability of the affected communities to easily understand project proposals due to the low levels of literacy. It would have been more beneficial if the locals could have a thorough understanding of the EIS to facilitate effective discussions. Lack of understanding has usually led to hostilities during public hearings.
- The absence of EIA capacity at the District Assembly Level to undertake their own EIS review and to guide their communities to make inputs into EIA Studies.
- The absence of organised NGOs to assist communities in

understanding the issues and in making meaningful comments about a given project.

## CONCLUSIONS

The key lesson is that public participation in environmental assessment review is essential and may lead to substantial benefits for both the proponent and affected community. Where it is ignored it leads to conflicts and problems for project implementation, acceptability and sustainability.

## LIST OF RELEVANT PUBLISHED PAPERS AND OTHER SOURCE MATERIAL

EPA 1995, *Ghana Environmental Impact Assessment Procedures*, Environmental Protection Agency, Accra.

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# Environmental impact assessment of the Camisea Gas Project: the importance of consultation and local participation

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## ABSTRACT

Large reserves of gas and natural gas liquids have been discovered in the Camisea Region in the Amazon rain forests of south-east Peru. The project is located in an area inhabited by indigenous groups. These communities may be exposed to a number of potential impacts which may lead to changes in their livelihoods and socio-cultural characteristics.

This paper focuses on the socio-cultural aspects of the EIA process of the Camisea gas project to highlight that consultation and local participation are the key to EIA and eventual project success. The paper highlights the importance of local participation in delivering long term project success. EIA is an integral and key tool that can be used as the catalyst for initiating this process; a process which leads to social equity and local empowerment.

## INTRODUCTION

Large reserves of gas and natural gas liquids were discovered by the Shell Company SIEP, in the mid-1980s. These reserves are located in the Camisea Region in the Amazon rain forests of south-east Peru. This area was allocated to Shell Prospecting and Development Peru (SPDP) following a licence agreement in 1996 for hydrocarbon appraisal and development. This potentially would have been one of Peru's largest development projects, capable of turning the country into a net energy exporter. The project comprised three main components, namely a gas plant and associated infrastructure located in the rainforest close to the well sites (eg. in field pipelines and well sites); a 600 km export pipeline system across the Andes to the coast; and a fractionating plant plus marine terminal at the coast.

In accordance with Peruvian legislation, project developers are obliged to conduct an Environmental Impact Assessment (EIA) for major infrastructure and development projects. This ensures that adequate provision for environmental protection can be incorporated into the planning, design, execution, monitoring and decommissioning of the project. This EIA will be seen as the first step in an extended programme of consultation, research, analysis and participation leading to sustainable development of the region.

**See Topic 3**

**UNEP EIA Training  
Resource Manual**

*Public involvement*

The project is located in an area inhabited by indigenous groups, and riverine communities, and includes isolated and semi-isolated groups. All these communities may be exposed to a number of potential impacts which may lead to changes in their livelihoods and socio-cultural characteristics. It is important that measures are taken to avoid the loss of tradition and customs, especially since these can lead to secondary impacts on the sustainable use of their natural environment.

A year-long intensive EIA was conducted, supported by work which had begun in 1994. The EIA, conducted by an independent contractor, Environmental Resources Management (ERM Peru), covered all the issues related to the physical, biological and socio-cultural environment, identification and assessment of the potential impacts and mitigation measures. The EIA process is an innovative management tool that may be used to identify these changes. It is conducted early on in the project cycle and predicts impacts and allows for mitigation to be built into design. The challenge is to gain effective participation from the communities which may be affected by the project.

SPDP has been undertaking exploratory and appraisal drilling in Blocks 75 and 88B respectively since 1997. Results of these phases would contribute to a decision on full-development called the FFDP. Additional economic/marketing/technical analysis were carried out to determine viability of the FFDP. SPDP however could not reach a mutually satisfactory agreement with the Peruvian Government (15 July 1998) and consequently decided not to proceed to FFDP. Nevertheless, there are some important lessons to be learnt from the four years that Camisea was alive. The following is a description of what was planned, and what happened, during those four years.

This paper highlights the importance of local participation in delivering long term project success. EIA is an integral and key tool that can be used as the catalyst for initiating this process; a process which leads to social equity and local empowerment. The paper focuses on the socio-cultural aspects of the EIA process to highlight that consultation and local participation are the key to EIA and eventual project success. The key processes for directly involving local communities are provided with examples for involving community members in field surveys; continuous consultation; local empowerment through Vigilance Brigades; and capacity building and training.

## **NATURE AND SCOPE OF ISSUES**

### *The legal and institutional context of public participation*

#### The legal context

The 1993 Peruvian Constitution (Article 2) enshrines the basic right of every Peruvian citizen to participate, individually or in a group, in matters which may affect their political, social, cultural and economic life. There exist legislative instruments which endorse and facilitate every Peruvian citizen's

right to participate in decisions that may affect the environment or indigenous peoples' rights.

The institutional context

Promulgation of legislative instruments has provided a sound legal framework for public participation in Peru. The main impediment to realization of effective public participation has been the lack of an organized and developed institutional framework to implement the legal requirements. There is often a lack of resources within government and representative institutions which tends to limit the amount of consultation and facilitation that can be achieved. More recently though, the EIA process has been used as a key mechanism to facilitate and initiate public participation (notably within the EIA requirements established by the Ministry of Energy and Mines). The EIA process in Peru is a formal requirement, and the participation of the public is encouraged, through the EIA process itself and recently, via the associated public hearing process. The Public Hearing process is being adopted increasingly by other Peruvian line ministries.

## **STAKEHOLDER CONSULTATION: PROCESS AND OBJECTIVES**

*The communities and people involved*

The Camisea Field Production Facilities will impact upon different groups of peoples in different ways and with varying magnitude, and can essentially be categorized into two distinct groups.

- Those potentially most affected, which include native communities or colonist settlements, located at and in the immediate vicinity of the 'zone of operations'.
- Those affected to a lesser degree which include native communities or settler groups that live along the Urubamba river downstream of Nuevo Mundo towards Atalaya and Pucallpa, the semi-isolated groups of Motentoni and Marankiato located south-east of SPDP's operations in the Cashiriari gas fields, and potentially some nomadic groups located within the Nahua and Kugapakori State Reserve.

The majority of the activities and consequently the impacts will take place during the construction phase of the gas processing plant, the in-field pipelines and the production clusters. Additional impacts will be caused as result of logistical activities needed to support these constructional activities. The 'zone of operations' or the area where most of the impacts will be concentrated will therefore be located at or in the vicinity of the site called Las Malvinas.

## **PROCESS AND PROCEDURAL CONTEXT**

*The process of stakeholder consultation*

‘Stakeholder’ is the name given to those individuals or groups likely to be either directly or indirectly affected by any part of a proposed project development. Those individuals or groups likely to be directly affected, such as native communities and their representative organizations are referred to as primary stakeholders, while those likely to be indirectly affected, such as line ministries, government departments and national and international non-government organizations (NGOs) are referred to as secondary stakeholders.

The participation of project stakeholders in project planning, design and implementation is now universally recognized as an integral part of environmental and social assessment. Local communities, their representatives, government and national and international NGOs may all be able to contribute to (and benefit from) dialogue directed at identifying and resolving key project-related questions. Stakeholder consultation is a two-way flow of information and dialogue between the project proponent and stakeholders, specifically aimed at developing ideas that can help shape project design, resolve conflicts at an early stage, assist in implementing solutions and monitor ongoing activities.

The objectives of stakeholder consultation

The key objectives of stakeholder consultation include the following:

- provide information related to proposed project activities;
- facilitate and maintain dialogue;
- seek participation of all interested parties;
- identify stakeholder interests and issues;
- create solutions for addressing these concerns and integrating them into project design, operations, and management; and
- enhance the project by learning from, and incorporating, the expertise of individuals, professionals, communities and organizations.

The main impediment to realization of effective public participation has been the lack of an organized and developed institutional framework to implement the legal requirements. There is often a lack of resources within government and representative institutions which tends to limit the amount of consultation and facilitation that can be achieved.

More recently though, the EIA process has been used as a key mechanism to facilitate and initiate public participation. Enlightened EIA incorporates an element of stakeholder consultation. The EIA process in Peru is a formal requirement, and the participation of the public is encouraged, through the EIA process itself and recently, via the associated public hearing process. The Public Hearing process is being adopted increasingly by the various Peruvian line ministries.

The stakeholder consultation programme has been a forum for promoting dialogue, participation and cooperation between all stakeholders. Its focus has been to identify, discuss, resolve and implement actions that maximize project profitability, minimize social, cultural, and ecological impacts, and contribute to the long term sustainable development of Peru and the Camisea Region. The consultation programme was also aimed at enhancing the delivery of social and environmental investments in the future of the Camisea Region and Peru, and demonstrating openness and transparency and commitment to the Camisea Project's social and environmental goals.

The consultation programme was based upon the following main principles:

- to develop and maintain an open and transparent dialogue with all parties who have an interest or influence on the proposed Camisea project;
- to be iterative and flexible (i.e. so that decisions can be continually fed into design, construction and operation) and to demonstrate how, when and why input from stakeholders was or was not utilized;
- to learn from stakeholder expertise so as to modify and adapt future consultation activities and project design;
- to maintain stakeholder consultation throughout the project planning and design phases and to continue such dialogue through actual construction and operation;
- to recognize that there exists different levels of understanding amongst the stakeholders and to develop the consultation programme accordingly; and
- to provide complete information about the project, with regard to such issues as construction methodology, engineering and operating design, and mitigation.

Stakeholder consultation for the Camisea Field Production Facilities has included the following main activities:

- consulting with the native communities of the Lower Urubamba;
- consulting with the native community federations;
- consulting with Government; and
- consulting with national and international NGOs.

The needs of primary stakeholders, for example, are very different to those of an international NGO, and thus the consultation programme has been cognizant of the wide-ranging differences that exist between stakeholders, and the ways in which information needs to be disseminated and comments fed back. The stakeholder consultation programme has consequently used different tools to address different stakeholder groups, ranging from, for example, technical information contained in a formal report for a specialised

international NGO through to using three-dimensional (3-D) scale models and picture posters for native communities.

The main objectives of the community consultation programme include the following:

- provide information about the project;
- identify community expectations;
- explain SPDP's commitment to providing 'net benefit' to the region;
- provided information on SPDP's Regional Sustainable Development Strategy;
- sense concerns regarding environmental and social issues;
- seek opinions and information regarding key project decisions (eg location facilities and in-field pipeline routing, types of logistics to be used etc);
- support participation in the project decision making process and design;
- address expectations through a mutually agreed process of compensations;
- establish a mutual agreement for land to be used for project related activities; and
- contribute to building capacity for regional leadership.

#### *Incorporating community concerns into project design*

One of the key objectives of community consultation is to ensure that the concerns, fears and suggestions expressed by the communities, feed back into shaping project design.

### **APPROACHES TAKEN**

#### *The EIA process*

Stakeholder consultation as part of the EIA process began in 1996 with the Appraisal Drilling Campaign EIA and continued through to 1997 with the Pagoreni/San Martin East Exploratory Drilling Campaign EIA undertaken by ERM Peru. Consultation during these EIAs focused on dialogue with primary stakeholders in the Camisea region, federation leaders, and secondary stakeholders in Peru, Europe and the USA. Since then efforts have focused on EIA consultation for the Camisea Field Production Facilities EIA through 1998.

#### *Linking EIA to stakeholder consultation*

Stakeholder consultation is an integral component of the EIA process. The EIA stakeholder consultation and participation programme was developed in accordance with the objectives and principles set out within SPDP's

overall programme. It has been conducted as a distinct yet integrated component of this programme. The stakeholder consultation and participation programme has been developed to fully integrate the more focused consultation activities specifically undertaken within the EIA process. For example, SPDP Community Liaison Officers (CLO) have played an integral role in assisting EIA efforts by working together with the EIA field survey teams. The CLOs have not only been the interface for communication between SPDP, ERM Peru and the native communities, but have also been involved in such field activities as baseline data collection, community meetings, and community participatory mapping exercises.

The main elements of the EIA stakeholder consultation and participation process include the following:

- distribution and feeding back comments from the Scoping Report;
- finalizing the EIA terms of reference following stakeholder consultation;
- stakeholder consultation during EIA field surveys;
- issues identification following field surveys and on-going consultation;
- distribution and feeding back comments from the Key EIA Issues Report;
- distribution and feeding back comments on the Final EIA Report;
- stakeholder consultation during the EIA approval process, namely the public hearing;
- post EIA consultation; and
- EIA training.

#### *The Scoping Report*

The Scoping Report was produced in June 1997 and was the first main consultative document in regard to the EIA and the overall Full-Field Development Programme (FFDP). This document was designed to serve as a study terms of reference (ToR) for the FFDP including the Camisea Field Production Facilities component, and included information on the relationships between the design and EIA processes. It outlined the execution programme for the various EIAs and how it was anticipated stakeholder input would feed into the EIA process, as well as other Camisea project management activities. Copies of this document were distributed to all stakeholders based in Peru and elsewhere.

#### *Finalizing the Terms of Reference*

Stakeholders were invited to provide comment so that the ToR for the FFDP EIAs could be finalized. One-to-one meetings were held with some stakeholders and their comments sought and fed back into the design of the studies, thereby finalizing the ToR for the EIAs. Even though a complete list

of identified stakeholders had received a copy of the Scoping Report, few responded.

#### *EIA Field Surveys*

In order to develop and produce an EIA, field work is necessary. This phase of the EIA process allowed the EIA team to conduct the following main activities:

- collect baseline information (regional and site-specific) which will be used to assess the significance of a project's activity on its surrounding environment;
- understand more about the area or region from first-hand experience;
- consult with those people which may be affected by the project's development, so as to inform them about the project, to seek their agreement to the project, and to feed back their comments, concerns and fears so as to mitigate against potential impacts.

Extensive consultation with the communities most likely to be directly affected by the Camisea Field Production Facilities was conducted during the EIA field surveys.

#### *Issues identification*

Following on from the EIA field surveys, consultation with various stakeholder groups (i.e. Government, NGOs and native communities), a number of issues of primary concern to the stakeholders were identified. An approach was then developed which focused on taking these issues and processing them through a system so that a solution might be reached on each of the issues.

This Key Issues approach is based on the principle that by addressing these issues early-on, stakeholders are able to get involved in the process earlier. This ultimately allows for solutions to be reached earlier as well. The identification of key issues culminated in a Key Issues Report which addressed those issues that were identified as most relevant to the EIA and the stakeholders.

#### *Key Issues Report*

The key issues have been identified through consultation with stakeholders (eg through international and locally held workshops), EIA field surveys, and design activity. A separate Key EIA Issues Report has been produced and disseminated to stakeholders for comment and to seek active participation. A pro-forma has been produced which invites stakeholders to choose which key EIA issues they would like to be either involved in actively or just receive information on. Stakeholders will be able to participate in resolving the key issues through one-to-one meetings, focus groups or larger workshops.

### *Final EIA and EIA Approval*

Upon submission of the Final Camisea Field Production Facilities EIA to the Ministry of Energy and Mines, copies of the report will be automatically distributed to a number of stakeholders for their comments. Copies will also be available to others on request. A non-technical summary will however, be distributed to all listed stakeholders (and any others requesting a copy), so that they may have the opportunity to review the EIA. All stakeholders have the opportunity to attend the Public Hearing which is scheduled to be called by the Ministry of Energy and Mines approximately four to six weeks following lodging of the EIA with the Authorities. SPDP will then be provided with the opportunity to respond to any concerns by stakeholders (following the Public Hearing and otherwise) prior to Government determination of SPDP's application within 60 days after first submission of the EIA.

In addition, the EIA, in a simplified format, will be presented to the native communities for review, following production of the final EIA and before Government approval. The native community Federation Leaders will be invited to attend the Public Hearing on behalf of the communities they represent.

In order to aid the native communities' ability to both understand and evaluate the simplified EIA for themselves, a Guide to Native Communities for Review of Environmental Impact Statements has been produced and distributed to the native communities.

### *Post EIA*

Stakeholder consultation will continue following EIA submission and approval. An on-going local, national and international consultation process will be developed in consultation with the stakeholders and will continue to be refined through project construction and operation.

### *Further EIA consultation efforts*

In addition to those activities outlined above, two training workshops, aimed at building EIA capacity for local NGOs and SPDP Community Liaison Officer (CLOs) respectively have been conducted. Two separate workshops were held with the following main objectives:

- highlight ERM's work to date in the region and how both NGOs and CLOs are involved in the EIA process;
- raise the general level of understanding as to what an EIA is and why it is conducted;
- run through the EIA process itself and its individual components using show case examples; and
- demonstrate the link between the EIA process and stakeholder consultation.

### *NGO EIA training*

The specific objectives of this workshop were to provide the participants with the following information:

- an overview of the function of EIA including a description of key technical components;
- an outline of EIA methodology from scoping to mitigation;
- the key benefits of EIA to industry; and
- how SPDP's commitment to social development fits into the EIA process.

The participants were provided with an information package relating to EIA methodology and process, benefits to industry and specific examples from EIA projects. Following completion of the workshop, the main findings from the discussions were collated, analyzed and then disseminated to all the participants.

The focus for the field survey consultation was three fold: to present information on the project, to elicit community concerns regarding the project, and to build capacity of community members involved in the field surveys regarding EIA methodology.

## **RESULTS AND IMPLICATIONS**

### *Field surveys*

The main objective of the field trips was to visit each of the communities in the Lower Urubamba region between Sepahua and Pongo de Mainique.

The main objectives of the consultation in the field trips included the following :

- meet the communities of Lower Urubamba;
- gather first-hand primary concerns relating to all aspects of the FFDP;
- present the concepts of EIA including the Environmental Management Plan (EMP); and
- identify key mechanisms for consultation to continue.

### *Key concerns*

The process allowed the identification of the main concerns of the communities. These can be broadly split between concerns relating to the FFDP, socio-economic issues and environment and are collectively presented below.

### *Key findings*

Full Field Development Programme

In general there was a positive attitude from the communities towards the FFDP. The communities were keen that it would be a source of many benefits (eg employment during the construction period). They saw many of these however, as short-term. The communities wanted to learn more about the project, as this was the first time for many communities that the FFDP had been mentioned. In principle, except for Cashiriari none of the communities objected to the gas plant being built on their lands, although they would not want it sited next to their village.

#### Socio-economic Issues

The main concerns of the FFDP in terms of socio-economics were the potential affects upon health, education and agricultural development. Many of the communities felt that the project might bring new diseases to the region which might affect health as well as food stocks and production. The communities were keen that SPDP showed a willingness to support development projects.

#### Environment

There are a number of environmental issues of concern to the communities, notably the following.

- Water pollution – they were concerned about the potential wastes from the project and how this will affect water quality, and also the impacts of the increased river traffic upon fish stocks, their main protein source.
- Use of hovercraft – they felt very strongly about the hovercraft and relate this to noise causing dwindling fish numbers, the wash from the hovercraft affecting daily river activities, and a mythical belief about a monster coming to take the fat from their children away to produce helicopter fuel, known as the ‘pishtaco’ myth.
- Increases in general river traffic – they were concerned about the increases in river vessels and how these may disrupt their fishing or daily riverine activities (e.g. washing, bathing).
- Control of access along any roads – when asked about roads, the communities stated that they would accept these as they would provide improved market links and communication between communities. They were adamant however, that complete control and security must be provided to ward off and control the potential for settlers and loggers to enter their lands.
- Use of helicopters – the communities were worried about the increased noise levels from the helicopters and how this may affect the wildlife and potential game.

All of the communities saw the EIA as a constructive process and as a means of helping them to protect their environment.

#### *Consultation process*

The communities feel that there has been a good level of co-ordination between SPDP, the communities, the local authorities, federation representatives and ERM Peru. They did note however, that the consultation of women and elders was not as effective as it could be and ways should be sought to improve this.

The communities in general welcomed the visits made by project personnel. Although their level of technical understanding is somewhat limited, the use of visual material provided great added value in disseminating a large amount of information.

#### *Community consultation regarding baseline data collection*

A five week survey focused on community consultation and socio-economic/cultural baseline data collection as part of its field survey for the Camisea Field Production Facilities EIA was undertaken. The field survey conducted involved the following communities: Las Malvinas, Chokoriari, Camisea, Shivankoreni, Segakiato, Cashiriari, Nuevo Mundo, Kirigueta, Marankiato, Montetoni.

The specific objectives of the survey were to:

- visit each of the communities potentially impacted by the gas processing plant, in-field pipelines and production clusters;
- conduct the socio-economic and cultural impact assessments at each community addressing such issues as natural resources consumption, hunting (areas, species, frequencies, means), collection (distances, products, difficulties), logging (species, distances, uses), agriculture (location, labour force, products, land use), marketing, etc..(Fisheries were not included in this study as a separate study was developed);
- identify the community's main concerns in relation to the FFDP; and
- discuss appropriate mitigation measures with the communities.

#### *Field survey methodologies*

The field survey was conducted using the following main methodologies:

- Community meetings were held to provide brief explanations to the communities concerning ERM Peru's research and EIA work. These meetings were also used as the main forum for data gathering, collecting community concerns relating to the proposed project
- Participatory community mapping was conducted to present information processed by a group of participants (eg men and/or women groups) in a visual format. The participatory maps provide

valuable socio-cultural baseline information, much of which is presented in a geographically spatial form.

- Questionnaires were conducted based on a statistically defined sample, and a specific number of surveys were applied to house heads in each community. This allowed the field team to obtain quantitative data and define local resources consumption trends.
- Semi-structured interviews were held with the community presidents and members within the communities in order to supplement information collected through the questionnaires.
- Population registers were used in some villages which enabled the survey team to identify the total number of people, men, women and children, and to determine local historical tendencies on birth, death and migrations.

The concerns highlighted by these communities were representative of concerns raised throughout the region. In addition, a total of 173 questionnaires (statistically representative) were carried out at the following eight communities. The figure in parentheses highlights the number of questionnaires carried out at each community. The questionnaires were focused on collecting quantitative baseline data on such issues as hunting, collecting, agricultural, logging and marketing. Chocoriari (21), Camisea (20), Shivankoreni (19), Segakiato (25), Cashiriari (13), Nuevo Mundo (29), Kirigueti (40), Las Malvinas (6).

#### *Community consultation regarding logistics impacts*

A survey of five riverine communities was undertaken in order to assess the impacts of increased river traffic once construction for the Camisea Field Production Facilities begins. Daytime ambient sound measurements were taken and community participatory techniques were undertaken at the following river-bank locations: Kirigueti (upstream from Nuevo Mundo); Miaria (between Nuevo Mundo and Sepahua); Puija (in close proximity to Sepahua); Bufe Pozo (between Sepahua and Atalaya); Maldonadillo (in close proximity to Atalaya).

The communities were consulted using semi-structured interviews and questionnaires to elicit their views and concerns about increases in river traffic. Forty-seven interviews were conducted between the five communities. In addition, ambient noise measurements were taken at each of the communities to provide valuable baseline information upon which impacts could be further assessed.

#### *Native community participation during the EIA*

Since the beginning of the Camisea project the establishment of a close working relationship with the native communities of the Camisea region has

been sought. The process has involved the native communities, as far as possible, with the following activities, during preparation of this EIA.

- River traffic log survey: In order to assess the level of impacts from increased river traffic once FFDP construction begins, a river traffic log survey to collect baseline ambient data was initiated. This survey was conducted at Nuevo Mundo, Camisea and Las Malvinas and involved local community members. The river log provided an account of the types of river vessels and the time of day they passed any one of the communities. The information collected has been used during the assessment of impacts for this EIA.
- EIA field surveys: During EIA field surveys, native community members were employed to assist the technical experts with such activities as plant, tree and animal identifications (during transect exercises), collecting surface and ground water samples (from streams, rivers and community water wells), and assisting in collecting ambient noise and air quality measurements.
- Socio-economic and socio-cultural baseline data acquisition: During the field surveys, ERM Peru's socio-economic team visited all of the communities of the Camisea region. They conducted community-wide meetings and encouraged community members to participate. One key focal area for community participation was during the collection of socio-economic and socio-cultural baseline data. ERM Peru made use of well known 'participatory rural appraisal' (PRA) techniques such as semi-structured interviewing, historical and daily profile assessments and participatory mapping. All of these techniques provided invaluable baseline information which has been used throughout this EIA. Furthermore, they provided an opportunity for the communities to get involved in the EIA.

*Proposed ongoing stakeholder consultation during project implementation and operation*

Consultation on the implementation of the EIA was to be managed within the context of SPDP's overall stakeholder consultation programme.

The goal of the on-going consultation was to inform and involve stakeholders in the implementation and monitoring of the policies and strategies outlined in the EIA and the EMP. The consultation programme needs to be continually developed, modified and adapted in light of the changes and activities pressing at any one time. SPDP was committed to work with stakeholders by involving them at key phases of the programme. Stakeholders will be involved in the development of the consultation process and programme itself, capacity building exercises, implementation of measures outlined in the EMP, monitoring project activities and establishing review mechanisms.

### *Native community participation*

Native community participation was seen as a key element of gauging the success and effectiveness of implementing those measures outlined in the EMP. A key focus therefore lies in capacity building and awareness training. Furthermore, communities were encouraged to participate in monitoring project activities through such measures as external auditing and the implementation of a community complaints procedure. Project CLOs were to continue to provide the link between the project and the communities, and work with them to find other ways of maximizing their participation during project construction and operation.

### *Monitoring and evaluation*

As part of the overall stakeholder consultation programme, it was envisaged that a focus group of secondary stakeholders was to be established to aid in the design of a monitoring and evaluation (M&E) programme. This programme serves to provide an external check as to whether SPDP is meeting its commitments set out in both EMP and Health, Safety and Environment (HSE) objectives and goals. Some stakeholders have developed a record of developing and managing complex M&E programme and their expertise would be extremely useful in helping to design such a programme for SPDP. This group of stakeholders will liaise with the native communities in developing such a monitoring programme.

### *Internal training and education*

SPDP was working towards developing a training programme which covers HSE components identified within the EMP. This programme covers general environmental and social issues for all staff and more specific technical issues for relevant project personnel. It was intended that key stakeholders be involved in the training programme to build their technical capacity and also raise awareness for HSE issues.

### *Developing new key issues*

Updates on the key issues were to be provided to all stakeholders. The updates provide information on the procedures established to insure key issue management implementation and also report on successes and problems. As the needs and circumstances of the project changes, and as gaps are identified in key issues procedures, stakeholders will be involved in identifying new key issues and possible solutions to identified gaps in mitigation strategies and procedures. Management systems could then be adapted to respond to the needs of the issues as they develop.

### *Dissemination of information*

SPDP will continue to disseminate its briefing paper on a regular basis. These serve as an effective means of providing stakeholders and any other interested parties with an update on project activities to date and those planned for the near future. In addition, SPDP is committed (internally and by national legislation) to produce an annual HSE Performance Report

which will be made available for public perusal upon completion. Finally, SPDP will continue to update its Camisea website to include information on technical, environmental, social, health, safety and other project related issues. Stakeholders are encouraged to send in comments and questions on the project through the website.

#### *Meetings and workshops*

One-to-one meetings and workshops to develop the project with the participation of stakeholders will continue. It is intended to hold annual workshops and more regular meetings with national and international stakeholders to keep them informed on project activities and any new key issues, and allow for their participation during the construction and implementation phases.

The primary results from the consultation rounds were as follows:

- No community was opposed to the overall project.
- The communities accepted the use of hovercraft for transporting project equipment and materials, subject to the use of an early warning system, a lead boat and timing restrictions documented as standard operating practice in a 'River Traffic Safety Procedure' which the communities have actively participated in developing.
- A decision on Las Malvinas as the preferred gas processing plant location was made after the fourth consultation round and after incorporating community opinion into a series of internal site selection workshops.
- The communities were able to begin contract negotiations outlining plans for land acquisition and hire, as well as appropriate compensatory measures.
- The communities have increasing understanding of the concepts behind the Camisea Field Production Facilities, what the potential impacts are and what these could mean for them. They advanced their comprehension as to what construction of the in-field pipelines and the gas processing plant would involve.
- The communities wanted to learn more about the potential adversary effects from the project upon their environment. They needed to know of the potential down-sides as well as the potential benefits in order to make informed decisions.
- The communities still needed more information on how the in-field pipeline would be constructed, what appropriate mitigation measures would be employed, and what the potential risks would be to them. Similarly, more information is required about SPDP's waste

management plans, in particular, for dealing with toxic and hazardous wastes.

- Colonists felt that more attention had been paid to the native communities in terms of discussing benefits and compensation.
- A significant amount of further consultation is required before the communities fully understand the range and level of impacts.

## **RECOMMENDATIONS**

Throughout the field trips a number of recommendations were made as to what SPDP should do during the FFDP. These recommendations are summarized below.

- make the consultation programme an ongoing and permanent process;
- ensure that effective and regular evaluation and monitoring is conducted to improve the process;
- use methods and strategies to increase local motivation and interest in the consultation process and include women and elders;
- centre the presentations around one or two issues, rather than trying to make a comprehensive presentation of several themes.
- keep the messages short, clear and concrete and include a final summary at the end of each presentation;
- identify methods for encouraging people to ask questions during the presentations through strengthening local communal organizations (i.e. training of leaders and representatives);
- maximize the use of complementary audio-visual materials: slides, videos and printed materials;
- train the communities to understand key issues associated with EIA and EMP, monitoring SPDP activities, and in implementing local independent conservation and environmental protection measures;
- (ERM Peru should) take part in more frequent consultation activities with the aim of developing a more efficient participatory process for the EIA production and implementation;
- further assess the potential impacts of helicopters on game;
- implement training and education programmes focused on increasing awareness related to breeding seasons, hunting females, rare and endangered species, dangers of over-hunting and general wildlife management;
- promote palm reforestation programmes (used for thatching roofs);

- implement agricultural and forestry training programmes;
- implement strict control of loggers in the region using the communities as guardians;
- establish improved market links;
- develop river safety procedures with the communities, spill contingency and emergency response plans; and
- establish strict flight paths for the helicopters to avoid coming into close proximity with the communities.

SPDP has taken these recommendations into account, and used them to refine and improve further consultations with the communities. Key examples include:

- an on-going consultation programme is being developed post EIA submission and approval;
- SPDP with ERM undertook a training and capacity building workshop with Federation leaders in Sepahua;
- SPDP will involve the local communities to monitor its activities once construction begins;
- the on-going biodiversity assessments conducted by Smithsonian Institution will hopefully yield results which may indicate the impacts of helicopters on game;
- SPDP's Regional Sustainable Development Strategy will address delivery of training programmes;
- SPDP is currently developing an access control plan for its Camisea field production facilities;
- river safety procedures have been developed with the communities, and a River Safety Navigation Booklet has been produced; and
- flight paths will be developed in consultation with the communities so as to minimize the impacts and nuisance.

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# Wetland conservation: institutional constraints and community awareness

*Donah Kakwikire Kataata*

## ABSTRACT

The state of the environment in Uganda's Pre-independence period was probably the most ideal in the whole of the African region. Once described as the 'Pearl of Africa' by Winston Churchill, the tiny country that lies between 4° 12' and 10° 29' N latitude and between 29° 34' and 35° 00' E longitude with an altitude above sea level of between 620 to 5110 metres enjoyed an ideal weather pattern suitable for agricultural production. This essentially forms the country's economic backbone, without destabilizing the ecosystem. Increases in population, which now stands at 22 000 000 people, have had very negative implications on land usage, mainly for agricultural and shelter purposes.

## INTRODUCTION

Uganda covers a total surface area of 241,038 km<sup>2</sup> of which 43,941 km<sup>2</sup> is open water and swamps. Kampala city, Uganda's Capital and industrial centre covers a total surface area of 195 km<sup>2</sup> of which 31 km<sup>2</sup> (15 per cent) is wetlands.

The gradual and steady increase in population means that sanitation facilities have to expand and with more development projects land, which is ideal only in limited locations, is used up. This has ended up infringing on wetlands as well.

Since the NRM Government came to power, revamping the economic sector and diversifying economic production which solely hinged on agriculture between 1960-1985 has been a major concern. The establishment of the Uganda Investment Authority (UIA) in 1991 saw an increased number of industrial establishments. Kampala City has the majority share of large industrial investments a number of which have encroached on the wetlands. Kinawataka and Nakivubo swamps in particular have become major targets for development because of their location and in order to achieve economies of scale.

In Uganda, Environment Impact Assessment is a new phenomenon. Although now being appreciated, it will require concerted efforts of all sectors in our society if we are to reap its benefits. Statute No.4 of 1995 of the

**See Topic 3**

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*Public involvement*

Republic of Uganda brought into existence the National Environment Management Authority (NEMA) with power to ensure that, amongst other things, wetlands as integral parts of the ecosystems are protected from negative impacts resulting from human activities. In conjunction with other lead agencies such as Kampala (KCC), NGOs (e.g. IUCN ) etc. NEMA strives to protect the environment and threatened species. As pointed out, EIA is a new requirement and its adaptation is still regarded as an ordeal by most industrialists, since they consider it expensive and unnecessary.

## **BACKGROUND**

Kinawataka and Nakivubo swamps lie on the eastern part of the city. They both open into Lake Victoria, a natural reservoir of water supply to the city's residents. Besides serving as flood controls, these wetlands are used mainly for effluent filtration and water purification before discharge into Lake Victoria.

Lack of information flow to various institutions involved in the processing, establishment and construction of processing industries accounts largely for the destruction of wetlands, in the Uganda case in urban centres.

## **NATURE OF PROBLEM AND SOCIAL RESPONSE**

Following an appeal by the State in both local and international media, a number of investors have been trying to construct heavy processing plants in Kampala in particular, because it is well linked to a hydro power dam whose output is sufficient to run heavy industries. The Kinawataka and Nakivubo swamps lie along the power supply route and hence are vulnerable.

Large plants like Coca-Cola and Pepsi cola employ a reasonable workforce and generate a substantial amount of revenue to the State. Their existence is of national importance.

The area particularly around Kinawataka was zoned in 1972 for industrial establishments and impact assessment (EIA) was put in place as a prerequisite for establishment of any project as recently as 1995. The National Environment Policy came into existence only four years ago. The creation of NENM is just as recent.

Establishments like Pepsi cola and Coca-Cola were built before NEMA came into existence; at the time EIA was not that crucial. Perhaps in an attempt to minimize costs, no proper drainage facilities were initially put in place. It has been noted in the past that one of the beverages plants was discharging its effluents onto open ground and the grass was beginning to wither. In an attempt to mitigate this sad scenario, it is believed that underground tunnels have been constructed to remove the effluent which is now likely to end up in Lake Victoria causing pollution and destroying the zooplankton. What is not known however is whether both Pepsi cola and Coca-Cola have in the

past been meeting minimum standards before disposing of any effluent into the swamps; this is very important since the swamp leads into Lake Victoria which supplies the city's water for industrial and home use, as well as being the habitat for rare species like the Crowned Crane (*Balearica pavonina*), the Shoebill (*Baleariceps rex*) and fish.

### **SOCIAL INPUT AND PUBLIC AWARENESS**

Repeated flooding in the city is largely blamed on the destruction of swamps, which act as natural drainage channels. Besides, in Kampala, they are useful for stripping sediments' nutrient and retention of toxins. As well, they have been natural habitats for rare fauna species e.g. the Shoebill and the Crested Crane. The continued construction of warehouses and industries in the swamps sparked off public outrage. In February 1999 angry residents near the affected swamp wrote to Kampala Town Clerk complaining about the infringement on the swamps. The developers were ordered to halt construction until drainage channels were constructed to prevent floods and an EIA report submitted to NEMA. Surprisingly, although when the site was visited one developer had not stopped construction, most other developers had complied.

In a related incident, an international school has been a point of contention following its construction in Nakivubo swamp. This swamp is of vital importance to city residents because it filters all the semi-treated sewerage and untreated industrial wastes. Tampering with it means that the effluent will go into Lake Victoria which is close to Kampala's water works. Officials from the Inspector General of Government (IGG) and the Kampala City Council (KCC), the National Environment Management Authority (NEMA) and National Wetlands Programme were irked by this infringement prompting an inquiry into this scenario. This did not yield any positive results since in most cases permission is granted by State technocrats without demanding strict adherence to the EIA standards.

### **EIA PROCESS AND TIME FRAME**

It is now a requirement for project developers to submit an EIS/EIA to NEMA before a project is undertaken. NEMA studies the report and, after ensuring that all measures have been put in place to comply with NEMA standards, a certificate is issued for work to commence. Where the project is likely to arouse public concern, as was the case in the recent proposed construction of a hydroelectric power dam, the public and all stake holders are invited to a public hearing. Views from all parties concerned are heard and, depending on the social response, the issue may be deferred until compromise is reached. When the Environment Policy came into being in 1995 with the establishment of NEMA, most of the developments in wetlands were either already started or completed. Developers cannot easily appreciate the value of an environmental audit report.

NENM, NGOs and all other leading government agencies will have to play a leading role in sensitizing the entire cross-section of the population to the mandatory EIA requirement. This has to be done over time. One KCC senior official observed that 'Although EIA is mandatory for industrialists, few submit the EIA/EIS to the relevant authorities'. This is because, as pointed out earlier, this is a new requirement, and developers regard it as an expensive exercise. It should be emphasized that at times compromise is difficult to reach, especially on big investments, as the government is trying to attract as many investors as possible.

A case in point is the Nainanve Industrial Park, a big land/forest reserve that has been opened for industrial development. The wetland will be destroyed and the forest reserve lost. In effect, this will cause water pollution of Lake Victoria and flooding of the Jinja Road highway.

### **MONITORING AND EVALUATION**

NEMA undertakes monitoring as a government agency. Other institutions, like Makerere University Institute of Environment, also undertake studies as do various other independent institutions, and the press.

Since NEMA is the government's watchdog on environmental management its decision and ruling is final. But because of the large number of projects in diverse areas of our country, and given the limited resources necessary to traverse the entire nation so as to maintain EIA standards, sometimes it is very hard to ensure that the EIA process is followed at all times and all places. The Kinawataka and Nakivubo case for instance was brought to the attention of the public by residents living near the swamp. NEMA in turn intervened, halting the construction, and KCC, acting as a lead agency on behalf of NENM, enforced the ban on construction. Residents though are still suspicious because they don't have access to these closed-down establishments and cannot ensure that ameliorative measures have been put in place.

### **CONCLUDING REMARKS**

The relevance and importance of EIA at this stage of human development cannot be questioned. As more and more developmental projects are carried out, the state of environment in any part of the world has to be closely monitored. The need for capacity building and the Government's unreserved commitment and political will have to be at the forefront if the ecosystem is to remain stabilized.

Judging from the past experience, it appears that the NEMA, the Government's top watchdog, is in most cases caught off guard and steps in only to carry out environmental audit. It is, however, very evident that the press and the public and NGOs have been acting as effective partners and good watch dogs.

Some heavy industry plants at times are not subjected to a rigorous EIA process for fear that the developer may be concerned about the heavy expenses involved in mitigation measures and in turn shift the plant to another country, consequently denying the State revenue. If there is going to be a way forward the ground has to be leveled so that all developers, big and small, are subjected to the same strict EIA process.

NAME	AREA (km <sup>2</sup> )	TYPE	LANDUSE	THREATS
Kasanga	4.72	P>S Papyrus	Subsistence agriculture And hunting	Drainage
Kinawataka-Kawoya	1.5	P Papyrus	Industrial development Subsistence agriculture And papyrus harvesting	Drainage and permanent conversion
Kirombe-Kachanga	2.44	P Papyrus	Mining of sand	Fire
Kiwembo-Kawaga	1.27	P Miscanthus Papyrus	Papyrus harvesting And hunting	None significant
Kyetinda	2.06	P Papyrus	Subsistence agriculture And papyrus harvesting	Drainage
Lubigi	2.85	P Papyrus	Harvesting Papyrus	Over-harvesting
Mayanja River	0.81	S	Subsistence agriculture	Drainage
Nabisasiro	1.98	S	Subsistence agriculture	None significant
Nakivubo	5.29	P Papyrus	Effluent treatment Subsistence agriculture Papyrus harvesting Settlement	Drainage Noxious weeds Over-harvesting
Nalukolongo	*	S	Settlement Industrial development subsistence agriculture	Drainage
Nsooba-Bulyera-Kiyanja	4.61	S	Settlement Subsistence agriculture Waste disposal Brickmaking	Drainage and Permanent conversion
Walufumbe-Nalubaga	2.52	S	None	None

*P – permanent*  
*S – seasonal*

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# Selecting development options through environment-based planning approaches

*A Case Study of the Colombo-Katunayake Expressway Project in Sri Lanka*

*Ariyaratne Hewage*

## INTRODUCTION

Colombo is the capital city of Sri Lanka, situated on the West Coast of the country. The proposed high-speed road link is between Colombo City and Katunayake, the location of the international airport, which is situated about 25 km north of Colombo. The project would fulfil a long-felt need not only to facilitate passenger and freight movements between the two points, but also to ease the traffic from and to the northern part of the country.

At present the time taken to travel between the two points is between 45 minutes and one hour depending on the traffic. Travel between the Airport and City of Colombo is also hampered by the passenger and goods transport to and from Colombo and the northern part of the country. The inadequacy of the present facility will be a serious impediment to economic growth in the area and the country, as a whole.

The proposed alignment of the expressway would be 24.6 km in length with four lanes (expansion to six) each lane having a width of 3.5m. The design speed is 100 km/hr. The preferred and acceptable alignment (Western Trace) has been selected as the best option based on four primary options along with a 'No Action' Option.

The Colombo Katunayake Expressway (CKE) would pass through mostly marshy land, as well as built up land and the Negombo lagoon. Marshy areas having soft ground would undergo consolidation settlement which is a critical phase of the project. Soil movement, construction of embankments, filling of 1.9 km of the canal along with the canal deviation will be carried out. In addition, work on asphalt concrete pavement, construction of base course and sub-base course and construction of bridges over Dandugam Oya and Jaela will also be carried out.

Pre-construction activities include the construction/acquisition of offices and housing, workshops, repair facilities, warehouses/stockpiling areas, quarry sites/crushing plants, concrete batching and mixer plant, asphalt mixing plant, power and water supply, major construction equipment and a site laboratory. Sand required for the sand blanket would be obtained from offshore dredging, pumping and stockpiling at identified locations.

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*Screening*

The concept of an expressway was first formulated in 1989 by the Road Development Authority (RDA) and many of the earlier parameters have now changed including land use and socio-economic factors. The traffic on the existing primary road between Colombo and Katunayake (A3) increased by almost 250 per cent within the decade from 1981 to 1990 and in 1995 certain sections of the road were carrying around 40,000 vehicles per day. Taking into consideration all these factors, a new trace has been proposed. The new proposal is to construct an alternate highway between Colombo and Bandaranayake International Airport (BIA). This proposal was approved by the Cabinet of Ministers in August 1995 subject to an acceptable financing arrangement.

Several primary options which would enable high-speed transport of sufficient capacity have been evaluated to find the best option. The primary alternatives considered in the process were:

- Alternative 1 Western Trace
- Alternative 2 Eastern Trace
- Alternative 3 Improvement to existing road, A3
- Alternative 4 Improvement to the railway inter model option
- Alternative 5 'No action' option

The basic social and environmental setting for this EIA case study is as follows.

#### *Socio-cultural environment*

The socio-cultural environment of the project setting includes the people living in the alignment of the CKE, the community living in the sides of the north of CKE and the daily traffic that will use the CKE when it is in operation. There were 130 houses and small shops in the path of CKE and these have to be demolished and relocated.

There were another sixty families who lived in the road reservation area of the CKE and this reservation area will be acquired by the Road Development Authority (RDA). This community will be allowed to stay, but they will have to tolerate the ill effects even after the construction.

The CKE runs along highly populated areas and this will cause several problems to the community who will be separated by the path of the CKE. Certain sections of the existing A3 road were used by around 40,000 vehicles per day in 1995.

#### *Physical features*

The physical features of the project area includes an expanse of marshland (133 ha of Muthurajawela marsh wetland), paddy lands, agricultural land, coconut land, homestead, residential areas and the Negombo lagoon area. The CKE links Colombo, the Capital of Sri Lanka with Bandaranaike

International Airport, the only International airport of the nation and it travels through highly urbanized/industrialized areas with several key national social organizations in the vicinity.

#### *Biotic environment*

The biotic environment includes faunal species such as many different species of mammals, birds, reptiles, fishes, crustaceans, amphibians and other aquatic life in the wetlands (marsh/lagoon). In addition, it also includes vegetation such as trees, shrub, grasses, reeds, and cattails with aquatic vegetation such as lilies, sea-grasses etc.

Several project-related issues were identified at the proposal stage.

#### *Social conflicts*

Two main groups of communities are affected by this project. The first are those involuntary resettlers to be relocated because their houses will be demolished (130 houses and six small shops). Sixty five percent of the dwellings are shanties built by squatters. Eighty per cent of residents are employed in temporary occupations and more than 77 per cent earn around Rs. 3000/= per month (approx. US\$45).

The remaining families (in 60 houses), allowed to stay in the road reservation (expressway) acquired by RDA, will be vulnerable to ill effects even after the construction.

#### *Ecological issues*

The expressway passes through the ecologically sensitive habitats of wetlands, such as the Muthurajawela Marsh, ponds, streams, brackish water swamps, network of canals and the Negombo Lagoon etc.

In addition to loss of area of the existing habitats, the biological diversity on both sides of the express way would be affected by noise and other impacts. Large quantities of sea sand will be dredged off shore to fill the roadway and this may cause damage to coral reefs, benthic habitats, etc. Seawater from the sand stockpiling may also affect the ecology in the area. The expressway runs through the lagoon for a distance of 1.4 km and would isolate a narrow strip (3 per cent) from the main lagoon area.

Other impacts on ecological resources are obstruction of storm water flow, obstruction of animal paths, disturbance of animals by noise during construction and operational phases, disruption of water flow in the old Negombo Canal, and contamination of aquatic habitats with pollutants such as oil, cement, tar, lead, zinc, iron, rubber and solid litter.

#### *Hydrological issues*

The existing railway track and the A3 road already act as barriers. The expressway will cause only marginal increase to free flow of water. The

crossings of the express way at old Negombo canal, local drainage canals and major streams will cause congestion of water flow.

### *Policy issues*

Two major policy issues needed to be addressed before granting approval for the implementation of the project:

- It is proposed to maintain the proposed expressway as a toll-road and thus to charge a fee from the vehicles using it. Since this is the first time a fee levying system on a roadway has been introduced, there may be some resistance to it. The government should take a firm decision to go ahead with the proposal since it has several long-term benefits.
- The expressway runs through the conservation zone of the Muthurajawela wetlands affecting the Muthurajawela Visitor Centre (MVC) and separating the permanent building from the nature trial area. In addition, during the construction phase MVC may lose its attraction for visitors, and the boat trips along canals will have to be suspended.

## **PROCESS AND PROCEDURAL CONTEXT**

There are several major requirements established by the EIA and other existing institutional framework for the project, as follows:

### *Legal requirements*

Projects for the construction of national and provincial highways involving a length exceeding 10 km fall within the prescribed list for EIA as published under National Environmental (Approval of Projects) Regulations No.1 of 1993. Under the provisions of section 23Z of the National Environmental (Amendment) Act of No.56 of 1988 the preparation of an EIA is a mandatory legal requirement for projects prescribed by the Minister in charge of environment.

The EIA will have to be implemented through a designated Project Approving Agency (PAA) as prescribed by the Minister under section 23Z of the NEA. The CEA acts as the PAA for this project and the Road Development Authority (RDA) is the project proponent for the CKE. (A list of statutes relevant to the assessment is given in the annex).

### *Preliminary information*

The project proponent is required to submit preliminary information on the project. This should include a description of the nature, scope and location of the project accompanied by location maps and other details as required by the PAA. This would also include the magnitude of the proposed project, use of natural resources, employment opportunities, operation method of

the project etc. The preliminary information would enable the authorities to decide whether the project falls within the prescribed project list.

#### *Designation of Project Approving Agency (PAA)*

Depending on the type of the project, the Central Environment Authority (CEA) appoints another government agency from among the identified list of agencies as the PAA. An agency which will have any special interest in the project promotion is not considered eligible for appointment. In this case the CEA acted as the Project Approving Agency. Since the Road Development Authority was the project proponent the Ministry of Transport and Highways was not appointed as the PAA in order to avoid any biases towards the approval of the project.

#### *Scoping*

Scoping is done through an inter-agency meeting of all relevant agencies. In regard to CKE, the relevant agencies are CEA, Wildlife Department, Urban Development Authority, Water Supply and Drainage Board and Sri Lanka Land Reclamation Board and other relevant agencies. Scoping meetings were held to identify significant issues, type of analysis and mitigatory measures to be considered. This was also used to determine reasonable alternatives that should be considered in the EIA and also set the Terms of Reference (ToR) for EIA. In addition this is the forum to communicate with the developer about the requirements of EIA and to inform the community.

#### *Preparation of Terms of Reference (ToR) for EIA*

The ToR was prepared by the PAA after the scoping stage of the EIA process. CEA professional staff members served on the committee on ToR preparation. In addition, the CEA also granted its formal approval to the ToR after having reviewed it thoroughly.

#### *Public participation*

The provision for public participation is contained in the NEA. On receipt of the EIAR the PAA will make preliminary assessment of its adequacy as measured by the ToR. If found adequate, the notice of the availability of the EIAR for public review will be announced in the gazette and in newspapers in Sinhala, Tamil and English languages. Thirty working days are allowed for public review. At the end of the public comment period, the PAA will decide whether the case warrants a public hearing. The public comments received during the period of 30 days will be sent to the project proponent for review and response, all the substantive comments received on the draft will be attached to the final draft.

#### *Technical Evaluation Committee (TEC)*

The PAA appoints a TEC comprised of professional staff from the PAA and the CEA plus other invited subject matter experts. The TEC reviewed the EIAR and the public comments received. The TEC also asked for more

information on the project proposal from the proponent for further review. On the basis of recommendations made by the TEC, the PAA approved the EIA subject to certain conditions being met.

#### *Decision making*

The PAA will grant approval for the project subject to specified conditions or will refuse approval for the project (giving reasons for the non-approval). A project proponent who is aggrieved by the refusal can appeal to the Secretary of the Minister in charge of Environment. A member of the public aggrieved by a decision to grant approval for a project has to seek recourse through the courts.

#### *Mitigatory measures*

As a requirement of the EIA, the proponent prepared a mitigation plan indicating how he was proposing to limit some of the project's adverse impacts on the environment. Accordingly, the proposed mitigatory measures for resettlement of people, construction of Muthurajawela Visitors' Centre, regular testing of water quality of water bodies, noise reduction devices and other measures will be monitored by the Road Development Authority.

#### *Monitoring Plan*

As part of the final EIA, the proponent submitted a monitoring plan for implementing the proposed mitigation measures. The members of CEA, RDA and other relevant agencies will serve as the monitoring committee.

(A flow chart depicting the EIA process is at Figure 1)

### **APPROACHES TAKEN**

The issues related to this project have been addressed in different ways. The various strategies and methods used in this process are discussed below.

#### *Selection of the best option*

Four different reasonable options were considered together with the 'no action' alternative:

- Option 1 - Access controlled express way to the west of Colombo - Negombo Road A3, (Western Trace).
- Option 2 - Access controlled express way to the east of Colombo - Negombo Road A3, (Eastern Trace).

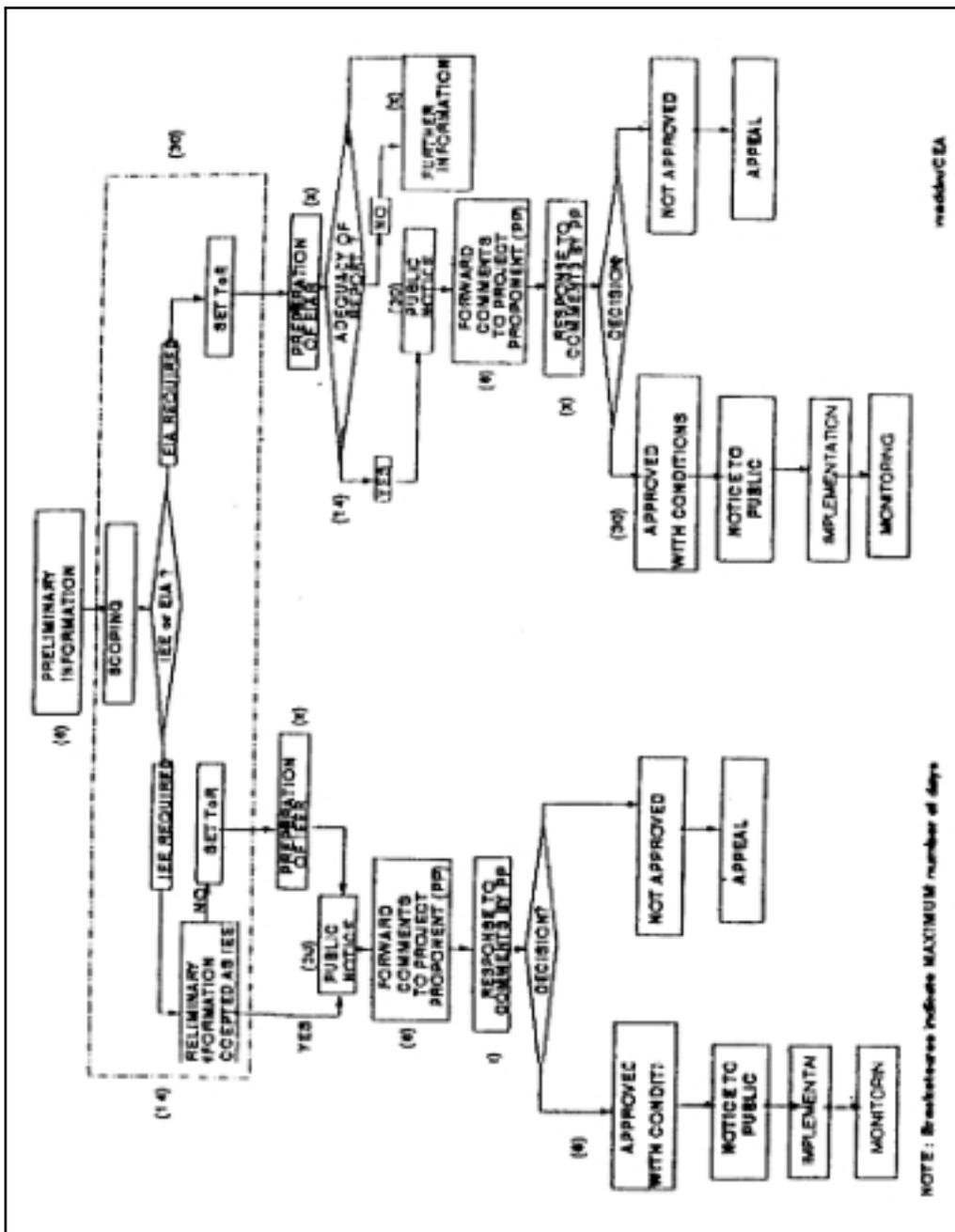


Figure 1: The EIA/IEE process

- Option 3 - Improvements to the existing Colombo - Negambo Road A3 (widening of the Road, better traffic control measures etc.).
- Option 4 - Improvement to the railway between Colombo and Katunayake. (More locomotives, and rolling stocks laying an additional track and improved signaling).
- Option 5 - 'No action' alternative.

All five options were evaluated on the basis of ecological, hydrological, socio-economic, engineering and economic criteria. A comparison of options according to different parameters is shown in Figure 2.

The economic appraisal is based on social cost benefit analysis. The benefit and cost of each alternative is calculated, and compared, to identify the most beneficial option. To conduct a cost benefit analysis a base line (no action alternative) option is selected, against which all the other options were measured. In this case the existing level of the A3 road and the railway system in 1996 is taken as the base line.

Based on the comparison of the above evaluations, controlled express way to the west of Colombo-Negombo road A3 was selected as the best option.

#### *Re-settlement of displaced people*

The resettlers (inhabitants of the 130 houses and six small shops) will be provided with better housing and other facilities close to the original settlement as far as possible. Some of them will be employed in the CKE (Construction and Operational stages). The people who live in permanent houses ear-marked to be demolished will be faced with loss of property, loss of income (agriculture, fishing, etc.), disruption of the social structure etc. They will be paid reasonable compensation, based on current valuations. New land for re-settlements will be provided with water, sanitation, access roads and electricity for those who request land.

#### *Noise reduction*

Noise barriers will be installed to reduce the noise to acceptable levels in places close to dwellings, schools and religious places.

#### *Construction of over passes*

It is also proposed to provide links through vehicular and pedestrian overpasses to minimize the separation of communities on either side of the expressway. Proper signaling and traffic management measures will be used to reduce the inconvenience caused by the congestion during construction.

#### *Drainage and flood control*

Local drainage canal crossings will be provided with culverts to avoid drainage congestion and these will also serve as pathways and refuges for fauna (animals) crossing the CKE. Major stream crossings would be provided with sufficiently wide bridges to permit floods to be discharged without upstream inundation. A short segment of a bypass canal will be constructed to ensure the hydraulic continuity of the old Negambo Canal. The horizontal alignment of the canal will be merged with the existing canal by a smooth transition curve. The runoff of the CKE will be sent through a system of wet ponds to minimize much of the pollutants.

### *Protection of the eco-system*

No new access roads will be built to the construction sites through the marsh. Strict waste control programmes will be implemented at the construction sites as a safe guard to prevent adverse effects. Measures will be taken to minimize damage to coral reefs in laying pipelines to dredge sea sand. Evacuation pumping will be carried out simultaneously with the pumping of a sand/water mix to minimize percolation from escaping seawater in sand stockpiling area. Two underpasses will be built into the CKE to permit tidal mixing and navigation, in order to mitigate ill effects on the isolated strip of the lagoon.

### *Muthurajawela Visitor Centre*

Construction of a new visitors' centre away from the CKE is proposed. This will be in a suitable location selected by the Wetland Conservation Project in consultation with the Department of Wildlife Conservation. An overhead bridge to be constructed over the Nonage Ela canal will provide access to the nature trail area.

## **RESULTS AND IMPLICATIONS**

Several approaches were used in the EIA process to ensure proper management of the environment. Most of the approaches enabled the project proponent and the government to improve the project through introducing modifications before the project commenced its operations.

### *Establishment of a future national requirement*

The urgent requirement of a high-speed link between Colombo and Katunayake was established by the EIA study. The towns close to the International Airport are rapidly expanding residential and industrial areas. The existing links (the A3 road and the railway track for passenger and goods transport ) between Colombo and Katunayake are unable to meet even the present demand while incurring substantial financial loss to the economy. Considering the projected demand for the future it has been established as an urgent requirement of a high-speed link (expressway) between Colombo and Katunayake.

### *Selection of the best option*

It has been proved that the Western Trace (CKE) was the best option out of the four on the basis of economic performance and minimum environmental impacts. Five reasonable options for enhancing the transport link were considered in the study . They are the two alternate traces (Western and the Eastern Trace) for an access control express way, improvements to the existing A3 road and the railway, and the 'no action' alternative. It has been proved that the railway improvement will not be able to meet the objectives without a parallel upgrading of the entire national railway network. The widening of the existing A3 road which runs through highly populated

areas with unlimited access to satisfy the projected requirements would be impossible as this will cause unacceptable social impacts of a high magnitude. Comparison of the two remaining traces proved that the Western Trace is preferred as it will cost substantively less, and cause low environmental and social impacts.

#### *Secondary alternatives*

Secondary alternatives for four segments of the selected option (Western Trace) have also been identified to minimize detrimental social and environmental impacts. As certain segments of the selected Western Trace cause serious consequences secondary alternatives were considered for four segments of the Western Trace. The alternatives which would help minimize adverse impacts could be implemented with reasonable cost. It has also been directed that secondary alternatives within the proposed trace should be selected so that the trace will not traverse the Muthurajawela sanctuary.

#### *Fish breeding*

In order to protect the fishing breeding area, a bridge of appropriate width will be constructed in the Madabokka area of the Negombo Lagoon. This would help free movement of fish from the mangroves to the lagoon. It has been shown that the measures recommended in the report are not sufficient to compensate for the ill effects caused to fish production. As such, PAA has requested the project proponent to implement the following measures:

- Any loss in productivity resulting from the loss of sea grasses should be compensated by establishing a similar area in close proximity within the estuary.
- To compensate the decrease in organic production due to loss of mangroves by replanting *Rhizophora* to an acceptable level.

#### *Baseline data*

A base line survey of flood levels, inundation duration, water spread areas along the trace and the project area will be carried out for the preparation of the final designs of the expressway. In addition, mapping of expected flood detention inundation areas and assessment of flood duration changes will be carried out and this data will be submitted to CEA for monitoring.

#### *Other considerations*

The following areas for action were also identified. There was a need to:

- obtain approval of the Sri Lanka Land Reclamation and Development Corporation for the final drainage management plan prior to implementation;
- ensure the construction methods are suitably modified to minimize turbidity and inflow of additional sediment into the lagoon;

- identify suitable land area along the lagoon verges for expanding the water area to compensate for loss of water area for the construction of CKE;
- compensate for any loss in productivity resulting from the loss of sea grasses by establishing a similar area in close proximity within the estuary;
- compensate for the decrease in organic production due to loss of mangroves by replanting *Rhizophora* to an acceptable level;
- further improve the proposed resettlement and compensation package by an additional compensation to be paid to those families whose livelihood will be directly affected (vegetable cultivators, boutique keepers, fishermen, etc.) and to establish new income sources;
- payment of an additional compensation to all families whose houses to be demolished as a 'settling down' allowance, to mitigate for disruption of their livelihood etc;
- establish a clear channel of communication between the project proponent and the community affected through out the resettlement process; and
- monitor the resettlement process to be continued to a reasonable period in order to alleviate difficulties of the resettlers after resettlement.

### **LESSONS TO BE LEARNED**

Several lessons can be learned from experience of the EIA of CKE. Some of the key points are discussed below.

#### *The EIA process improves the project planning*

It has been shown from this project that the EIA has been very useful in improving project planning. Five different reasonable alternatives (options) were to considered when selecting a preferred alternative, which was socially, economically and environmentally acceptable. The preferred option was modified to suit the EIA requirements and practical situations.

If the proponent had tried to implement a single option he would have been faced with serious problems from the Community, Government Agencies and NGOs. It can therefore be clearly concluded that the EIA process has helped to modify the project at planning stage that enabled to produce an acceptable solution to address the issue.

#### *An incomplete EIA delays the implementation of the project*

The EIAR prepared for this project was not complete and therefore the Technical Evaluation Committee of the PAA has recommended various

types of additional information and studies to be conducted in hydrological sociological and economical aspects. An EIA should include a review of several feasible alternatives, all reasonable likely impacts, recommended mitigatory measures that can be implemented, and should ensure that other necessary approvals are obtained concurrently with the EIA process.

*Proponents interactions with the community is vital for a good EAIR*

The project proponent was able to select options with limited social impacts that can be mitigated within a reasonable cost by having direct dialogue with the affected parties. But if the project proponent had established a good, continuous rapport with the affected communities from the beginning he could have offered a more acceptable resettlement plan and could have thereby avoided delays which occurred in the project. In this case, the project-approving agency has recommended additional compensation to improve the settlement plan.

*Ecological issues should also be given the same due consideration as social issues*

It is interesting to note that the EIA process had forced the project proponent to give the same weight to the ecological issues as to social issues when selecting a preferred option for the project. In this case the alignment of the CKE has been shifted to pass through the environmental sensitive Muthurajawela Marsh, Negombo Lagoon conservation zone to avoid detrimental environmental impacts caused by passing through an urbanized area.

*Involvement of political authority in decision making*

In this particular issue, the highest political authority, the President of the country, who intervened in the project as a matter of national interest was convinced of the need to protect the environment. She therefore instructed the project-approving agency to select an option which had low social as well as ecological impacts. This intervention led to the selection of the most preferred alternative for the project. It can therefore be concluded that if facts are properly presented to the political authorities they will make better decisions for long-term benefits for the country.

O P T I O N S

IMPACTS ON	WESTERN TRACE	EASTERN TRACE	IMPROVE ROAD A3	IMPROVE RAILWAY	'NO BUILD'
Hydrology	●	●			
Fauna and Flora	●	●			
Humans	●	●	●	●	●
Land Use	●	●	●	●	
Visual Amenity	●	●	●	●	●
Noise Level	●	●	●	●	●
Air and Water Quality	●	●	●	●	●
Economy	●	●	●	●	

Other Considerations

Note: The circle size reflects the severity of the impact

Engineering Considerations	●	●	●	●	●
Achieve Aims and Objectives		✓	✓		

Figure 2: Comparison of adverse environmental effects from the five options considered

## ANNEX 1

Some statutes relevant to the present assessment

- National Environmental Act No.47 of 1980 as Amendment No.56 of 1988.
- Coast Conservation Act No.57 of 1981 as Amendment of 1988

- Board of Investment Act No.49 of 1992 (which replaced the GCEC-Act No.4 of 1978)
- The Road Development Authority Act 1981
- The Urban Development Authority Law 1978
- Urban Development Projects (Special Provision) Act No.2 of 1980
- The Greater Colombo Economic Commission Law No.4 of 1978 (Amended Act No.49 of 1992 which established the Board of Investment)
- Land Acquisition Act No.9 of 1950 as amended.
- Flood Protection Ordinance No.4 of 1924 (as amended)
- Sri Lanka Land Reclamation and Development Corporation Act No.52 of 1982.
- Fauna and Flora Protection Ordinance No.2 of 1934 as amended by Acts Nos.44 of 1964, 1 of 1970 and 49 of 1993.

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#### Key words

project  
 planning  
 preferred  
 alternatives  
 mitigatory  
 measures  
 social  
 impacts

# The Termosantander gas turbine project

*Monica Cuellar*

## INTRODUCTION

A national Energy Expansion Plan was established in Colombia in 1993 to promote projects for electric generation from gas and coal, with the purpose of increasing national capacity and ensuring electricity supplies.

The project called Termosantander was carried out during October 1996 to October 1997. The purpose was to generate electricity by a gas turbine power station with an installed capacity of 2172 MW and gas consumption of 55 million cubic feet per day. The gas was brought from the gas facilities located about 350 m from the station site, where exploration and exploitation of crude oil is carried out for the company AMOCO COLOMBIA. The energy produced by the station power was conducted to the national electric system through a transmission line of tension intensity of 230 kV.

The project is located in the north east part of Colombia in the Department of Santander in the municipality of Cimitarra. It is located in the Magdalena River valley (the main river of Colombia which crosses the country from south to north) and the foothills of the Eastern chain of mountains of the Andes system. The area has various wetlands and marshes ranging from 100 to 350 m above sea level. There is more variation in the topography in the vicinity of the station and within the first 20 km of the transmission line. There are erosive processes caused by natural and human factors (this includes removal of vegetation cover for small road construction and extraction of materials).

The temperature varies between 25 and 28 °C and the precipitation between 2800 and 3000mm. Humidity is between 82.8 and 86.4 per cent.

Estimated population of the area is 35 000, with the highest density in the municipality of Cimitarra. Economic activities are based mainly in agriculture and livestock, and there is insufficient infrastructure for education, health, housing, water supply and energy in this area.

The major influence of the project has been the acquisition of land for the power station and the 66 km for the line transmission. Additionally, there is further land use for the construction of the workers houses, offices and storerooms. These areas were selected after an analysis of four alternative sites.

**See Topic 4**

**UNEP EIA Training  
Resource Manual**

*Screening*

The station power was donated and installed by the Westinghouse Electric Corporation, and it consists of two units of simple cycle with potential to generate 108.6 MW each, and operated by turbine gas and electric generators. The length of the pipe system transporting gas is 350 m. It was also designed with the purpose of increasing generation tension from 13.8 kV to 230 kV and in this way to be connected with the national transmission system. The transmission line has 161 steel towers, each 400m apart. The main activities for the construction included access adjustment, corridor clearing and adjustment of tower sites.

The Environmental Impact Study was implemented according to the Terms of Reference (ToR) provided by the Ministry of Environment and based on social, biological and physical criteria.

In November of 1998, the Termosantander Company asked the Ministry of Environment to cancel the environmental license because of the lack of a guaranteed gas supply. So the thermoelectric project had a life of only two months (from January to March 1998), even though it was built to operate for 25 years. This was a very complex situation because there were no established ToR for the dismantling of this kind of project. What was needed were specific guidelines for abandoning the project and restoring the landscape. The Termosantander Company spent three months in accomplishing this and the existing infrastructure of the station power was used to make a greenhouse and a kindergarten, both administered by the municipality. The productive capacity of the greenhouse was 8 000 000 plants/year and the kindergarten catered for 120 children.

Total cost of the project was approximately US\$141 000 000 for the thermoelectric station and US\$8 000 000 for the line transmission, financed totally with private capital from foreign investors. The costs for Environmental Management Plans were US\$1 500 000 and US\$430 000 respectively.

### **NATURE AND SCOPE OF ISSUES**

Impacts were identified for both the construction and operating stage. In the former, the most significant issue was destruction of 40.7 ha of forest with its consequential habitat destruction and ecosystem fragmentation. In the later stage, noise, water and air pollution were identified as the most relevant impacts. All of them caused fauna displacement and environmental quality degradation.

The project was developed in a remote area, where local people had low incomes and difficulty in meeting basic needs, so expectations of employment and economic benefits were high and a massive immigration process occurred.

Special Terms of Reference were needed to dismantle the project and restore the landscape. Seminars, discussions and workshops with the community were necessary in order to make clear to them the reasons for closing the project. Programmes of social content for the long term had to be proposed including environmental education programmes and reforestation activities.

The fact that the project did not operate for more than two months and the cost of the project was so high, make visible the lack of provision in governmental planning. However, environmental assessment had been carried out.

The local environmental authority (CAS) was also involved in the EIA process, giving permission for cutting the forest and using water of two rivers located near the station. Each permission had determined the amount of natural resource to be used and under the figure of 'retributive taxes'; compensation programmes were enforced, such as reforestation activities and economic tariff.

Apart from the impacts caused by the construction of the power station, there was also a need to identify impacts associated with the pipe installation for gas transport and the installation of the transmission line for electricity conduction. In the first case, the pipes were laid 1m deep in the soil. Where the pipes crossed water surfaces a superficial infrastructure was used to minimize negatives effects if the pipes became damaged. The route for the transmission line was selected to run in less forested areas and the line ran for only 66 km before it was connected to the national transmission system.

Access was limited due to the topography and lack of infrastructure, so materials and equipment were transported with helicopters, except those easily transported by cars or small trucks on very simple unmade roads. However, it was necessary to improve the existing road and construction of seven bridges was needed for transporting the two generators. Material for construction such as sand, stones, and clay among others, was provided by the rivers in the area and the local authority gave the administrative permission for this.

## **PROCESS AND PROCEDURAL CONTEXT**

### *Legal issues*

The Ministry of Environment is the head of the national environmental system, which is composed of 35 regional authorities and five research institutions. The Ministry gives environmental licences for high impact projects, which are designated by law. Local authorities regulate small-scale projects.

This project was referred to the Ministry, which provides specific Terms of References for different sectors such as energy, transport, chemical, mining, industry, and agriculture. EIA is mandatory.

#### *The sequence of the EIA process*

The first step includes an Environmental Diagnostic of Alternatives, which basically is to guarantee that the best place has been chosen for developing the project. Normally three different options must be analyzed, but in the Termosantander project four were studied. The differences between them were not only in economic aspects but also in selecting a place with the lowest environmental impact and a better location considering access, resources availability and minor impact to the community.

Because there was not any doubt that the place suggested was the best, taking into account environmental, technical and social aspects, there was no need to meet this requirement and no detailed studies for each alternative were ordered.

Terms of Reference for EIA were established and Environmental Impact Study was submitted to the Ministry for evaluation by an interdisciplinary team. A technical concept was developed in two months, giving the environmental licence for developing the project, and mitigation measures for controlling negative impacts were fixed. By law there is a maximum of six months for evaluating the EIA. However, the administrative process, lack of trained practitioners, number of concerns and lack of appropriate technical information make it impossible to fill this obligation and normally the time used for this purpose ranges between one and three years. Given this scenario, the evaluation of Termosantander was done in a very short period of time.

The EIA components were as follows:

- Justification of the project.
- Description of the project.
- Definition of influence area.
- Baseline considering physical, biotic and social components.
- Zoning of critical environmental areas.
- Identification and evaluation of impacts according to the aspects considered in the baseline.
- Establishment of environmental plan management.
- Risk analysis and contingency plans.
- Monitoring programme.

The aspects mentioned above are included in the ToR produced by the Ministry and are based on the Law 99 of 1993 and Dec.1753 of 1994.

The EIA process also had to include local public participation with community consultation about the design of the project and the environmental management plan. The mechanism for this was through continuous workshops and meetings with local leaders, regional authorities, NGO's and environmental institutions.

Agreements were reached between the owners of the project and other stakeholders. Local people had priority when engaging workers for the project. Regional authorities were responsible for providing permits for using water and forestry utilization and for controlling effluents and emissions discharges.

In order to develop the project the following resources were needed:

RESOURCE	AMOUNT
Forest	17 ha of secondary forest 11 ha of high stubble 2.7 ha of low stubble 1.7 ha of grass
Soil	28305 m3 removal
Water	180l/h/day
Gas	55 millions
Manpower	300 people

Direct and indirect areas of influence were established. The first one was considered to be about 2142 ha, where the power station, encampments and transmission line were settled, and the second one of about 26 537 ha, where indirect impacts on physical, biotic and social effects occurred.

Briefly, the major negative impacts identified are summarized in Table 1:

The methodology used to predict impacts was based upon a matrix, which associated the activity developed and the effect produced on the environment.

The impacts were ranked according to five characteristics:

- Type: positive or negative.
- Magnitude: high, medium and low scale.
- Duration: short term (less than one month), medium term (up to ten months) and long term (life long of the project).
- Tendency: increasing, stable and decreasing.
- Alternative of management: prevent, mitigate, correct or compensate.

Indicators of physical, biotic and social components were also used in order to identify impact.

## APPROACHES TAKEN

In order to contribute to the effectiveness of EIA process, different studies were carried out, starting with the analysis of four alternatives for selecting the site for the station and to open the transept to install the transmission line. This process of characterization and analysis was supported with basic general and thematic cartography, aerial photography, satellite images and specialized software.

The selection of the best alternative was based on the use of Geographic Information Systems (GIS), which enabled the establishment of the relation and comparison of variables which would take place in the project. The use of GIS was important because by overlapping thematic layers, it was possible to identify vulnerable and critical areas.

Only one area with problems was identified: it corresponded to the first 28 km of the transmission line, located in a hilly topography and with a dense forest cover. As a consequence this section of the line was replanned with towers placed on higher ground and in open spaces.

In order to carry out the baseline investigation, the area of influence was divided into five sectors. Characterization of physical, biotic and social components was implemented for each sector and using the same methodology.

- For the physical component the geology, geomorphology, climatology and hydrology were studied. Field work was carried out by specialists and a database was created.
- For biotic components the fauna and flora (vegetation cover) were studied.
- For the social component interviews and meetings were undertaken with the community, and secondary information was also used.
- The thematic base for the geospheric analysis was obtained from general cartography with a scale of 1:75 000 and thematic cartography with a scale of 1:200 000. The result was a map characterizing relief, rocks and soil of the area in a scale of 1:25 000 with field verification.

SYSTEM	COMPONENT	IMPACT
PHYSICAL	Atmospheric	Mobile gas emissions
		Dust emissions
		Noise mobile and fixed sources
		NOx emissions
		SOx emissions
		CO emissions
	Hydrologic	Sediments
		Bacteriologic pollution
		Grease and oil pollution
		Water waste
		Fluvial dynamic alteration
		Solid waste
Geospheric, Geology, Soils	Changes in the physical and chemical characteristics of water	
	Removal of Soil	
	Increased hydrological erosion	
	Mass remove	
	Permanent and temporal changes in use of the soil	
BIOTIC	Vegetation Cover and Ecosystems	Landscape alterations
		Damages in vegetal cover
		Decrease vegetal cover
		Pressure upon the resource
		Decrease nesting areas and food
		Hunting pressure
	WILDLIFE	Fragmentation of Ecosystems
		Noise displacement
		Death by car accidents
		Risk of collision with cables
		Alterations of wildlife ecosystems

Table 1. Gas turbine station and transmission line: environmental impacts

This analysis permitted identification of places with more potential for erosion and defined better conditions for locating both the power station and the towers. The air quality of the area was researched, involving parameters for different classes of pollutants and noise. Results were used to identify possible impacts during different phases of the projects.

STAGE	ACTIVITIES
PRELIMINARY ACTIVITIES	Acquiring land Finding and contract of hand work Construction of encampments Construction of storerooms Location of infrastructure Opening access
CONSTRUCTION ACTIVITIES	Operation of encampments Excavation for the infrastructure Obtaining material (sand, clays etc) Material transport Construction of appropriate infrastructure for drainage Opening channels for pipes Hydrostatic proof of the pipe system Construction of foundations Installation of infrastructure and equipment Installation of towers Construction of control building Construction of infrastructure for protection Establishment of the corridor for the transmission line Installation of the energy conductors Material disposal Revision
OPERATION ACTIVITIES	Operation of the generation plant Operation of the line transmission Maintenance of the line and the corridor Maintenance of the equipment of generation
DISMANTLE ACTIVITIES	Packing of equipment Disposal of material Restoring of the station site as a greenhouse and kindergarten Reforestation of open areas Transfer of the infrastructure to environmental and regional authorities

*Table 2: Main activities of the project*

A Pasquill-Guildford model for dispersion of atmospheric contaminants was run, according to the meteorological characteristics of the zone. Results of the modeling showed that emissions would be below the permitted levels established in policy guidelines.

Monitoring during the two months of the operation of the project showed that equipment and controlling measures established were appropriate and there were no significant impacts on the air quality.

The main water bodies were also identified and divided into four hydrologic categories: macro river basins, micro river basins, small river basins and water bodies. Additionally, an evaluation of hydrological information was produced by the IDEAM with physical, chemical and biological characteristics of all water systems in the area.

It was found that the river quality was not appropriate for human consumption due to the high amount of microbiological contamination especially of the *Troulodus spp*, and offer of nutrients was low (oligotrophic). Consequently, water treatment was needed before using the resource.

Characterization of fauna was undertaken using secondary and primary information. Statistical analysis was used to establish population density, habitat preferences and food consumption. Results showed that some species of mammals were in danger of extinction: *Myrmecophaga tridactyla*, *Bradypus variegatus*, *Felix wiedii* and *Panthera onca*.

The actions oriented to the protection of the fauna were focused on the prohibition of hunting, signs on the road to prevent death of the animals by cars and enforcement of environmental education programmes.

The flora was characterized and quantified by using 45 small holdings for a total area of 1532 m<sup>2</sup>. The data obtained was analyzed ecologically and statistically and the GIS was used in order to see geographical distribution and produce a map of vegetation cover.

The socioeconomic component was studied, based upon secondary information existing in the plans of development for the regions produced by the governmental institutions and by primary information obtained directly by meetings and interviews with the community. Additionally, there were workshops with the leaders and other members of the community, in order to tell them about the project and its possible effects (negative and positive). The objective was to develop the environmental management plan.

An archaeological study was implemented, oriented towards identifying and evaluating potential places of cultural heritage and consequently developing a plan for rescuing archaeological objects before constructing the project. For this purpose photo-interpretation activities and revision of cartography were needed, complemented with field work and laboratory analysis of the samples found. As a result, the presence of archaeological material was established, together with its exact locations. This formed the basis for the implementation of control measures.

## **RESULTS AND IMPLICATIONS**

The EIA of the project identified environmental components (physical, biotic and social) of the influence area of the project both direct and indirect. It was also possible to identify the activities causing degradation of the

environment and define environmental management measures to prevent, control, mitigate, compensate and correct impacts caused by the development of the project.

It has to be mentioned as a deficiency of the EIA that measurements for conservation of fauna were restricted to installing information signs and meeting with workers and local people. This situation indicated a lack of existing information about the region because there was little research into this aspect.

Environmental legislation for EIA has been an important factor in whole process. Without proper policies and environmental legislation it would have been impossible to enforce any mitigation measure.

Even if the project had a short life span, it can be said that environmental management was appropriate and that relations between Termosantander and the community were established properly. Local people recognized the benefits of the project and its economic importance, not only because people had employment opportunities but also because infrastructure were built for the welfare of the community.

Plans for implementation of EIA for a project were made using specific ToR which reflect current environmental policies. However, this case study has shown that ToR for dismantling and abandoning a project still need to be developed.

Cumulative impacts that could be produced by this project were not properly identified because of a lack of scientific knowledge. Also a lack of appropriate and holistic databases makes prediction and management of these kind of effects impossible. It is also necessary to mention that in the area in which the project was developed several industries for crude oil exploitation and exploring and electricity production have been established.

The transmission line was not dismantled because of the possibility that it could be used to be used in a future for connecting remote areas with the national electric system. Consequently, the government and Termosantander negotiated that for the 66 km of transmission line all the environmental obligations were assumed by ISA - a public company that is administrating the line.

Environmental and administrative agreements were made with the local municipality, which undertook certain obligations. The local community was involved in this.

#### **LESSONS LEARNED**

- EIA for the construction and operation and dismantling phase of this project, were key factors in developing the project in an environmentally friendly way.
- Environmental Analysis of Alternatives allows a better decision

making process.

- Social participation in different phases of the project, from the initial conception of the project to its operation and dismantle, guarantees the maximization of the objective of the EIA.
- The short operation time of the project meant huge economic loss for the investor who developed the project for 25 years of duration. There was no guaranteed gas supply. Termosantander depended on one gas reservoir and its capacity was over estimated. In this situation there is evidence of a lack of Colombian Government support for investors in searching for solutions.
- It is important that the State through different institutions elaborates TOR for all kinds of projects in their different stages. Also it is important to start considering the significance of cumulative effects and identify scientific and technical knowledge resources for developing methodologies for this.
- The development of an environmental network which allows a better understanding and comprehension of the situation for an efficient decision making processes is also important.

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#### Key words

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cumulative  
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public  
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## Glycol waste incineration in a wet process

*Parvaiz Naim*

### ABSTRACT

Air samples collected from the surroundings of a wet-process cement kiln showed no difference in air quality before and after glycol waste incineration. Use of EIA techniques, on the other hand, was more useful in ascertaining the actual problems associated with the incineration process. The life cycle analysis and computer model revealed that the waste largely came out of the kiln unburned. This had the potential of damaging both the electrostatic precipitator and human health. An analysis of alternatives identified that direct waste feeding into the burning zone ensured complete pyrolysis of waste including dioxins and furans, without damaging equipment or human health. A scientific and technical knowledge of the system was found essential for making effective use of EIA techniques in planning and decision making.

### Introduction

A polyester staple fibre manufacturing unit in Pakistan used to dump its glycol waste in the sea. Because of public and government pressure, the waste was sent to a wet-process cement factory. There it was mixed with the raw material slurry and fed into the cement kiln. A team of scientists did not find any difference in the quality of cement and all samples before and after glycol waste incineration. The EPA nonetheless insisted that the incineration activity should be examined using EIA techniques. The polyester manufacturers thus approached IUCN-Pakistan office, which conducted the study in April-May 1997.

The cement factory on three sides had 2000 ft high semi-arid hills with several mining and quarry operations for extracting salt, coal, limestone, gypsum, clay and gravel. The fourth side had open land interspersed with a few small villages and some agricultural fields. Wildlife largely comprised jackals, rabbits, monitor lizards, snakes, rodents and a variety of birds. Winters were mild (rarely falling below 0°C) and summers were hot (frequently above 40°C). Much of rain came during the monsoon period (June-August).

The cement factory had 3 kilns, each with 600 ton production capacity. Each kiln burned 100 tones high-sulphur (2.2-3.5%S) furnace oil. Smoke stacks were 52 metres high. During the trials, one ton of glycol waste was mixed

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with 1000 tonnes of raw material slurry and fed into the kiln from its cold end where temperatures were 180°C. The 135 metre kiln had a burning zone on the other end with temperatures around 1500°C.

#### **NATURE AND SCOPE OF ISSUES**

- Workers complained about an unpleasant smell when glycol waste was mixed with raw material slurry; it caused headaches, running noses and vomiting in some workers.
- The management complained about choking of slurry feed pipes by glycol waste, which sometimes caused system shut-down.
- The general public complained about dust and smoke from the cement factory. They did not appear concerned about glycol waste incineration.
- The EPA expressed concern about incineration efficiency and the production of dioxins.

#### **PROCESS AND PROCEDURAL CONTEXT**

Since the snapshot air quality sampling had not provided satisfactory answers, it was decided to use a computer model for predicting pollutant fall-out around the factory throughout a year. Because of the EPA's concern about incineration, it was decided to conduct a life cycle analysis of the process.

#### **APPROACH TAKEN**

The entire process was studied step-by-step. This included detailed examination of waste transport, storage and handling, feeding temperatures, cement kiln internal working; temperature regime in the kiln; exhaust system etc. An air dispersion model (RTDM) was used to determine exhaust dispersion patterns. This information was projected on a satellite imagery of the area. An analysis of alternatives was done, focusing on a comparison of two incineration options (i.e. waste mixing with slurry and kiln feeding from cold end; and direct waste injection into the burning zone).

#### **RESULT AND IMPLICATIONS**

The life cycle analysis showed that the approach tried for waste incineration did not subject the waste to a high temperature. Fed from the cold end, much of the glycol waste evaporated during the slurry drying process.

The remaining waste caught fire at 200°C and escaped to the smoke stack. It never reached the burning zone on the other side of the cement kiln where

the temperature was 1500°C. The escape of unburned and partly burned glycol waste threatened the functioning of the electrostatic precipitator by coating its charged surfaces. The small quantity of escaping fumes was difficult to detect in the factory surroundings but had the potential of affecting human health. Small amounts of polymers are known to deceive human immune systems, mimic certain hormones and act as endocrine disrupters altering metabolic and growth pattern especially in the foetus.

The option of direct waste feed in the burning zone offered organic component pyrolysis immediately after entry into the burning zone. The gaseous component attained a temperature of 1500°C and stayed in the kiln for about 10 seconds. This condition was more than sufficient for dioxins and furans destruction. The organic matter free exhaust did not affect the electrostatic precipitator or surroundings. The inorganic residue got mixed with cement without affecting its quality.

#### **LESSONS LEARNED**

- The life cycle analysis and computer model use were helpful in the identification of environmental problems which could not be ascertained using an actual snapshot field air quality survey.
- Snapshot studies can miss the big picture.
- Scientific and technical knowledge of a given system is essential for making effective use of EIA techniques in planning and decision.

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#### **Key words**

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and  
environmental  
health problems**

## Experiences in the first pulp mill project submitted to the environmental impact assessment system in Chile

*Ana María Peña Alid*

*The opinions stated in this document are the sole responsibility of the author and do not necessarily reflect the opinion of the National Commission on the Environment (CONAMA).*

### ABSTRACT

This case study concerns the first environmental impact assessment conducted on a cellulose project in Chile. The project site was in Southern Chile (Region X). The facility was to discharge its effluents into the Cruces River, along the banks of which a Natural Reserve and a RAMSAR site are located.

What follows is an analysis of the procedures established during the voluntary implementation of Environmental Impact Assessment in Chile, the benefits to be derived from using Terms of Reference, the assessment criteria that were taken into account to protect the sheltered area, and the difficulties encountered in determining the significance of the ensuing impacts.

### INTRODUCTION

This document discusses the Review and Assessment of the Environmental Impact conducted on the Valdivia Project. The proposal was for the construction of a new Kraft pulp mill with a 550,000 tonne/year output capacity, which would make a significant contribution to the national economy (investment is estimated at US1.3 billion), given the fact that it would generate major revenues from export sales on the world market.

The introduction of new pulp mill plants was highly probable given Chile's vast forestry resources and current cellulose prices on the international marketplace. Central and Southern Chile, which present comparative advantages in terms of the proximity of raw materials and abundant watersheds – indispensable for running this type of industry – were particularly appropriate locations.

The Environmental Impact Assessment for the Valdivia Project was of great significance given its voluntary nature and the geographical location and sheer magnitude of the project. It has established an important precedent for future environmental impact assessments. A salient feature of this project –

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the construction of a bleached Kraft pulp mill – is its location upstream from the Cruces River Natural Reserve and the discharging of effluents into this watercourse. This project had to be evaluated on the basis of extremely demanding criteria which precluded even minimal alterations to this Natural Reserve, which is included in the RAMSAR Convention on 'Wetlands of International Significance, particularly as a habitat for Waterfowl'. This is the only stretch of Chilean wetland with the necessary characteristics for inclusion in this category. Furthermore, this Convention binds the State of Chile to place particular emphasis on the safeguarding and protection of this ecosystem.

The project was voluntarily included in the Environmental Impact Assessment System (EIAS) in October 1995, and it secured its environmental approval in May 1996. The assessment procedures used were the result of two years' experience in both the public sector, which evaluates the projects, and the private sector, which conducts the Environmental Impact Study (EIS) and presents them to the authorities for review purposes. For this specific project, the authorities issued Terms of Reference (ToR) to be used in conducting the Study. The ToR established the minimum content requirements for carrying out an Environmental Impact Study (EIS).

This case study addresses the particulars that were involved in analyzing synergistic and cumulative effects, the procedures used in reviewing the Environmental Impact Assessment, as well as the criteria and background information which served as the decision-making basis in evaluating the project's effects on the ecosystem of the RAMSAR-protected Cruces River Natural Reserve.

### **NATURE AND SCOPE OF ISSUES**

The Environmental Impact Assessment for this project was carried out at a time when Chile still lacked regulations for the establishment of consistent procedures and criteria to address this issue.

Notwithstanding the above, the Environmental Impact Assessment System (EIAS) considers that the environmental assessment of a project provides the Regional Commission on the Environment (COREMA) with information deemed sufficient for that authority to issue a well-founded resolution that will assign a certain environmental approval to the project. The requirements include a consideration of the technical aspects of the project, a balanced summary of the objections raised by the community, the measures promulgated in the mitigation, remediation and indemnification plans, environmental follow-up or monitoring, the environmental approval either approving or rejecting the project, the environmental conditions or demands under which permits would be issued (if the project is approved) and mention of the public entities with competent jurisdiction in overseeing and monitoring the project.

In other words, should the project be approved, it would not only receive its environmental qualification but also all related environmental permits. Failure by the EIA to include the necessary requirements or background information for the issuing of these permits will also prevent the authorities from issuing an approval for the project.

The ToR provided by the authorities for the conduct of this study failed to render an accurate definition for, and limits to, the most relevant aspects of the assessment, incorporating all environmental components (climate and weather, air quality, geology, geomorphology, hydrology, water quality, vegetation and flora, fauna, socio-economic aspects, infrastructure, archaeology, landscape) and requiring a detailed description of each component. The authorities' lack of experience in determining the area of influence of the project, given its magnitude and location, accounts for these difficulties. Moreover, since the Valdivia Project was the first of its kind (cellulose) to be included in the EIAS, everyone was concerned that excessive zeal in defining the limits of the requested data would lead to the exclusion of important aspects from the assessment. Thus, the State would have been to blame for any impact generated by the project and not included in the ToR.

The project filed with the authorities for the issuance of ToR was by then well defined, having already established its exact location, the concept engineering and the technology to be used, i.e. a project not adaptive to substantial modifications. There was also a preset timetable for the start-up of activities, construction and installation.

The EIS for the Valdivia Project presented a description of a project at the concept engineering stage. However, much detailed and indispensable background information required for the granting of sector permits connected with the EIAS in Chile had not been included.

The Environmental Impact Assessment for this Study suffered from major shortfalls in the identification and analysis of the environmental effects arising from the project, particularly with regard to the Cruces River Natural Reserve. In this sense, the Study Baseline was painfully incomplete in most of its components (e.g. hydrology, water quality, aquatic vegetation and flora, land-based and aquatic fauna, socio-economic aspects), which precluded building a real scenario of the project's area of influence and of the environment without the project.

Furthermore, several factors were not considered in the assessment, e.g. the impact of emissions into the atmosphere (viz. the transformation of SO<sub>2</sub> into sulphuric acid) and the disposal and handling of solid waste generated by the project.

#### **PROCESS AND PROCEDURAL CONTEXT**

While the environmental impact assessment was being carried out, several aspects were considered that had been provided in the Environmental Law

which promulgated the EIAS as well as other instruments applicable within the context of the voluntary system and established by CONAMA.

The following aspects are significant:

- ToR were laid down for the preparation of the EIS. The Study contemplates the environmental components that must be considered for assessment purposes and the minimum requirements established by the authorities to review the EIS. However, this document carried no legal force to be established as a mandatory requirement during the review process. Under the Environmental Law, the authorities have 120 days to issue a project's environmental approval. The following action is taken during this period:
- the Environmental Impact Study is reviewed by the State bodies deemed environmentally competent by virtue of the characteristics of the project, its emplacement and potential to affect either resources or communities protected under the Environmental Law. The following entities participated in the review: Regional Planning and Coordination Office, Regional Water Bureau, Regional Highway Department, Regional Housing and Urban Development Office, National Forestry Corporation, Farming and Livestock Service, National Fishing Service, National Tourism Service, Valdivia Public Health Bureau, and National Bureau of Maritime Territories and Merchant Marine.
- These entities reviewed the EIA in light of the established ToR and sectoral criteria. They then sent their comments to CONAMA and requested clarification or revision of EIS data which they deemed necessary for a proper understanding and assessment of the project.
- CONAMA used the collected data to prepare a report in which it requested clarification, further elaboration or revision of information from the applicant, pointing out the most serious shortcomings revealed by the Study.
- Once the queries were answered and the problems resolved, CONAMA drafted a Technical Report on the basis of the reports issued by the competent entities. This Technical Report sets forth all relevant precedents from an environmental standpoint, requisite action to comply with the environmental regulations, and confirms that the necessary background data has been furnished for the issuance of the sectoral environmental permits related to the project.

Lastly, the competent authorities (COREMA) were called upon to give the project an environmental qualification, including any applicable conditions or restrictions.

Based on the Study's characteristics, the project owner was required to clarify several aspects in connection with the project. Salient among the problem areas were the following:

- The completion of the hydrology baseline, which should at the very least consider water flow measurements during a given annual cycle and include all seasonal fluctuations. This completion of the baseline was of vital significance in assessing the impact caused by the diversion of water for running the pulp mill, as well as the impact on water quality in the Cruces River due to effluent discharge.
- The EIS only mentioned the eventual design of a sanitary landfill for the disposal of solid waste generated by the project. However, the Study failed to provide any information on where the landfill would be located, the baseline data, and the impact assessment for the site. The authorities demanded that further information be delivered in connection with the landfill for environmental impact assessment purposes. Moreover, the Public Health Bureau required the data in order to issue the sanitary permit – sectoral environmental permit – for the construction and operation of the waste site.
- The air pollutants to be generated by the project would include 2.24 tonne/day of particulate matter and 13.2 tonne/day of SO<sub>2</sub>. These emissions would have an impact on air quality in terms of primary effects (human health) and secondary effects (natural resources). The EIS failed to provide an accurate determination of the magnitude and extent of the impact generated by these emissions.
- This project provided for the arrival of 3500 people during the construction stage of the plant. Workers would lodge in the communities neighbouring the mill site, such as San José de la Mariquina, Lanco and Máfil, the largest of which had a population of merely 2500. A request was therefore filed to assess the socioeconomic and cultural impacts on that towns, as well as to account for the impacts caused by an eventual increase in the demand for infrastructure and services.
- One of the most problematic issues faced during the environmental impact assessment was the presence of the RAMSAR site within the Project's area of influence. In fact, this Reserve lies 30 km downstream from the mill site and is fed by the Cruces River. The Reserve operates under the auspices of the National Forestry Corporation (CONAF)

and is the only RAMSAR site in Chile, as ratified by an Executive Order issued in 1981.

EIS results indicate that the Reserve would be affected by project-related environmental impacts of moderate to minor significance, in particular with regard to exotic nutrients which could possibly alter the ecosystem.

Nevertheless, the public entities in charge of reviewing the project refuted the accuracy of the assessment, since the flow of exotic nutrients to the Reserve would be far greater than those presented in the Study. The authorities thereafter demanded that the future impacts on the RAMSAR site be reassessed.

### **APPROACH TAKEN**

Following the official request for more information on the topics mentioned above, the applicant delivered a revised Study that incorporated the following additional data:

- Update and analysis of maximum water flows in the Cruces River.
- Water quality monitoring programme to be carried out in the summertime.
- Information on solid waste disposal, which is still found deficient in terms of eligibility for the respective permit. Not only was the location provided tentative in nature, but it was also outside the influence perimeter of the EIA project. The authorities were therefore unable to render an opinion on the environmental viability of the landfill.
- The report mentions the synergistic effects on the Reserve produced by a combination of factors, such as the discharge of organic matter, increased temperature and minimum river flow. However, since no data were provided in connection with this effect, the authorities were unable to determine whether an impact would be generated on the receiving watercourse or not.
- Data were furnished in connection with socioeconomic impacts, albeit still insufficient for environmental assessment purposes.

The predicament of the Cruces River Natural Reserve merited the attention of the Head of the Special Policy Department of the Chilean Foreign Affairs Ministry, in order to clarify how Chile would live up to the environmental commitments assumed by the government when this Reserve qualified as a RAMSAR site. These obligations include the comprehensive protection and preservation of the conditions which make this site unique, and the Special Policy Department had in its possession data that revealed the fragility of this area as regards its self-preservation. Following consultation with the

public entities related to the RAMSAR site, the Department concluded that the project's features would generate environmental impacts to the detriment of the aquatic environment and its biodiversity – in short, a violation of applicable environmental regulations.

The work conducted by the public entities that participated in reviewing the Study was enhanced by information provided by some NGOs that took up this issue. The NGOs voiced their concern for the RAMSAR site and for certain species that inhabit the local ecosystem and are classified as endangered. Scientists and non-governmental organizations vehemently opposed the project and came to the defence of the Natural Reserve, arguing that the effluents would be discharged into the river that runs through the site and greatly impair its viability.

On the other hand, the large investment sums considered for the project and the distinct possibility of new jobs engendered great expectations among the local population. In recent years, the region had been mired in an important economic depression, and the potential new job sources to be generated by the project raised hopes that the situation would finally be reversed.

Finally, CONAMA issued a Technical Report concluding that – in light of the information furnished by the Environmental Impact Study – it was unable to qualify the project as environmentally viable, given that it had failed not only to demonstrate compliance with environmental regulations, but also to assure that the proposed mitigation action would fend off adverse effects on the quality and quantity of renewable resources, or on protected resources or areas of environmental value.

## **RESULTS AND IMPLICATIONS**

The COREMA is in charge of assigning environmental approvals to projects or activities, certifying their viability from an environmental viewpoint. The COREMA is a collegiate body made up of the Regional Intendant, the Regional Ministerial Secretariat, the Province Governor, Regional Councilmen and the Director of CONAMA. This particular COREMA made decisions about this project on the basis of the following background information:

- the Technical Report prepared and certified by the Technical Committee;
- a balanced summary of the observations made by the local population; and
- other considerations, such as regional and local development policies, public opinion, an analysis of the social and economic costs and benefits that the project or activity would generate for the country, region, community, State etc., adherence to international treaties etc.

The Environmental Impact Assessment System (EIAS) is intent on establishing a uniform procedure to analyze environmental permits in any

single instance; therefore, the Technical Report must be conclusive in its determination of whether the requisite data and requirements provided by law have been delivered in order for the competent environmental State authorities to issue the applicable permits. There was no way the Technical Report could be favourable for the project if the EIA lacked information that was necessary for a positive decision to be reached in connection with any particular permit. Such a departure from established procedure would have completely frustrated the original intent of the EIAS.

The COREMA finally agreed to approve the project, albeit establishing multiple environmental restrictions and the obligation to evaluate several project aspects environmentally.

#### *The Natural Reserve*

The Technical Report prepared by CONAMA, with data contributed by competent entities, concludes that the information furnished in the EIA and the review thereof by the Technical Committee precludes the making of any assurances as to the presence or generation of impacts in the Natural Reserve. Even if the project were to adhere to the benchmark emission standards established for plant effluents, this safeguard would still fall short of preventing significant adverse impacts from being generated in terms of alterations to the characteristics of the protected site.

The conditions which COREMA established in order to approve the project were based on the Technical Report prepared by the Technical Committee, the additional background information furnished by the applicant and the data included in the project's EIS. What follows is a detailed account of the conditions.

The industrial effluents from the pulp mill must be treated by the primary and secondary treatment systems provided in the EIS. Moreover, and with the intention of protecting the Natural Reserve and RAMSAR site, the applicant will be required to opt for any of the following alternatives for the discharge of effluents:

- discharge into the Cruces River, calling for the incorporation of a tertiary treatment system that will operate on the terms to be established by COREMA; or
- discharge into a stream or body of water other than the Cruces River and not directly communicating with, or flowing into, the Natural Reserve.

Furthermore, any option chosen would be subjected to an environmental assessment submitted for approval by COREMA. Regardless of which alternative the applicant chooses, the assessment must include a study of the effects of consuming a given amount of water from the Cruces River and discharging it into another stream or body of water. All of the above is aimed at evaluating potential impacts on the Natural Reserve.

### *Disposal and treatment of solid industrial waste*

The applicant must implement a disposal system for solid industrial waste, to be located in a suitable area within the limits which the EIS establishes for the mill site. This sanitary landfill must comply with all applicable environmental regulations and abide by the EIAS. A detailed profile on the types and quantities of the waste to be dumped in the sanitary landfill must also be included. Particular emphasis was placed on information regarding the degree of toxicity of the waste and the compatibility among waste materials from a reactive point of view.

### *Water supply and consumption*

Consumption of water from the Cruces River was limited to the maximum figure, established in the EIS, of 900 l/s, for both process and cooling water. Also, should the water flow on the Cruces River border on the minimum flow rate limits and/or be deemed by the General Water Bureau as cause for concern, the applicant must consult with CONAMA and the General Water Bureau for the implementation of measures conducive to the prevention of undesirable environmental impacts as soon as possible, in order to stave off irreparable damage to the aquatic environment.

### *Emissions into the atmosphere*

It was recommended that the applicant consider the implementation of a control system for SO<sub>2</sub> to reduce plant emissions. This measure cannot be imposed by the authorities as the project meets the environmental quality standards currently in force in Chile. However, emissions from the pulp mill would create a zone where environmental quality would fall close to the maximum authorized limit. This would be caused exclusively by the installation of the mill, since no other sources of this type of emissions exist in the vicinity.

### *Monitoring or follow-up plan*

Stations must be set up in areas adjoining the Cruces River Natural Reserve and in the protected site itself during the first three years of the plant's operation, aimed at monitoring water quality. Standardized essays and protocols must be used with key Chilean species in order to account for the effects on the Reserve's ecosystem components.

The applicant must constantly monitor smokestack emissions and air quality for sulphur dioxide concentrations (SO<sub>2</sub>). Moreover, permanent monitoring of weather conditions is necessary in order to check the emission levels stipulated by the EIS and undertaken by the applicant.

## LESSONS LEARNED

### *Terms of Reference*

Several problems have arisen from the existence of ill-adapted ToR which, moreover, have no binding force in so far as the preparation of the EIS (given the voluntary nature of this system) and are based on a predetermined project that was conceived without any community involvement. These issues are as follows:

- a voluminous Environmental Impact Study full of unnecessary details;
- the relevant aspects of the project were identified during the EIS review and not while preparing the ToR or the Environmental Impact Study;
- loss of time and money because irrelevant or inapplicable information is not deleted;
- separate presentation of environmental impacts; not accounting for synergistic or cumulative effects from the combination of environmental factors and project emissions and discharges;
- competent authorities must decide on the basis of information furnished by the Technical Report prepared by competent entities and relevant aspects for regional development, political and social factors, among others; and
- Terms of Reference must be adapted to each specific project, since they assist in identifying relevant impacts even prior to the environmental assessment. They are also helpful in defining the practical areas in which the authorities shall require the applicant's commitment.

### *Significance of impact assessment*

The approval of any given project and the conditions established for its execution hinge directly on how impact significance is interpreted.

Assessment criteria or methodologies used in this project were found wanting in the following areas:

- environmental quality and emission standards currently in force in Chile (very few as of now);
- fundamental criteria to allow for a broad and consensus-based comparison of aspects not currently regulated;
- methodology guidelines to focus environmental assessment on the aspects deemed most relevant to this type of project and to the emplacement thereof ; and
- in the specific case of the Natural Reserve's ecosystem, additional

assessment instances had to be established that would include the participation of environmental experts. The goal was to achieve consensus in assessing the significance of the impacts and not leave this task to the decision-making process, since the latter takes non-environmental aspects into account.

On the other hand, project owners must include environmental variables from the conceptual stage, and regard them with the same relevance as the technical and economic aspects. Incorporating environmental factors in the decision about the feasibility of a project affords the following benefits:

- determining a proper location for the project in order to diminish potential environmental impacts;
- substantially minimizing environmental degradation since impacts are forestalled;
- minimizing potential conflict with affected communities or environmental activists;
- expediting the Environmental Impact Assessment procedure; and
- establishing precedents to facilitate the environmental assessment process for other investors wishing to participate in this type of project.

### **DECISION-MAKING**

The following is deemed necessary, given the characteristics of the project, Chile's transition to democracy from an environmental standpoint, and especially the evolution made by environmental impact assessments:

- Keep the authorities (COREMA) informed as to the progress being made in reviewing the Environmental Impact Study, and the project and the opinion of the community most directly affected by it, prior to making the final decision, in order to keep undue pressures at bay.
- Begin the Environmental Impact Assessment process early enough to allow for modifications.
- Support and strengthen the technical review of the EIS to reduce uncertainty when making the final decision.

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approach to EIA  
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biological  
impacts

## Environmental impact statement: 105 km highway corridor in the State of Durango

*Julieta Pisanty -Levy*

*This case study has written authorization from the project proponent.*

### ABSTRACT

This is a case study of the construction of a two-lane highway in the State of Durango. The average right of way will be 60 metres wide to allow for future expansion to four lanes. The highway will be built to high specifications and will have intersections, bridges, crossings for roads, railroads, pedestrians and cattle and minor drainage works. The area required will be 632.61 hectares. The surrounding environment has dry and temperate climates that support desert vegetation, stands of conifers and other trees and irrigated and rain-fed agricultural areas. There are several rivers of varying flows and small streams. The topography is highly varied with large canyons, plateaus, hills and plains.

The Environmental Impact Assessment (EIA) for this project was prepared in accordance with Mexican environmental legislation. When it was carried out, the project was in its planning phase.

### INTRODUCTION

The project involves the construction of a two-lane highway in the State of Durango. The average right of way will be 60m wide to allow for future expansion to four lanes. The highway will be built to high specifications and will have intersections, bridges, crossings for roads, railroads, pedestrians and cattle and minor drainage works. The area required will be 632.61ha.

The corridor is the first phase in a larger project whose final destination lies on Mexico's west coast. When the statement was completed in 1995 the date of commencement of work had not been set.

The main cities the highway will link are Durango (348 000 inhabitants) and El Salto (39 000). There are localities neighbouring the corridor that vary in size and number of inhabitants. The aim of the project is to facilitate the transportation of people and regional produce to the Pacific coast. The surrounding environment has dry and temperate climates that support desert vegetation, stands of conifers and other trees and irrigated and rain-fed agricultural areas. There are several rivers of varying flows and small

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streams. The topography is highly varied with large canyons, plateaus, hills and plains.

The Environmental Impact Assessment for this project was prepared in accordance with Mexican environmental legislation. The statement was evaluated and reported by the competent federal authorities. When the assessment was carried out, the project was in its planning phase and it was possible to propose impact prevention and mitigation measures that could be considered and applied by the project proponent in the implementation phase.

In addition to complying with current federal legislation and regulations, a professional study was made that identified not only the potential impact of future work but furthermore, suggested that certain design aspects of the project be revised.

### **NATURE AND SCOPE OF ISSUES**

From the technical viewpoint, the project was planned with all the major works typical of high-specification highway construction. In response to the topographical conditions of the area, bridges up to 400m in length, cuts up to 30m in height, the extraction of huge volumes of construction materials and the clearing of various species of desert scrub and trees were all planned.

The project proponent must purchase more than 600ha of land for the right of way and has a legal department responsible for dealing with all aspects of the purchase and/or expropriation of the privately and commonly owned plots needed for the construction of the highway and space for future widening.

It sometimes happens that the project proponent has not finished paying for land acquired before work has begun. From the social viewpoint, this generates ill feeling among those affected. Therefore, in this study it was recommended that what is called the 'freeing of the highway right of way' be completed before construction commenced in order to avoid conflicts with the owners.

### **PROCESS AND PROCEDURAL CONTEXT**

Mexico is a North American and Latin country with several years' experience in the application of federal, state and municipal government environmental policies on different levels. There has been progress in mitigating environmental impact, due to the fact that preventive policies have been recognized as an important tool in the correction of existing environmental imbalances.

In Mexico, the General Ecological Balance and Environmental Protection Act and the Environmental Impact Regulations establish which projects must be

assessed. Highways and communication routes must be analyzed to anticipate the environmental impacts that their construction and operation will generate.

Carrying out environmental impact statements for proposed projects and integrating them into the environmental impact procedure of the National Ecology Institute – a decentralized body of the Ministry of the Environment, Natural Resources and Fisheries – is the responsibility of the Federal Highways Bureau of the Ministry of Communications and Transportation.

The personnel of the Bureau of Environmental Impact, backed by other bureaus in the National Ecology Institute, are responsible for reviewing statements and issuing technical reports approving, applying conditions or rejecting projects.

The project proponent must implement not only the mitigation and other measures proposed in the study but also the recommendations and/or conditions established by the authorities in the report. The Federal Attorney General for Environmental Protection must ensure that the project proponent complies with the terms of the report. In this case, the Federal Highways Bureau is in the process of implementing a system of internal oversight to verify that works constructors quantify the cost of each project's mitigation measures and any conditions imposed at the time of approval, and implement them.

The environmental study for this highway project was prepared based on the 'guidelines for the development and presentation of the environmental impact statement in the general modality referred to in articles 9 and 10 of the Regulation to the General Ecological Balance and Environmental Protection Act in the field of Environmental Impact', and the special guidelines for federal highways issued for such purpose by the National Ecology Institute.

The different chapters of the study contain the following information:

- general information on the project proponent and the consultant preparing the EIS; a description of the planned works;
- a description of the physical, biological and socioeconomic environment;
- factors of the project relating to land use and protected natural areas regulation of environmental impacts; and
- mitigation measures and programmes to reforest and/or restore of affected areas.

Various laws, regulations, highway construction standards and official Mexican standards relating to the protection of forest areas, soils, protected plant and animal species, in addition to regional, municipal and sectorial development plans and programmes were revised.

## APPROACH TAKEN

One of the first activities carried out was the collection and analysis of the available bibliographic and cartographic information which provided, on the one hand, detailed information on the works to be built in the project and, on the other, the characteristics of the physical and chemical, biological and socioeconomic environment of the area. In this phase, materials provided by the Highway Project Department were used – mainly aerial photographs of the highway corridor, drawings of each one of the 105 planned kilometres and information on structures, drainage work, pavements, location of quarries and surplus material dumping sites, etc.

The aerial photographs allowed identification of the settlements along the corridor, farming and grazing land, scrub land, woods, forestry trails, quarries in use and physical features such as canyons, rivers and streams.

The necessary information was ordered, classified and selected; only the information pertinent for the study was used.

The purpose of the field visits was to:

- learn about the prevailing environmental characteristics along the corridor;
- verify the existence of farming and forestry;
- observe quarries in use and locate those proposed;
- observe the conditions of existing settlements;
- identify types of vegetation and dominant species;
- corroborate bibliographic and cartographic information related to geological aspects, soils, and surface and underground currents; and
- talk with local informants and with persons performing other studies related to the highway.

The identification and evaluation of environmental impacts was performed with the help of checklist and map overlay methodologies. A list of activities for the site preparation, construction, operation and maintenance phases was drawn up. The second list included the climatic, edaphic, hydrological, geological, biological (plants and animals), landscape and socioeconomic characteristics of the area of influence and the region.

This methodology was used to order all the activities planned and to identify in which phase of the project they will be carried out, to decide whether they will be simultaneous or consecutive and to infer the impacts they will have on the environment.

Overlaying different types of maps allowed the projected works to be correlated with environmental characteristics such as:

- types of vegetation and soils that will be affected by clearing the right of way;
- rivers and streams that will suffer increased sediment as a result of the mining of quarries and the construction of the highway;
- types of vegetation and surface currents that will be affected by the location of dumping sites for excess material not used in the construction;
- types of vegetation and farming in the area affected by the construction of gravel access roads;
- places where cuts will be made and intersections and bridges built; and
- privately and commonly owned land that will be affected.

In addition, the project's area of influence was highlighted on a map, showing the aforementioned correlations but mainly concentrating on an exhaustive analysis of the direction of flow of the area's surface currents. This map can be considered as the result of the integrated approach to impact analysis.

Both the desk and field work was carried out by an interdisciplinary professional group made up of a civil engineer, a geological engineer, three biologists and two architects.

The main environmental impacts identified were as follows:

- a socioeconomic impact due to affected private and common property lands; and
- impacts on local climate, air, soil, surface water, geomorphological dynamic, vegetation, wildlife, landscape and inhabitants due to such action as clearing, cuts, the mining of quarries, the operation of machinery and equipment, the installation and operation of crushing and asphalt producing plants, and the creation of dumping sites.

The impacts could take the form of :

- changes in local climate;
- the presence of suspended particles, gas, smoke and noise;
- an increase in proneness to soil erosion;
- an increase in solid particles suspended in rivers and streams, and the silting up of water courses;
- an alteration of the natural pattern of drainage;
- an intensification of erosion and sedimentation processes;
- changes in the original topography and stability of the terrain;
- a loss of tree stands, desert scrub and crops;

- the destruction of wildlife habitats and the creation of barriers to movement;
- a visual impact due to changes in the landscape mainly in mountain areas due to the height of cuts and embankments, and the extraction of construction material; and
- soil pollution due to accidental spills of fuel, grease and oil in machinery and equipment operating yards.

For each of the above impacts the phases of the project in which they could arise and the specific place or area affected were identified and their corresponding mitigation measures were proposed. The impacts were graded by intensity and extension; reversibility; duration, and whether they were adverse or beneficial, cumulative, avoidable or unavoidable.

### **RESULTS AND IMPLICATIONS**

Once the EIS was completed, it was delivered to the project proponent who had it revised internally. In accordance with the study's results, proposed measures and conclusions, the proponent determined that some aspects of the project design should indeed be analyzed once more and modified to avoid significant environmental impacts. This was the case of the proposed sites for dumps, that would have been located in canyons, streams, rivers, *Pinus* and *Quercus* woods and areas of desert scrub, among other sites.

A study was also proposed of the technical and economic feasibility of transporting material remaining after excavation and general earth movement to quarries to be used in restoration work. This analysis has not yet been performed because the construction of the highway was postponed and, therefore, it is not known if the proposals will be taken into account. The project proponent has, however, delivered the environmental impact statement to the National Ecology Institute for review and report. At the time of writing the terms of the report were being examined by the Federal Highways Bureau.

It must be said that although this highway is included in the Communications and Transportation Sector 1995-2000 Development Programme, it apparently is not currently a priority project which is why a date has yet to be set for its construction.

In developing countries like Mexico, consideration must be given to such important factors as the economy. Faced with insufficient public funds, the federal government implemented a programme to build and operate new four-lane toll highways some of which were leased to the private sector and Mexico's State governments.

Projections made before 1994 for the highway kilometres needed by the country and the investments required to build them have not been met partly due to the economic crisis which began towards the end of 1994.

Construction costs exceeded forecasts, tolls charged by lessees were very high and traffic flows turned out to be much lower than forecast. Once again the federal government had to take charge of these highways to avoid damage and to promote use by drivers.

Against this background, it is understandable that priority is being given to what are considered strategic projects. Since there currently is a toll-free highway linking the city of Durango with the Pacific Coast, an alternative route already exists; but it is not a high-specification link and journey times are considerable due to the difficult topography of the terrain.

In conclusion, it may be said that this particular environmental impact statement was prepared properly and in a highly exhaustive fashion but that the project has not gone ahead due to reasons unrelated to the corresponding environmental report.

### **LESSONS LEARNED**

With respect to environmental impact assessment practices in Mexico, in general terms there has been significant progress in recent years but much remains to be done in certain areas. For example, assessments must be made in parallel to the planning of projects in order to integrate environmental protection measures and to estimate their potential monetary costs. This goal currently seems unlikely because projects are normally analyzed in the final stages of their design.

The consulting group carrying out an environmental impact statement should participate in the follow-up stage to support the project proponent in the implementation of mitigation measures. This is not the case today because regulations do not require it and the authorities responsible for overseeing compliance with reports do not have adequate resources to supervise all works accepted or conditioned.

There must be greater awareness, both on the part of project proponents and certain consulting groups and authorities, of the importance of such studies in preventing harm to the environment. In Mexico the time and money set aside for these studies remains limited and there have been problems with excessive commercialization, poor quality reports, unreliable and often dubious data, and a common attitude of going through the motions.

Nevertheless, in recent years the Ministry of Communications and Transportation in particular has set aside extensive funding for the preparation of environmental impact statements for various highway corridors in different states of the country and this has allowed the particular environmental impacts of each one to be identified and the measures to avoid, minimize or compensate for them to be proposed.

Unfortunately, some highway lessees did not correctly implement the proposed mitigation measures, with the result that the actions they took –

for example to stabilise tall and steep faces of cuts using sprayed concrete – are not having the required effect (avoiding rock falls). In this specific case the impact on the landscape is visually catastrophic. Such actions are usually less expensive and more readily achieved than stabilisation using replanting with appropriate species but in the long term their maintenance costs rise considerably. On some highways these errors are being corrected; one short-term goal would be for construction companies to prepare realistic budgets not only for the construction of works but for the implementation of mitigation measures and the restoration of affected areas, such as quarries. In addition there must be much closer oversight both by the project proponent and the competent authorities.

In the case of public sector works in general, there must be a change in the Acquisitions and Public Works Act to loosen the tight restrictions put on available funding: environmental impact studies and construction projects are being granted to whoever guarantees the all too often incongruous factors of quality and a low price tag.

#### LIST OF RELEVANT PUBLISHED PAPERS AND OTHER SOURCE MATERIAL

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#### Key words

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decision making

# Monitoring the construction stage of the H P Toro hydroelectric project

*Eduardo Peralta*

## ABSTRACT

The Toro Hydroelectric Project (H. P.) is located in a very valuable zone surrounded by protected areas with high tourist potential and this aspect was very important in the assessment.

The stages of the environmental management of the hydroelectric project are as follows:

- environmental impact assessment;
- environmental monitoring in the construction stage;
- environmental monitoring in the operation stage; and
- the final operation of the project.

The construction stage is where the more severe impacts will be produced though most of the time these are short term impacts – generally when the work is finished the impacts also finish. In this stage the immediate impacts become obvious and steps can quickly be put into place to mitigate the negative effects on the environment.

## INTRODUCTION

Studies of environmental impact have a growing importance in the planning of development projects. The interest in these types of studies is due to a more critical understanding of the impact of big infrastructures on society and the social environment, and the relationship of these. It comes back to the need for ever increasing efforts to ensure that environmental considerations form an integral part of the strategic planning for developments.

## THE ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

In developing the EIA Hydroelectric Project the Costa Rica Institute of Electricity (ICE) made a contract with the Centro Científico Tropical (CCT) in 1988. This organization has on a number of occasions undertaken environmental and ecological studies of hydroelectric projects.

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management*

## **METHODOLOGY**

The EIA was directed by the Ministerio de Recursos Naturales de Energia y Minas de Costa Rica for energy projects. A multidisciplinary team composed of 15 specialists in hydrology, biology, vulcanology, ecology, wildlife and tourism participated in the assessment. A simulation of the project was designed to evaluate the predicable impacts for the construction and operation of the project. The evaluation used a double valuation Leopold Matrix, assigning values from 1 to 10 in upward order in accordance with the magnitude and importance of the assessed impact. The EIA determined the feasibility of the project from the environmental point of view.

## **CONCLUSIONS AND RECOMMENDATIONS FOR THE EIA**

### *General conclusions*

The multidisciplinary team that participated in the EIA of H.P. Toro concluded:

- The Toro Hydroelectric project is possible from the environmental point of view.
- Development will cause a moderate impact in the construction stage that will strongly affect the landscape.
- There are long term permanent impacts for which it is important to have adequate guidelines and recommendations.
- Other possible environmental impacts on the project were identified, principally for volcanic activity.

### *Specific recommendations*

The main recommendations of the CCT were.

- Attempt to dig the pipeline in such a way as to eliminate negative impacts on the landscape.
- Carefully manage the main disposal area.
- Restore the provision of water to those inhabitants affected by the project construction.
- Make a minor archeological 'rescue' during the preconstruction phase.
- Research the changes in the environmental acids to select the material types and the paint used in the different construction of the project (pipeline and power plant).
- Check the workers periodically to determine possible evidence of disease or other health hazards.

- Install a seismologic net to continue the research into the seismicity of the Toro Basin.
- Maintain a monitoring net for control of the river to detect the potential for landslides.
- Establish a system to measure of inflow and a photographic register to evaluate the reduction of the visual impact of waterfalls.
- Reafforest the surround area of the reservoir.
- Clean the whole vegetation area of the reservoir.
- Take care in building the tunnel route under the Agrio river.
- Check the acids of fog products on the river and warn people coming to watch the H.P. Toro project by the waterfall of Toro.
- Release 2.0m<sup>3</sup> in the Toro river and 0.4m<sup>3</sup> in the Gata river to maintain the inflow equivalent on the minor monthly average in both cases, in the periods of main tourist activity on Saturdays and Sundays.
- Develop an environmental educational plan.
- Inform the inhabitants of the zone of the project and possible concern about it.
- Promote the preparation and execution of the management plan for the Toro upper basin.

#### *Environmental monitoring*

The environmental monitoring of H.P. Toro was undertaken in two different stages. The first was to establish recommendations of the EIA to mitigate the environmental impacts that the different projects would cause. The second concerned the construction of the road to the power plant of Toro II giving special emphasis to the landscaping and rehabilitation of land cover for stability and aesthetic effect.

A monitoring environmental programme was designed for the construction stages and operations of the utility. This programme had been modified to adapt to the needs of the project.

### **MONITORING ACTION IN THE TORO PROJECT**

#### *Location of the disposal areas*

Four areas were designated for disposal of materials extracted from the different construction activities of the project. The total volume of the excavation of the project construction was calculated as 596.569m<sup>3</sup> and the four deposits as having a capacity of 640.00m<sup>3</sup>.

### *The reduction of inflow of the Toro River waterfall*

A photographic register of the construction process was kept between January and December 1992 together with an inflow register that corresponded to the days these pictures were taken.

### *Camouflage of the pipeline*

There is a possibility that the pipeline could be located underground. This can be better assessed when the pipeline construction has progressed and the visual impact has been analyzed to consider the best options.

### *Acids control of the fog of the Toro River waterfall*

A programme for acid control commenced in April 1992 and ended in March 1993. An instrument was constructed to catch the waterfall fog.

### *The rain control of the pH of the zone*

From the beginning of 1990 to the end of 1995 rain samples for the acids analysis work were collected.

### *Clearing of vegetation in the reservoir area*

The clearing of the area of the reservoir will be undertaken during the construction stage.

### *Archeological rescue*

No materials of archeological significance were found.

### *Management of the Basin*

Points related with the Upper Basin protection, environmental education and the provision of information to the inhabitants were included as part of the management plan of Toro River Basin. In 1990 the Departamento Ambiente y Energia Alterna undertook a preliminary project to manage the plan of Toro River Basin.

The environmental education of the inhabitants has been undertaken at the formal level with schools in Bajos del Toro and Colonia Toro and will continue to be implemented in the environmental educational plan del Ministerio de Recursos Naturales Energia y Minas (today MINAE). As part of the management planning of the Basin there is a proposal for a tourist local circuit.

A socioeconomic diagnosis was performed and identified the need for a specific programme for women in the area. Advice on this programme has come from the MINAE and the ONG and CEFEMINA.

There have been cultural activities to integrate the communities of Colonia Toro and Bajos del Toro. Approximately 315 people participated in the popular festivities of the Bajos del Toro community with the first Environmental Exposition of the ICE 'Development in harmony with nature.'

#### *Medical care for the workers*

This recommendation is to be accomplished by five supervision programmes; labour groups control of hygiene and health, preventive medicine campaigns, training monthly inspectors, first aid dispensaries and medicare. There is a full time dispensary in the project central building for the tunnel and excavation workers. There are also full time security and hygiene staff.

#### *Installing a vigilance control system on the slopes of the river to detect landslides*

A programme has been planned to investigate which of the slopes present higher risks of landslides. Once these are identified we can proceed to build a data base using the Geographic Information System (GIS), to determine the more susceptible landslide and erosion areas.

#### *Access road to the power plant*

A road is needed to the power plant house Toro II which is located at the bottom of the canyon of the Toro River with a level difference of approximately 300m between the top of the slope and the base. At the feasibility stage the ICE decided that there should be adequate access to this point and the best alternative was to build a margin road to the left of the Toro River.

#### *Monitoring road construction for the Toro Power Plant*

Part of the road (4km) is to go through the South East sector of N.P. Juan Castro Blanco and it is necessary to have permission for construction of this road. In the construction stage 80 per cent of the natural rain forest was destroyed, and there is a need for a forest rehabilitation plan.

There is also a recommendation to keep the necessary inflow to maintain the waterfalls as a tourist attraction of the Toro and Gata Rivers.

#### LIST OF RELEVANT PUBLISHED PAPERS AND OTHER SOURCE MATERIALS

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## Huites irrigation project

*Maria A. Gomez-Balandra*

### ABSTRACT

The case study presented here deals with a multiple purpose project for flood control, irrigation and generation of electricity. The project was evaluated within the legal framework of the environmental impact legislation enacted in 1988 and in response to specific guidelines for the water sector.

Construction of the dam and installation of the hydroelectric generating plant have since concluded. Feasibility studies for the works in the irrigation district are underway. The irrigation districts, as members of the private sector, will finance the project – a first in Mexico.

Many of the mitigating measures for the impacts identified in the natural and social environments have been implemented. The proposed follow-up and monitoring programme includes long-term activities including water quality analysis. The successful implementation of this programme will depend on the agreements among involved agencies.

### INTRODUCTION

The Huites Irrigation Project centres around a conventional concrete gravity-flow storage dam, 162m high with a capacity of 4,023 million m<sup>3</sup>. Additional structures include diversion works, a spillway and a hydroelectric generation plant, as well as the main channels and the distribution networks in the irrigation district. The dam is located in north western Mexico in the states of Sonora and Sinaloa (fig.1).

The dam was designed to control floods by storing up to 1115 million m<sup>3</sup> to protect 50,000ha of cropland, provide irrigation water to 70,000ha and 89,700ha in 1.28 cycles, and generate electricity at a rate of 875 kW.H/year with a minimum capacity of 400MW.

This project harnesses 95 per cent of the runoff from the watershed and provides virtually complete control of flooding.

The cost of the structure in 1992 was USD 212 million (Ps7.8: USD1). Construction began in that year with a record estimated completion time for the dam and the hydroelectric generating plant of 29 months.

The project was located in an agricultural region where storage and diversion dams, irrigation districts and hydroelectric plants were present.

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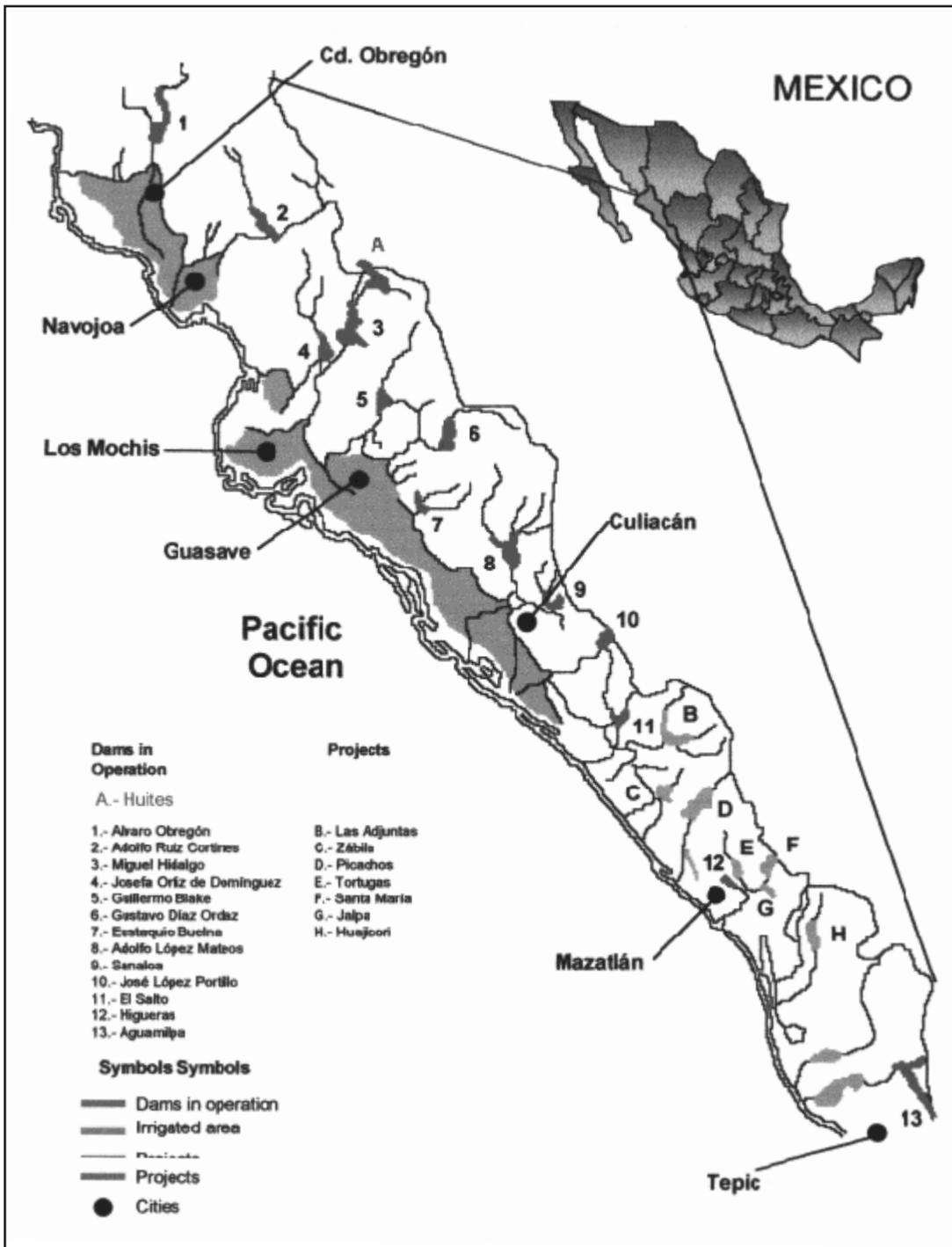


Figure 1: Project location

The Huites Dam, upstream of the existing dams, provided flood control for the runoff from the thawing snow, an enlargement of the irrigation districts and an additional source of electricity. The regional crops are wheat, soybean, sorghum, rice, safflower, maize, dry beans estimated to increase to 386 000 tonnes with a value of 250 000 million Mexican pesos that would benefit 6650 families in six municipalities in the adjoining states of Sonora and Sinaloa. Domestic consumption was to account for 68 per cent of the production and export, 32 per cent.

Irrigated agriculture in the north west provides 30 per cent of all the nation's production. This proportion would rise with the implementation of the Huites project to reach 65 per cent of the estimated potential crop area in the zone.

The project influence area is around 73 902ha of which 20 023ha (27.09%) are cropped, 1140ha (1.55%) are used for animal husbandry, 44 290ha (59.93%) are forestry areas, 1278ha (1.78%) are being cleared and 3269ha (4.42%) lie fallow. Urban centres occupy 405ha (0.55%) and hills account for 3497ha (4.73%).

The major negative impacts identified were related to the flooding of 9457ha (maximum extraordinary water level of 288.43), part of which was low deciduous forest that was the property of nine ejidos (4924ha), private parties (2050ha) and the federal government.

Other negative impacts were related to changes in soil use, hydrology and ownership, the loss of habitats for the terrestrial and aquatic fauna, and the relocation of fourteen communities with a total of 1130 inhabitants according to the 1990 census (INEGI, 1990).

## **NATURE AND SCOPE OF ISSUES**

The technical studies for the design of this project were started in 1991 by the Hydraulic Resources Secretariat. It was initially conceived as part of a regional development plan, the Northwestern Interconnected Water Plan and later the Northwestern Interconnected Water System (SHINO), that joins watersheds through storage, deviation, conveyance and distribution works in Nayarit, Sinaloa and Sonora.

The Environmental Impact Statement was prepared in 1992, after considering the guidelines established in the regulations concerning environmental impact of the Ecological Equilibrium and Environmental Protection Law and the Cooperation Agreement between the National Ecological Institute (INK) and the National Water Commission (CNA) (INE-CNA, 1991). The CNA, in accordance with the requirements of its projects, adopted and complemented the guidelines to fulfil the requirements of the Environmental Impact Statement.

During the execution of the screening procedure proposed by the CNA, the need to prepare an Environmental Impact Statement tailored to the project

was recognized. For this purpose, the CNA hired Construcciones y Estudios, S.A., duly registered as an environmental impact consultant with the National Ecology Institute, as required under law.

In accordance with the environmental impact regulations of the Ecological Equilibrium and Environmental Protection Law (1988-1996) and the modifications proposed by the CNA, the evaluation included:

- general information about the proposing party, the project and consultants;
- a description of all phases of the project or activity;
- a description of the environment before the execution of the project;
- an analysis of the environmental parameters at present and in the future;
- identification and evaluation of the environmental impacts of each phase;
- evaluation of the modified environmental scenario;
- prevention and mitigation measures for the environmental impacts identified;
- conclusions and recommendations;
- references,
- a list of participants including professional resumes; and
- appendices.

The appendices contained a detailed description of the methods used to study each parameter (water, flora, fauna, socioeconomic aspects, etc.), and the results of the samples and design calculations, and work schedule.

One of the difficulties of the project was the wide zone of influence, including the Fuerte River basin, its tributaries, dams, irrigation districts and a projection on the Pacific coastal region, approximately 220km from the project site. The diagnosis, and the identification and evaluation of the impacts were focused on the storage area and works, and the region downstream to the coast. The reconciliation of interests of the investors was another obstacle. The participation in the project financing was 51.5 per cent from the region's irrigation districts; 22.8 per cent from state funds, and 25.7 per cent from federal funding through the National Water Commission. The federal government agreed to build the storage dam and the hydroelectric generating plant, while the growers, with the support of the state governments, promised to build the irrigation facilities.

The National Water Commission and the Federal Electricity Commission (CFE) have not completely defined the terms of transfer of the dam electric generating plant nor the responsibility for the long-term mitigation and monitoring activities.

Irregularities in land possession have arisen during the process. Proposals were made to redefine the property limits with the participation of the Agrarian Reform Secretariat and the Agrarian Attorney-General's Office. The area destined for the dam was duly expropriated and compensation paid. The information concerning the communities cited in the environmental impact statement and used to estimate the number of dwellings required for the relocation of the families was taken from the 1990 census. The mitigating measures included the recommendation to prepare a specific census of the families to be relocated, the property to be compensated and the individual preferences as to sites and means of compensation.

### **PROCESS AND PROCEDURAL CONTEXT**

The procedure to evaluate projects of this nature, as specified in the Environmental Impact Regulation, is summarized in Figure 2. A basic requirement is that no portion of an ecological reserve be included in a project.

During the 1992 evaluation, this project formed part of the objective proposed by the Sinaloa State Urban Development Plan and the State and Local Ecological Development Plans.

The method used to identify and evaluate the impacts was developed by the Environmental Impacts of Irrigation and Drainage group and published in 1986 by the International Commission of Irrigation and Drainage (ICID). In it *ad hoc* techniques are used for the development of each phase. A check list of the major environmental components and a data list to identify the activities that will cause these effects were developed. These two elements, combined in an interaction matrix, serve to identify and rank the effects based on reversibility, duration, geographic area and direct or indirect relation to the activities.

Once the environmental impact statement has been drafted, it is reviewed by the National Institute of Ecology (INE). The INE has 90 days to authorize, impose conditions or reject the project. A project of this nature usually receives a conditioned acceptance. In this case, because of a shortage of qualified personnel, the INE required more time for the review. Under an inter-institutional agreement, the CNA and CFE sent staff to assist the INE.

The INE sent its decision after the project had started and gave conditional approval to compliance with the proposed mitigating measures. The decision included other measures including the control of the storage, handling and transport of explosives, an archeological study of the region, training in the use of agrochemical and pesticides and in industrial safety.

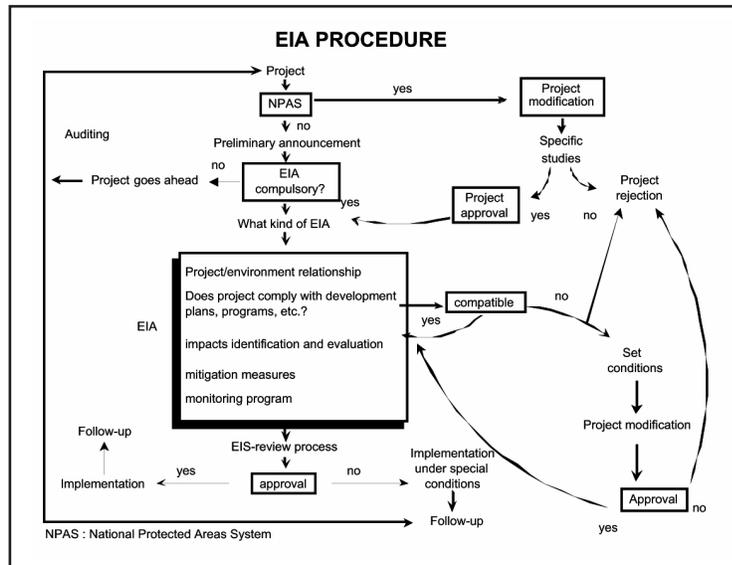


Figure 2: EIA procedures as specified by the Environmental Impact Regulation

## APPROACH

The bibliographic and cartographic information for the diagnosis of soil use, vegetation and geology was obtained from the National Institute of Statistics, Geography and Census (INEGI). This data, which is generally more than 20 years old, was updated from aerial photos.

Population, dwelling and agricultural census data from 1990 were also provided by the INEGI. Economically active population, age pyramid, economic activities, educational level, public health, public services and number of persons that speak dialects were other socioeconomic parameters taken into consideration. This information was compiled through communication strategies and negotiations with the affected communities.

The project permit included the CNA's recommendation for specific field and laboratory studies to determine water quality, agrochemical and pesticide pollutant concentrations, and inventories and classification by importance of the aquatic and terrestrial communities.

The process was divided to correspond to site preparation and construction, creation of irrigation districts, dam operation and expansion of the excavation and removal of soil, road construction, creation of drains, headwork, etc.

A wide range of criteria were used relating to hydrology, pollution, soils, sediments, biology, socio-economics, health and ecological imbalances. For example, hydrology considered dry and rainy seasons, hydric balance, and extraction and waterlogging. The socioeconomic component evaluated

changes in income and social well-being, migration, relocation, participation by gender, ethnic and minority groups, the presence of historic sites and regional effects.

To rank the impacts, certain conditions and characteristics were assumed and described with respect to conservation of the environment to interpret the impact that had been identified.

The positive and negative environmental effects were compared, in the presence and absence of the project over 10 years. This period allowed for the inclusion of a large part of the impacts after initiation of operations. With the use of a scale from 1 (favourable) to 8 (unfavourable), large numerical values were associated with predominantly negative impacts.

The evaluation indicated that the region in the absence of the project would suffer significant changes, while the project would occasion only minor changes because dams were already present on the river, and the benefits were greater than the drawbacks, taking into consideration the mitigating measures.

The description of the proposed modified environmental scenario served to portray the conditions and characteristics of the landscape, climate, soils, erosion, and water flow downstream of the dam system, changes in the coastal regions resulting from modifications in the frequency of the runoff, alterations in the aquatic and terrestrial flora and fauna, and the proliferation of species adapted to the new ecosystems.

The economic benefits included strengthening of the existing ejidos and irrigation districts, with little immigration to the zone, and improved living standards for all, especially for the relocated families who would have better housing and public services.

In general, the mitigating measures included

- relocation of communities, with census and surveys to determine preferences for compensation and replacement of housing and services;
- efficient water use to maintain the water levels needed for agriculture and the aquatic fauna in the lagoons;
- soil reclamation, including control of salinity and pollution by agrochemicals and pesticides;
- rescue and conservation of genetic information of the local fauna for relocation to previously-defined sites and the rescue from islands formed in the dam;
- reforestation to reduce erosion and dispersion of agrochemicals, and to create new habitats;
- deforestation of the floor of the dam (5000 ha), and the use of the greatest part of the cut trees; and

- ecological monitoring to study the recovery mechanisms, control the entry of pollutants, and protect natural resources and public health.

The estimated cost of the mitigating measures was 9.6 per cent of the total project budget.

## **RESULTS AND IMPLICATIONS**

When the construction of the dam concluded in 1995, personnel from the CAN and the Federal Environmental Protection Attorney General's office (PROFEPA) visited the site, from the entry to the reservoir to the dam, and graded areas to verify compliance with the mitigating measures.

Due to the shortage of personnel in the recently-created PROFEPA, and the then undefined responsibilities at the federal and state levels, guidelines for the inspection were not available. However, the CNA had transmitted quarterly reports to the INK for follow-up and discharge of the mitigating measures during construction time.

For the relocation of the communities, representatives, including ejido presidents and others named by the communities, participated in the negotiations with the authorities at 150 formal assemblies. As a result, the compensation for land and structures including homes, schools, tick control stations, churches, warehouses, fencing, and orchards was agreed upon. Specifically, the head of the household received a sum corresponding to that required for him to rebuild his home based on the number of inhabitants (four to six and more than six). Some families preferred cash settlements for the value of their home. In total, 323 dwellings were built by the heads of families.

The families were relocated in Choix, municipality of El Fuerte, where other members of the Yaqui ethnic group were living. Only four families refused to move to the selected site due to, in their words, greater expenses arising from participation in the electricity and water distribution systems. This group was relocated above the extraordinary maximum water level.

Other improvements included the building of six primary schools, two preschools, a church, roads between the communities, the planting of orchards and placing of fences; the latter two were paid for in cash based on the assessments of the National Assessment Commission. Reservoir deforestation of portion of the 6250ha required for the dam produced the boards used for fence construction in the relocated ejidos.

The relocation of the communities to a new environment resulted in a partial decentralization as witnessed by a loss of values and customs, already on the wane, in the existing ethnic group. A new cemetery was established. The remains of existing burials were left in the old one.

Other mitigating measures included the creation of terraces with the excavated soil and reforestation to prevent erosion. By December 1995, 3755

trees of six different species were planted along the dam and in the civic area.

Efforts to locate and rescue archeological ruins produced nothing and this phase of the programme was cancelled. The flora rescue programme was also cancelled when it was found that none of the species were in danger of extinction.

Local labour was used for the construction of the dam and most of the other activities described. According to the work schedule, up to 3500 workers, with differing levels of skills, were hired.

The ecological monitoring to be carried out by the CNA for water quality has continued. However, the effects on the coast have not been evaluated.

### **LESSONS LEARNED**

The INK environmental impact statement review process is improving although, for this project, the permit to begin work and the identification of mitigating measures were not received at the same time. The follow-up of the project did not start with the project. Due to a lack of specific information, and local and regional quantitative indicators, the Environmental Impact Statement was more descriptive than quantitative and analytical from the diagnosis, the projections, the impact evaluation to the proposal of the mitigating measures.

The use of different classifications and standards, for example of soil, water quality, and species abundance and diversity, made comparison of the magnitude and importance of the resources and possible impacts difficult.

There is a marked need to reduce, among the communities to be relocated, speculation that may result in mismanagement of compensation. The communities should be invited to participate early in the environmental evaluation of the project to evaluate with better precision the costs of the impacts and mitigating measures that directly affect them. In this project, these aspects were considered later on and not defined until agreements were reached with the communities.

A clear idea must be obtained of the social aspects of each group affected and benefited, directly or indirectly.

The participation of state and federal institutions resulted in new programmes for use of the dam, including seeding with fishes and other alternatives for production, and the creation of programmes to stimulate the participation of women in the irrigation districts.

The communities involved in the process should be encouraged to participate in its organization to develop their own programmes and prevent manipulation by outside influences.

Precise information should be used to identify the combination of effects and evaluate the residual and cumulative impacts.

The estimated costs for the mitigating measures, such as deforestation, reforestation, relocation and compensation, are often much lower than the real costs. As much data as possible should be compiled to increase the precision of the estimate.

Post-project environmental monitoring should be considered as part of the project with a budget for short, medium and long-term studies.

Although there have been previous experiences with projects of this nature, they have not been compiled to create specific terms of reference for the scope of the environmental assessments nor entered into data bases to serve as a learning experience.

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#### **Key words**

**mitigation  
assessment  
project  
management**

## Environmental impact assessment: for whose needs?

*J H Y Katima*

### ABSTRACT

Tanzania, like many other developing countries, is keen to attract foreign investments to foster the country's socioeconomic development. However, the competition among developing countries to attract foreign investment preference has in many cases sacrificed policies geared towards sustainable development for short-term economic gains. With the intention of conserving the global environment, the multinational financing institutions have made it mandatory that all development projects should be subjected to EIA before they can be funded. Is this sustainable? This case study suggests that an effective (and sustainable) EIA regime is dependent on, among other things:

- the government's political will;
- effective environmental legislation;
- institutional support;
- proper development objectives; and
- trained personnel.

Unfortunately, many of these factors are not in place in Tanzania (and probably not in place in most developing countries). This has led in many cases to frustration on the part of environmental impact assessors, governmental advisors and the public at large. Because of economic considerations some projects have been given a go ahead despite negative assessment and public outcry. In some cases, projects have been assessed positively even though the negative impacts are obviously overwhelming, which may be due to the fact that the investor is paying for the assessment and thus may influence the outcome of the assessment process. This case study examines the prawn project, which was subjected to EIA, rejected by the review team and approved for implementation by the government. The paper poses a question: For whose needs is the EIA conducted? The investor? The government? The assessor? The environment? The public?

**See Topic 9**

**UNEP EIA Training  
Resource Manual**

*Reviewing*

## INTRODUCTION

The Rufiji River delta is the largest block of mangrove forest (mangroves) on the eastern African coast. The delta is linked to the interior river system by an extensive flood plain about 130km long and more than 20km wide. It is also linked to a system of ocean currents and coral reefs.

The mangroves provide a unique ecosystem that displays dynamics of a flood plain and delta system as expressed by changes in mud and silt deposition, major fresh water outlets, and the creation of oxbow lakes, local flooding patterns, salt water intrusion etc. The mangroves provide an inter tidal fishery, serve as nursery grounds and breeding areas for the prawn industry for the locals and produce large quantities of mangrove poles for export.

Mangroves protect the coastline from waves and currents and thus prevent coastal erosion. Through their retention of sediments brought downstream by rivers, they extend the coastland into the ocean. As they are highly productive elements of the marine ecosystem, mangroves generate large quantities of detritus, which form the basis of a complex marine food web thus making them a unique ecosystem that is rich in floral and fauna biodiversity in both freshwater and saline environments. The delta has been utilized over the years by the Rufiji people basically relying on fishing, mangrove poles and rice farming for their sustenance. The present population living in the delta is 35 000 people.

The African Fishing Company Ltd (AFC), a subsidiary of Tannol Holding Ltd. of Korea, intends to develop a prawn farm covering about 6,000ha of surface water, with grow out ponds on 10 000ha of land. The proposed location of the prawn farm is within the Rufiji delta and the downstream end of the flood plain. The proposed farm will consist of production ponds plus water pumping stations, and supply and drainage canals. Staff quarters, and storage facilities for the materials and supplies will be built close to the farm. The target species for shrimp aquaculture is *Penaeus monodon*. AFC plans to employ semi-intensive production methods at farm level management.

The proposed development is planned to be accomplished in eight years with the first year of operation targeted to build 500ha of ponds. The ponds will be of 6ha x 1m average depth in size. There will also be some smaller ponds of the size of 0.1m x 1.0ha built for research and development purposes. A hatchery is proposed at Bwenjuu Island in the Mafia Island Marine Park where brood stock will be stocked at a density of 10 to 12 prawns per m<sup>2</sup> and will be fed with feed meals. There will be 2.3 crops of prawn per year with an annual production of about 2680 to 4600kg/ha. The annual feed is estimated to be between 6624 and 8280kg/ha. The estimated labour requirements are as follows: construction 250-500 people; farm operation about 6000 people; the hatchery 500 people; at the processing plant 1200 people. Other project components include:

- deep sea fishing in the Exclusive Economic Zone (EEZ) of the Tanzania coastal waters with a total fleet of six vessels;
- the provision of fish meal plant at Mwanza to recycle waste from the processing units and a feed mill at Mbegani for production of feed stuff from cereals and other unwanted fish and additives; and
- the provision of training and education for personnel.

## **NATURE AND SCOPE OF ISSUES**

### *Policy and legal issues*

In licensing the project the following pieces of legislation were contravened:

The National Land Policy of 1995 and Land Ordinance of 1923 were contravened by transferring right of occupancy to the developer without recognizing the customary rights of smallholders. The Forest Ordinance of 1997 and the Forest Ordinance Cap 389 of 1957 were contravened by allowing the developer to establish the prawn farm in the forest reserve. All mangrove forests are forest reserves. Allowing the developer to establish a hatchery at Bwenjuu Island has violated the Marine-Park and Reserve Act No. 29 of 1994. The project also falls within the licensed area to CANOP for the purpose of oil exploration. Other legislation contravened includes: the Water Utilization (Control and regulation) No. 110 of 1981 and international conventions such as CITES Convention (because of the existence of two endangered species in the area i.e. the Dugong and the Nile Crocodile) and the Ramsar Convention (because the Delta is a contiguous wetland which is part of the international landing sites for migratory birds). There also other development projects within the area e.g. The Mangrove Management Project, The Rufiji Delta and Floodplain Environmental Management and Biodiversity Conservation of Forest, Woodland and Wetland, The Rufiji Basin Management and Irrigation Project and The WWF Coastal Forest Project.

### *Environmental issues*

Loss of mangrove forest is estimated to be 1200ha. There is loss of biodiversity in mangrove areas as a result of destruction of breeding sites and nursery grounds for fish and other intertidal fauna, destruction of rare species of mangroves such as Rhizophora, together with the threat to endangered Dudong and Nile crocodile and over-exploitation of wild fish stock by increased human population. Self generated pollution and eutrophication in ponds, rivers and the ocean will come from effluents containing antibiotics and toxic chemicals. Other impacts will be the acidification and salinization of agricultural lands, disposal of wastes in Kioboni and Bumba rivers and associated water borne diseases and formation of complex land uses e.g. a town within the mangroves forest

reserve and flood plain. There are no suitable soils within the reserve for housing, sanitary landfill, oxidation ponds/lagoons, septic tanks etc.

### *Socio-cultural issues*

The project will result in loss of agricultural land, displacement and resettlement of local people, increased social conflicts between those who are for the project and those against it, increased government costs for provision of infrastructure and social services and changes in cultural values.

### *Economic issues*

Calculations indicate that the project will make a net loss of US\$ 24.9 million in year one and a net forex gain of US\$ 120 million in the fifth year. However, the government has given a tax exemption and forex retention holiday of 5 years, and the experience world-wide has shown that such projects fail in their fifth year which means the government will not realize anything. Using the overall risk of 30% the estimated foregone benefits in Rufiji delta area ranges between US\$ 72-107 million which exceeds the adjusted income benefits of the project which is US\$ 21 million.

### *Process and procedural context*

Unfortunately, there is no legal requirement for EIA in Tanzania. There is neither environmental policy nor environmental law. However, there is a National Environmental Management Council which advises the Government on environmental issues and the Division of Environment under the Vice President's Office, which looks after policy issues. The National Environmental Management Council has developed EIA guidelines.

The Investment Promotion Centre has the sole responsibility of approving all foreign projects. Its mandate is to assess economic viability. In this particular case, maybe because of public pressure, the government required an EIA before it approved the project. The developer had to produce an EIS for evaluation. Furthermore, the developer intends to borrow money from international financing bodies, in which case he has to show the environmental impact of the proposed project.

The EIS was sent to the Environment Management Council for Evaluation. The Council constituted a team of 11 experts, with three foreign experts from the USA, Zimbabwe and Germany. The reviewers prepared a report, and the NEMC also organized a public hearing, which drew participants from the Rufiji people, experts in different fields, and politicians. Written comments were received from within and outside the country. The Councillors mostly represented the Rufiji people. Thirty-two participants gave verbal comments on the project during the public hearing and 18 written comments were also read during the public hearing. The EIA review

team raised numerous questions about the EIA and the recommended mitigation measure. These views were supported in public hearings.

## **MITIGATION MEASURES**

### ***Mangrove forest***

The EIA proposed a no-net loss of mangroves by suggesting that the project replant mangroves in other areas. This was found to be unrealistic by the review team as the mangrove species respond differently to ecological requirements and other environmental factors and they are site-specific. Also there are not enough bare saline areas or clear cut mangrove areas in the Delta for replanting to compensate for the mangroves cut in the prawn farm project. The project does not give alternatives to meet the objectives of the mangrove management project. However, the EIA report admits the serious negative impacts of construction of canals, roads and other prawn farm project activities.

### ***Fisheries and marine environment***

The EIA does not cite the fact that there are no alternative sites for hatchery and grow out ponds. The EIA proposes that the use of DDT and antibiotics should be minimized without suggesting alternatives and thus there was no guarantee in the management submission in response to the EIA. The EIA also reports that AFC is committed to implement the mitigation plan. However, there are no funds budgeted to implement the plan. It was also observed that unless there are screens at pump intakes there would be a massive killing of fish and other aquatic zooplankton. Besides, there are no funds set aside for this measure.

### ***Land use***

There are no mitigation plans to avoid a town growing in the mangrove forest reserve. The septic tanks and/or oxidation pond necessary for the treatment of domestic waste requires suitable soil, which is not available in the delta. The ponds and other related structures will most likely be inundated during spring tides at equinoxes. There is no mitigation plan for this. There is a provision of 1m high levees above the surface which is not enough to mitigate the inundation impact since the spring tides could be as high as 1.5m.

Social benefits that are proposed for the locals who will be affected do not have financial commitment. Nor are there funds set aside for resettlement of the displaced families. No funds have been set aside set for land acquisition. And finally there are no alternative sites for the project.

### ***Water resources***

The drainage canals at the hatchery will be directed into small sedimentation basins before discharging by an overflow into coastal waters; no treatment is proposed. The EIA proposes, as a mitigation measure, that the pond sediments be stored in specified areas and allows rainfall to leak in and percolate to the ground. Also the EIA proposes that the pond sediments could be used for road construction or other repair work. The review team and the public hearing questioned the proposal because impact on ground and surface water was not analyzed. There is no proposed mitigation measure for an increase in waste matter, which will be disposed of in the Kiomboni and Bumba rivers. The contamination of the two rivers by the excessive use of lime will raise the pH of the rivers which serve as potable water for the local residents.

### ***Agriculture***

No specific mitigation measure is proposed by the EIA despite the fact that there is a possibility that polluted water from the prawn farm will leak into agricultural fields.

### ***Wildlife***

The EIA does not look at alternative usage of the Delta e.g. wild life protection for ecohunting and ecotourism. There are no mitigation measure against possible poaching of Dugong and Nile Crocodiles, which are already in alarmingly low numbers.

### ***Socio-cultural***

The EIA report uses cautionary words (non-committal) to address the socioeconomic benefit of the project to the local people e.g. such words as 'the proponent will support to a certain extent a dispensary, health centres, schools and water.' However, no financial commitment is made. The EIA does not provide mitigation measures to cover the cost of displacing and resettling people, costs of infrastructure and services for resettled people, loss of boat tract in one of the sites, and the decline of food security through the decline of agricultural land. However, the EIA proposes to discourage clearance of vegetation for agricultural purposes (i.e. after the project has cleared thousands of hectares for ponds).

There will be increased hygiene risks through water borne diseases and increased demand (with its environmental and social consequences) for fuel-wood, drinking water, farmland and settlement areas. The EIA gives vague statements such as 'insurance that local cultural pattern will be maintained'.

## **MONITORING PLAN**

There were no comprehensive baseline studies done which could have been used in the monitoring activity. The roles of the developer, the government, local residents and other stakeholders are not clearly defined in the monitoring plan. Besides this, monitoring activity is neither costed nor budgeted for.

## **RESULTS AND IMPLICATIONS**

The EIA review-team and the public hearing concluded that the EIA report was highly biased in favour of the project. It was proposed that the project be rejected on the following grounds:

- The project is planned to be located in a Mangrove Forest Reserve and Mafia Island Marine Park. Millions of dollars have already been spent on both projects.
- The plan is to discharge untreated effluents into the rivers that drain into the Mafia channel and Bwenjuu Island reefs.
- This will release untreated effluents containing silt, suspended solids from the remains of feed and pond sediments, dissolved chemicals from fertilizers, prawn feed, medicines (including antibiotics) and other nutrients.
- There are conflicts with existing and planned land use plans for the Rufiji basin and Mafia Islands.
- The proposal has many negative socioeconomic impacts on both the vicinity of the proposed site and beyond.
- The EIA is unsatisfactory, given so many uncertainties in the form of the size of the project, the newness of technology that is expected to be used and the relatively unknown baseline conditions.
- The EIA, which looks very much like a polished project proposal, is biased.

The Environment Management Council advised the government that:

- The project should be rejected, and proper land-use plan and baseline studies should be carried out in the Rufiji basin in order to harmonise the various competing interests in the area.
- A moratorium should be declared on all commercial mariculture in Tanzania until the government establishes proper guidelines for the development of commercial aquaculture in the country.

- Large scale aquaculture should not be conducted in ecologically sensitive areas like mangroves.
- The letter of offer allocating part of Bwejuu Island to the AFC should be revoked, since this offer contravenes the National Policy (1995) and the Mafia Island Management Plan and legislated under the Marine Parks and Reserves Act No. 29 of 1994.

Against all these recommendations the government approved the project without consulting the National Environment Management Council. In whose needs was EIA carried out? That is the question.

### **LESSONS LEARNED**

- EIA can not have any meaning, unless there is a strong government commitment in a form of a policy and environmental law.
- Lack of awareness of the importance of avoiding unnecessary environmental degradation hampers the success of the EIA regime.
- As long as EIA remains the responsibility of the developer, objective EIA will take time to come by. This leaves a loophole for influencing the EIA in the proponent's favour. Using experts from abroad is not a solution; this is because the local experts know the local environment better and they are the ones who have to perform the monitoring. In these circumstances the use of foreign experts is not sustainable.
- Lack of harmonized institutional arrangement with a clear and properly co-ordinated flow of events guarantees a continued contradiction in approval processes.
- Financial institutions should not only be concerned with seeing EIA reports but should also be interested to ensure that the recommendations are implementable and that the local capacity to monitor the implementation is in place.
- Some funds, such as those of GEF, could be used to commission EIA initially to ensure an unbiased report.

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# Towards 'sustainable development' in the Southern African Development Community (SADC)

*Jane Kibbassa*

## ABSTRACT

Sustainable development has become one of the most popular concepts in the evolution of ideas about managing the environment. Most of the definitions for sustainable development basically refer to development activities that do not deplete non-renewable resources at a rate that jeopardizes the ability of future generations to meet their own needs.

Environmental Impact Assessment has been accepted globally as an effective decision making tool in the move towards sustainable development. However, unlike developed countries, most developing countries are still at the initial stages of establishing the Environmental Impact Assessment (EIA) process.

Based on apparent environmental degradation emanating from economic activities, the SADC Region is now proposing to harmonize the EIA process. The main objective of the proposal is to ensure that, within the region, equity issues are given the same weighting as economic and environmental issues in the decision making process. To emphasize this approach, the region has proposed the renaming of EIA to EIA3 which takes care of the three components to be considered equally in the decision-making process, namely; *Equity, Environment and Economic*.

Tanzania is among the SADC countries still fumbling with the EIA process in the absence of a comprehensive EIA policy, legislation, effective political commitment, adequate expertise and public awareness. This paper attempts to discuss pertinent issues that need to be addressed in the SADC member countries in order to facilitate harmonization of the EIA process regionally. Practical examples of recent experience in EIA in use will be drawn from Tanzania.

## INTRODUCTION

Tanzania has subscribed to the new Southern African Development Community (SADC) policy for sustainable development - 'towards equity-led growth and sustainable development in Southern Africa.' The gist of the policy is that the integration in all key policy sectors of Economic,

**See Topic10**

**UNEP EIA Training  
Resource Manual**

*Decision making*

Environmental and Equity Impact Assessments (EIA<sup>3</sup>) should improve decision-making.

It is envisaged that EIA<sup>3</sup> would compel decision-makers to assess and defend their choices in terms of economic, social and environmental sustainability (SADC-ELMS, 1996). In order to achieve its goals SADC is now proposing to establish a common charter for the EIA process.

This paper gives an account on the status of EIA process in Tanzania and the challenges for the implementation of the SADC policy. The discussion will mainly dwell on the following questions:

- Who should give final decisions on EIA reports (EIS) ?
- Ideally where should the institution responsible for EIA be located ?
- What should be the role of the EIA institution ?

### **NATURE AND SCOPE OF ISSUES**

Harmonization of the EIA process depends primarily upon the state of art in individual countries. Despite the official recognition and commitment to EIA as exhibited in various policies such as the National Conservation Strategy for Sustainable Development (NCSSD), National Environmental Action Plan (NEAP), National Environmental Policy and Forestry Policy and pledged by our leaders, Tanzania is yet to establish a comprehensive EIA system. The existing legislation and policies do not provide for the implementation of the EIA process.

#### *Institutional framework and legal deficiencies*

Various institutions are empowered by sectoral laws to propose and regulate development in their respective areas of responsibility. Moreover, legal deficiencies as regards institutional frameworks have to a certain extent continued to pose serious threats to the EIA process in Tanzania. Lack of an effective sectoral and institutional co-ordination at national level is a major weakness in the EIA process. There is no requirement for one institution to liaise with others and ensure that a project has fulfilled the requirements in other relevant sectors prior to issuing a permit. This tendency leads to inter-agency conflicts either through duplication in mandates or violation of sectoral laws.

#### *Lack of effective EIA co-ordination*

The cross-sectoral nature of environmental issues calls for coordinated and holistic approaches. The mechanism for coordination of assessment and registration of development projects and programmes at the national level is currently done through the Planning Commission, whereas registration of the private investment is undertaken by the Tanzania Investment Centre (TIC). Ideally TIC should, together with all other stakeholders, ensure that

all feasibility studies of new projects and major expansions include a component of environmental assessment. However, there are no effective linkages between the government and private sector on environmental management issues. There is no overall mechanism in place to provide adequate support and guidance to the government and private sector (*Financial Times*, 6-12 May 1998). The two bodies entrusted with the control of development projects do not have established criteria for impact assessment to guide the review and eventual project approval.

There is no single authorizing agency whose advice on technical matters is regarded as final and conclusive. At present there are ambiguities regarding who should issue an environmental approval or a permit upon which other licenses may be issued. Officially there is no recognized standard procedure and guidelines for conducting EIA. This implies that proponents are not formally bound to use the draft National Guidelines prepared by the National Environmental Management Council (NEMC). Although NEMC is an established body by Act No 19 of 1983 (the NEMC Act), its functions are essentially advisory on all matters related to the environment. The Act does not provide for regulatory and supervisory powers on environmental impact assessment.

#### *Inadequate public participation in the EIA process*

Lack of clear methodologies for ensuring participation of all stakeholders, especially local communities, is among the weaknesses of the EIA process in Tanzania. These weaknesses, however, are related to the socio-political system e.g. lack of effective environmental leadership, lack of openness and transparency, increasing political interference, minimal political will, lack of independent decision-making capabilities and general lack of environmental awareness.

The aforementioned issues show clearly that in Tanzania proponents are not officially bound to integrate environmental concerns in the early stages of project design. Consequently, most of the EIAs are conducted either voluntarily or due to pressure from financial institutions as a loan condition. This has contributed to a tendency for EIA studies to be carried out in a way that is tailor-made to suit the requirements of the commissioning body. As a result most of the EIA studies carried out so far are commissioned after the projects have been designed; they differ greatly in terms of content and quality.

### **PROCESS AND PROCEDURAL CONTEXT**

The state of art of the EIA process in Tanzania as indicated above poses a great challenge to the implementation of the SADC policy. In a practical sense, it is difficult to establish how the Government is committed to the principles of sustainable development. The National Environmental Policy, which was approved in December 1997, states that 'EIA shall be a

mandatory requirement to ensure that environmental concerns receive due and balanced consideration in reconciling urgent development needs and long term sustainability before a final decision is made.' Although this statement is a positive move towards EIA legislation and consequent implementation, the pace is rather slow.

#### *EIA procedure and guidelines*

Current changes in macro-economic policies in Tanzania have to a great extent promoted the rate of investment in the private sector. This is quite a change in comparison to the time when the Government was the sole investor in many areas such as agriculture, industries, infrastructure, etc. Thus, in order to guide private investments in a more sustainable way, development of EIA procedures and guidelines is more important now than before.

Tanzania is yet to enact a comprehensive environmental law with a requirement for EIA properly elaborated, and setting out clearly the guidelines, procedures and arrangements for institutional mandates and stakeholder participation. Cognisant of the need for an authorized EIA procedure and guidelines, NEMC has prepared draft national guidelines which are awaiting approval from the government (NEMC, 1997). One of the key requirements of the guidelines is that, prior to undertaking an EIA study, a proponent must submit a draft Terms of Reference identifying all stakeholders and key environmental issues. The terms of reference which in essence guides the EIA study would be reviewed by NEMC in collaboration with a cross-sectoral Technical Review Team to ensure involvement of all stakeholders.

Lack of official guidelines as well as a legal requirement to conduct EIA has been a major cause of EIAs being undertaken in a haphazard way. For example, it has been revealed that the Tanzania Investment Centre (TIC) had registered 1025 projects valued at US\$ 3.2 billion; however, there are no reports to establish that these investments were subjected to EIA (*The Guardian*, 1998). According to a study carried out on EIAs (Mwalyosi and Hughes, 1997), there is no documented list of EIAs so far undertaken in Tanzania. The study further identified over 40 documents that were purported to be environmental impact assessments, but only 26 were found to be genuine EIAs. These cases indicate that EIA at the national level has not been adequately adopted (NEMC, Newsletter, 1999).

#### *EIA practitioners and the quality of EIA reports*

Due to the absence of official procedures, there is no formal mechanism to ensure that EIA practitioners (consultants) have the required expertise. A study by the Institute of Resource Assessment (1997) on EIA competency has indicated that 69 per cent of organizations involved in EIA lack specific expertise. On the other hand, for the qualified organizations, only 20 per

cent of the experts had been involved in the EIA process. This indicates that the qualities of most EIA studies conducted are inadequate as a basis for informed decision making.

## APPROACHES TAKEN

### *Decision making process*

Throughout the SADC region the policies and programmes for economic reform, social progress and environmental improvement are very much separated. Essentially, these key development efforts must be increasingly integrated as a 'single agenda and strategy' for sustainable development.

The new SADC policy is an attempt to achieve this integration. In order to anchor and reinforce the new policy in the development agenda, SADC countries must incorporate impact assessment as an integrated part of decision making in at least three key respects:

- assessing the likely 'environmental' impacts of economic policies and activities;
- assessing the likely 'economic' impact of the environmental policy and measures; and
- assessing the likely 'equity impacts' of both economic and environmental policies.

The new SADC Environmental Policy is basically trying to advocate that development strategies that fail to improve the lives and livelihood of the poor majority are not socially or politically sustainable.

*If an EIA review of a proposed policy or programme indicates that it will not lead to at least some improvement in the living conditions and prospects of the majority, then a sustainable alternative must be found that does' (SADC-ELMS, 1996).*

With the current situation of the EIA process in Tanzania it is not clearly established as to who should give a final decision when it comes to approving a project. In fact the first project which unveiled the weaknesses in the decision-making process in Tanzania was the Prawn Farming Project in the Rufiji Delta. The most striking part is the fact that decision-makers preferred the proponent's EIS though it was found to be very inadequate by the technical review team.

In the course of reviewing the proponent's EIS prior to approving the project, the review team saw a necessity of visiting the site to ascertain facts presented in the EIS. The exercise enabled the review team to identify a number of negative impacts not only on the local communities but also on the already existing activities in the Delta. Thus, the Government was advised to reject the project. Alternatively, NEMC advised the Government

to carry out a detailed baseline study so as to explore more viable options for the Delta, and to prepare a holistic land use plan to harmonise the various development activities in the delta (NEMC Report, 1997).

#### *Public involvement in the decision making process*

Participation of the public in decisions affecting their livelihood can only be achieved by making people aware and involving them during the early stages of project proposals. The prawn farming project approach was basically top down. Residents of the Delta were involved in the project at a very advanced stage when the site had been determined and the project design completed. The same applies for the EIA study that seems to have been commissioned merely to document the project location and its purported economic returns. This can be judged from the EIS that lacks costs and benefits analysis as well as alternatives in terms of site, design and technology.

#### *Review of the prawn farming EIS*

The review process included a workshop and public hearing meeting involving a number of interested parties as well as the Government. The forums were meant to seek opinions from both experts and general public. Views expressed by people from the Delta were focused on opposing the project. Their argument was that apart from endangering the environment, the project would be a hindrance to the socioeconomic development of the area.

The experts warned that the project had far-reaching implications on the livelihood of the villagers as well as on legally approved activities in the Delta. The decision also contravenes a number of international conventions that Tanzania has assented to. As for domestic laws the decision contravenes a number of sectoral laws *inter alia* the Marine Parks and Reserves Act No.29 of 1991 that gives protection to Mafia Island Marine Park; protection of the Mangrove Forest under the Forestry Ordinance Cap. 381, etc.

Lack of awareness of the long-term implications of the project among the communities and the leaders contributed to the formation of two groups with contradictory opinions. The contradiction was centered around the envisaged financial perspectives of the project. Looking at short-term benefits the project may appear to be beneficial to the Rufiji area which in comparison to other parts of the country is relatively undeveloped (*JET News*, March, 1999). Nevertheless, one would have expected the Government to guard its poor majority against projects that will in the long run make them worse off.

Despite opposing arguments from the experts, Rufiji Delta communities and other interested and affected stakeholders, the Government approved the project. *The Family Mirror* (August, 1998) argued that the project was approved by the Cabinet without debate ostensibly because most Ministers

knew very little about prawn farming. One would have expected the Cabinet to consult experts to explain the intricacies of the project before approving it.

In the mean time, it has been revealed that the proponent has yet to be issued with a Tanzania Investment Centre (TIC) certificate of incentives for the envisaged US\$ 180 million project in the Rufiji Delta (*Family Mirror*, 1998). According to TIC, the proponent has to meet certain requirements before getting the certificate, this includes a Title Deed and Environmental Permit from NEMC.

## RESULTS AND IMPLICATIONS

The villagers are now seeking an injunction to prevent the proponent from undertaking the prawn project in the Delta. Two thousand villagers have taken both the Government and AFC to court stating that they are dissatisfied with the decision that will displace them from their villages and deny them access to the natural resources.

Notwithstanding the outcry from the Delta people, experts and other affected stakeholders, the Government stands firm on its decision. According to a report by one daily newspaper, the Minister for Natural Resources and Tourism affirmed that the Cabinet decision on the Prawn Project in the Delta was final. 'All that was required were remedial measures to take care of any environmental risks as certain people have cautioned' (*The Guardian*, 1998). A monitoring team has been formed to prepare a monitoring programme that will ensure that the negative impacts from the project area minimized

Contradictory statements given by the Government leaders regarding the prawn farming project revealed that the Government lacks a clear vision of the whole question of development. It also became apparent that Government commitments to the principles of sustainable development are highly dependent on a strong political will. Therefore, there is a need for the Government to show, in a transparent way, its practical commitment to development activities.

The prawn project was handled in a manner that revealed previous perceptions that politicians regard EIA as a stumbling block in the path of economic development. Moreover this indicates a lack of awareness among our leaders on the value of natural resources and their inability to recognize the use of technical advice. Our politicians overlook the fact that confidence in technical information is an important parameter for guiding an informed decision-making process (*The Guardian*, April 7 1998). The fact however remains that EIA is a tool for development planning as it ensures that potential problems are foreseen and addressed.

## CONCLUSION

In short, the experience of current practice shows that EIA in Tanzania is being used passively as a rubber stamp. A more active role for EIA is envisaged where proposals should be turned down if they reveal environment effects that cannot be mitigated. The challenge ahead is to encourage economic activities that are environmentally friendly while discouraging those practices which are not. Under such circumstances conditional approval may be issued in which projects must satisfy certain conditions in order to gain approval. This will make EIA a more effective tool in the decision making process towards achievement of sustainable development.

## LESSONS LEARNED

### *Institutionalisation of EIA*

Tanzania needs to recognize that the cross- sectoral nature of environmental issues calls for coordinated and holistic approaches. Therefore, there is an urgent need to institutionalize the EIA process by ensuring that:

- a formal EIA system is in place and is backed by law to ensure that all development proposals, plans, policies and agreements are sufficiently screened prior to their implementation and execution;
- existing sectoral procedures and guidelines are harmonized within the frameworks of national EIA procedures guidelines;
- appropriate Terms of Reference (ToR) for EIA studies are produced and approved prior to undertaking investigations;
- roles and mandates of EIA institutions are clearly stipulated to avoid sectoral conflicts;
- EIS reviews are geared to evaluating adequacy of the information for decision making; and
- EIA practitioners are capable of clearly linking the implications of project activities on the biophysical and socioeconomic environment; most of the time alternatives are not provided and there is a lack of analysis of the costs and benefits of each alternative. As a result the outcome of EIA studies have been nothing more than encyclopedic documentation containing basic scientific inventories.

### *Informed decision making*

In order to fulfil its commitment to the principle of sustainable development Tanzania needs to strengthen analytical decision making. The following issues are important:

- there is a need to support and strengthen the technical capabilities of the EIA institution;
- decision makers should be well informed and rely primarily on technical opinion prior to approving a project;
- holistic land use plans should be established as a strategy for all development plans;
- there should be criteria to guide the decision making process as well as stipulating relevant Government levels to be involved at project level; and
- there should be a mechanism to ensure public involvement from initial stages of project proposals up to the decision-making stage.

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**Key words**

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## Environmental auditing: the case of Ecuadorian industry

*Carlos Páez*

*The opinions stated in this document are the exclusive responsibility of the author and do not necessarily reflect the official opinion of the participant and funding organizations. Due to a confidentiality agreement signed between participant organizations and consultants, the names of audited companies have not been revealed.*

### ABSTRACT

As part of the Programme of Competitiveness, the Ecuadorian Chamber of Industry included the Competitiveness and Environment Project, with the objective of assessing the environmental issues of industrial activity and recommending policies and action plans for improving its management and performance. An auditing process was performed, focusing on three basic aspects:

- knowledge of, and conformance with, environmental regulations;
- environmental impacts definition; and
- environmental management.

During March and April of 1998, fifteen cases were studied in the three most industrialized cities of Ecuador: Quito, Guayaquil, and Cuenca. These industries, which adhered voluntarily to the project, are of different sizes and dedicated to a variety of production fields. The results show a high heterogeneity in the magnitude and intensity of their environmental impacts; however, the most critical aspect was related to wastewater discharges, where most prevention or control action has been taken. Additionally, it can be determined that environmental management is still a practice not adopted by the industrial sector in Ecuador.

### INTRODUCTION

In January of 1998, the Ecuadorian Ministry of International Trade delegated to the National Federation of Industry's Chambers the responsibility for developing a programme designed to formulate a strategy for competitiveness within Ecuadorian industry as well as in the framework of global economy and the open market. One of the components of the programme was the Competitiveness and Environment Project, to identifying current conditions and opportunities for implementing

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environmental management practices within Ecuadorian industry. This Project had the financial support of the Embassy of the Netherlands and was developed between February and May of 1998. An independent multidisciplinary team was formed to perform the tasks involved in the Project.

This report summarizes the main findings of the Project, as well as the background context, the procedures and approaches taken, and the perspectives derived from this experience.

### **NATURE AND SCOPE OF ISSUES**

Environmental degradation due to industrial pollution has been recognized as one of the main problems presently confronting Ecuador. In fact, national and local governments have been trying to create new alternatives for introducing environmental responsibility in the industrial sector, without compromising its growth.

At present there are environmental laws and regulations for controlling industrial air emissions, water discharges, toxic solid waste generation and disposal, and noise levels for new and existing facilities, and also mandatory environmental impact assessment studies prior to new developments. However, despite the fact that those legal requirements have been in place for at least ten years, results are very poor and only quite a small group of enterprises have implemented environmental protection practices in their operations.

There are many different causes for this state of affairs. These can be summarized as:

- Inadequacy of the legal framework, since this basically is a transposition of other countries' laws.
- Political and technical weakness of national and local agencies in enforcing environmental regulations.
- Few developments or little experience in environmental engineering, especially in the field of industrial pollution control.
- Lack of sensibility of the industrial sector to environmental issues.
- Limited knowledge in the industrial sector about modern environmental management tools, such as pollution prevention techniques and environmental management systems.

On the other hand, these last ten years have seen the growth of public awareness about environmental degradation, which has meant an increase in the pressure from ecological and citizens' organizations for more stringent

control by authorities of pollutant activities, especially in the most industrialized cities.

As a response to that new movement, the Ecuadorian industrial sector has developed a strategic plan with the objective of promoting clean production and environmental consciousness among its members and the whole society. Additionally, government agencies, the scientific community, NGOs, and the industrial sector itself are interested in both reforming current environmental laws for incorporating more realistic performance standards on the basis of local conditions, and implementing modern tools of environmental management in industry, including economic incentives and managerial practices. Unfortunately, the outlook does not seem optimistic, as other more critical factors have forced environmental concerns to take second place to emphasis on economic survival.

## **PROCESS AND PROCEDURAL CONTEXT**

The focus of the Competitiveness and Environment Project was an environmental audit of a number of industries, with the purpose of determining the level of implementation of environmental management practices and the most important environmental impacts derived from their activities. The established process was as follows:

### *Selection of participant industries*

Representatives of the industrial sector and the Director of the Programme selected fifteen industries which had responded to an open invitation formulated by the Programme. That participation was voluntary and a confidentiality agreement was signed between the industries and the consultants. These industries are located in the Quito, Guayaquil, and Cuenca influence areas and are of different sizes and activities (meat products, food processing, wood products, pulp and paper, plastic products, dyes and paints fabrication, clay products, metallic products, flower and rice plantations, and animal food production). The selection criteria took into account the need to have diversity among participants and the willingness of industries to allow and facilitate auditing.

### *Formation of auditing team*

A multidisciplinary team of economists and environmental engineers, with experience in environmental impact assessment was assembled. Additionally, laboratories were selected for sampling analysis of air emissions and water discharges.

### *Definition of an auditing procedure*

Due to the objectives of the Programme, three basic aspects were established as targets to be evaluated:

- environmental regulations knowledge and conformance;

- environmental impacts; and,
- environmental management practices.

The team defined the auditing protocols for the initial interview, site inspection, and sampling of air emissions and wastewater effluents.

#### *Performing the environmental audits*

Audits were performed in March and April of 1998. They were undertaken with a manager from each of the selected firms. Audits consisted of an initial interview to explain the scope of the exercise and collect background environmental information, a site inspection of the facility, and a sampling activity of air emissions and wastewater effluents and measurement of noise levels, where appropriate. The interview and inspection were performed the same day. Sampling was done according to plant operation schedules.

#### *Individual reports preparation*

Audits were reported in individual files addressed to the top management of the participant organizations. Those reports contained not only the results and findings of the audit, according to the established protocols, but also some recommendations for improving environmental management and control practices in that industry.

#### *General report preparation*

The audit team also prepared a final report where general conclusions and recommendations are summarized. The structure of that report was according to the targets mentioned above and also describes the procedures and methodologies used in the Project.

#### *Workshops for discussion of the reports*

As a final part of the Project, three workshops, one in each city, were organized to discuss the general results. Besides industrial representatives, there were invited members of the national (Ministry of Environment and National Agency of Planning) and local governments (Municipalities of Quito, Guayaquil, and Cuenca), financial institutions (National Financial Corporation), and NGOs related to the project activities. The lectures at the workshops are published and available to the public.

### **APPROACHES TAKEN**

#### *Environmental regulations, knowledge and conformance*

During interviews, the auditing team evaluated knowledge of both the existence and the most important requirements included in national, local, and special environmental regulations related to specific activities (i.e. pesticides use or hazardous materials handling). A grade scale was defined

as follows: (A) complete knowledge; (B) partial knowledge; and (C) poor knowledge.

For grading the level of conformity, proof such as independent characterization analysis and/or official certifications was required. The categories used were: (A) conforming with most of the requirements; (B) conforming with some requirements; and (C) no conformance at all.

#### *Environmental impacts*

A cause-effect matrix was used for assessing environmental impacts, in order to identify which activities have the most critical effects on the environment, and also, the elements of the environment most affected by those activities. The basis for this determination was the results of laboratory analysis and in situ measurements which were contrasted with the limits and other requirements established in current national laws.

Since the audited facilities were located in urban areas, biotic elements of the environment were not considered. Rather, physical environment (water, air, and soil quality), as well as workers safety and community disturbances, was the main focus of the assessment.

Interactions were identified and graded in a numerical scale with a maximum of 100 points for the most critical impact. That numerical value was an aggregate of several parameters: intensity, extension, occurrence, persistence, reversibility, synergy, accumulative effects, relationship cause-effect, periodicity, and mitigation. Each of those parameters had its own categories with specific numerical scales.

After this exercise, impacts were grouped in three categories: (A) low impact (from 0 to 33 points); (B) medium impact (from 34 to 66); and (C) high impact (from 67 to 100).

#### *Environmental management practices*

A set of 15 aspects was evaluated in order to determine the level of integration of environmental management practices inside the participant organizations. Those aspects are related to the requirements of the ISO 14001 standard for environmental management systems, although they are not strictly the same. The aspects evaluated were:

- priority of environmental issues for the organization;
- integration of environmental practices into general practices of the organization;
- willingness to improve its environmental management;
- definition of an environmental policy;
- awareness of environmental impacts derived from its activities;
- definition of environmental objectives and goals;

- definition of an organizational structure and responsibilities associated with an environmental management programme;
- training programmes on environmental issues;
- consumers advice about products and services;
- definition of environmental requirements for subcontractors and suppliers;
- information to neighbourhood communities about environmental impacts and risks associated with its activities;
- implementations of process changes (pollution prevention or control measures) due to improve environmental performance;
- emergency preparedness;
- monitoring programmes and protocols; and
- Environmental documentation and records control.

Each aspect was graded from 1 (no action taken, poor condition, etc.) to 5 (actions has been evaluated and maintained desired condition, etc.). A final aggregate figure, in percentage, was assigned for every industry.

## **RESULTS AND IMPLICATIONS**

The most important results obtained from the Project are briefly presented below:

- There is partial knowledge about environmental law among participant industries. Most of them know of the existence of national and local regulations, but very few were aware of the contents or the requirements that those regulations imply. Besides, the understanding of the scope and purpose of those requirements was still confusing for the industrial sector.
- Most of the studied cases may be categorized in the B group, that is, conformance with some requirements. There were, however, a couple of industries with a very good environmental performance. In general, much more attention has been paid to wastewater discharges than to air emissions or other sources of pollution.
- Due to the size of the audited organizations, most of the environmental impacts were identified as low or medium. In order of importance, the main problems detected by the auditing were: discharges of untreated wastewater effluents, excessive levels of noise inside the facilities, lack of training about handling of hazardous materials, uncontrolled air emissions, and solid waste generation and disposal.
- Environmental management practices are still uncommon inside

participant industries. Most of the evaluated aspects were graded with 1 or 2, which indicates that some action has been taken in response to environmental issues. In the cases of Quito and Cuenca, where the local governments have had a more active role in environmental control, with more adequate local regulations, the average grading of the industries was higher than in Guayaquil which was characterized by a weak control. Finally, it is important to point out that all of the organizations showed a willingness to improve their environmental management practices.

### LESSONS LEARNED

This project constituted one of the few in our country related to environmental management in the industrial sector and the results show the necessity of new efforts oriented to promote good practices in pollution prevention inside the Ecuadorian industry. In that perspective, it would be important to consider the following conclusions:

- The mere fact of having a law does not imply a better level of environmental performance. It is necessary to promote that regulation among involved parties, discuss its scope and purpose, and, in the main strengthen agencies in charge of its enforcement.
- There is a serious lack of information in the industrial sector about modern tools for environmental management, and this is one of the main causes for poor environmental performance. Therefore, to create a new environmental consciousness, based on an integrated management of the environmental issues, seems to be a priority for that sector.

### LIST OF RELEVANT PUBLISHED PAPERS AND OTHER SOURCE MATERIAL

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## Social impact assessment: an interactive and participatory approach

*E A Akpofure & M Ojile*

### ABSTRACT

Current policy shifts world wide are tending towards eliminating or minimizing the continuing trends of environmental degradation. Realizing the urgent need to reconcile industry and community interests in the Delta of Nigeria which had, and continues to witness, some tensions and volatile outbursts, and to ensure that development is managed so that it is both sustainable and hence contributes to industrial and community stability, development projects can only go ahead after mandatory Environmental Assessment (EA) studies of such proposed projects.

Consideration of the social impact of project development generally – let alone of oil industry development specifically – was until comparatively recently an adjunct of EIAs. It would appear to be very much so even today in Nigeria, where more emphasis continues to be placed on the biophysical environment. Nonetheless, social impact analysis is gaining ground and momentum. But even then it poses special problems which make it far more than a methodological shadow of EIA. Social Impact Assessment (SIA) represents a novel and far more complex domain.

Social Impact Assessment (SIA) studies of three different projects in three varied socio-cultural zones of the Niger Delta have yielded better socioeconomic results, utilizing the ‘participatory assessment’ methodology alongside questionnaire surveys. This way, it has been possible to assess community needs and expectations, identify priorities for development activities and successfully implement project execution strategies.

### INTRODUCTION

A human action such as oil exploration activities (mining) simultaneously affects both the natural and the social environment, not only displacing plants and polluting water but creating jobs and relocating people. Clearly a comprehensive assessment of mining impacts would have to consider both ecological and social effects, and the higher order cumulative effects that result from their interaction (Westman, 1985).

Yet when, in the late 1980s, environmental impact assessment studies were first being conducted, these were limited to the webwork of effects on the

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natural environment. It took a series of communal clashes, violence and the destruction of oil & gas pipelines and installations, on the platform of fights for territoriality and compensation, for the scope of impact studies to be gradually broadened to encompass a range of social and economic concerns.

Examination of the full social and ecological impacts of a proposed action requires a 'holistic' approach, in the sense that examination of the effects on natural and social systems separately will not reveal the full scope of interactive effects. Hence the generic term or approach 'integrated impact assessment' has long been proposed for the study of the full range of ecological and social consequences of the introduction of a new technology, project, or programme.

Be that as it may, the special skills required for an assessment of ecological impacts derive from a distinct, though overlapping, set of disciplines from those required for social impact assessment. And because the consideration of the social impact of project development generally – and of oil industry development on which most developing countries like Nigeria depend – was until comparatively recently an adjunct of EIAs, the methods and techniques for effective and efficient study have tended to be less developed and understood. SIA we must acknowledge poses special problems which make it far more than a methodological shadow of EIA. SIA represents a novel and far more complex domain beyond that often applied to the assessment of the bio-geophysical environment.

Over six million people live in the 70 000km<sup>2</sup> Niger Delta where most of Nigeria's oil is produced, providing some 80 per cent of the federal government's revenue. Exploration and production of this oil necessarily brings many of the oil companies into contact with more than 12 major ethnic groups divided into about 800 communities. These communities increasingly feel disadvantaged by a deteriorating economy, lack of job prospects, limited amenities and general development, environmental degradation and a very complex political situation.

Consideration of social impact assessment within the integrated impact assessment framework is even more complex when placed against the multi-socio-cultural-cum-political background of a developing country such as Nigeria. To ensure that development is managed so that it is both sustainable and contributes to industrial and community stability, major policy shifts have favoured the proper assessment and understanding of community interests.

It is against the foregoing background that social impact assessments have to utilize 'interactive and participatory methodology' to achieve better socio-economic results. This way, it is possible to assess communities' needs and expectations, identifying priorities for development activities and successfully executing effective project strategies.

## NATURE AND SCOPE OF ISSUES

The Niger Delta of Nigeria is the richest part of the country in terms of natural resource endowment. Ironically, in spite of the Delta's endowment, its immense potential for economic growth and sustainable development, the region is, and continues to remain, in a parlous state; it is under increasing threat from rapidly deteriorating economic conditions and social tensions which have remained largely unaddressed by current and past policies as well as behaviour patterns. The degree of disaffection which the lack of development in the resource-endowed areas has generated has reached palpable heights.

By nature of its resource endowment, the major industrial activity to be found in the Niger Delta is oil related. Therefore, projects requiring environmental assessments are mainly field developments, flowstations, pipelines and flowline network installations, drilling activity etc. While the environmental assessments of these oil related activities are of recent development, their main focus until of late was basically the impact on the natural environment, with little or no regard to the communities within the immediate vicinities of these projects.

In any case, the wave of environmental awareness which has swept through the area, skewed towards oil pollution, has tended to generate very high feeling with, very often, some political undertones. While environmental assessment has become a major policy issue, the social conflicts which now frame an effective assessment include, but are not limited to, the obnoxious Landuse Act of 1978 which deprived or rendered communities landless in terms of economic rent, environmental degradation in the form of oil pollution and the attendant monetary compensations accruing from these.

Against the sociopolitical-cum-economic backgrounds of the Niger Delta, the imperative for effective social impact assessments within the framework of EIA cannot be overstressed. A well conducted SIA must find answers to communities' social well being by actively engaging the people for whom such assessments would benefit.

Perhaps in an attempt to forestall further environmental degradation in the resource-rich Niger Delta in particular and in the general Nigerian environment, an Environmental Policy was enacted. It is not as if the statutory framework for environmental protection did not exist in the country before 1988 when the regulatory framework was established with the all-encompassing empowering status. An overview of the existing Environmental Protection Laws in Nigeria will show that pre-1988 laws abound in many fragmented forms. Although most of these laws are not strictly environmental protection laws, they contain provisions which have a bearing on the preservation of the environment. However, 1988 marked a watershed with the enactment of Decrees 42 and 58, regulating harmful wastes management and establishing the Federal Environmental Protection Agency (FEPA) respectively. Several policies and laws followed

subsequently: these include in 1991 effluent limitation and pollution abatement in industries and facilities generating wastes, and Decree No. 86 of 1992 setting the framework for Environmental Assessment (EIA) as mandatory.

The FEPA EIA Decree No. 86 of 1992 made the preparation of Environmental Impact Assessments mandatory for all industry planning new projects. This involves the assessment of socioeconomic/ecological status of the project area and production of a report.

While SIA tries to find answers to the community's social well being within the framework of EIA studies, one other law is in place which severely limits its effectiveness; the Landuse Act of 1978. The most comprehensive piece of legislation ever enacted in Nigeria on land issues, it divested individuals or communities of different forms of land ownership and tenureship which existed before its enactment. This is an obnoxious law which negates communal territorial right to land, and hence adds to the tension in the Niger Delta environment.

#### **THE STATUTORY AND INSTITUTIONAL FRAMEWORK FOR ENVIRONMENTAL ASSESSMENT IN NIGERIA.**

An overview of the existing environmental protection laws in Nigeria indicate that the laws can be classified into two distinct areas: pre-1988 and the laws enacted since 1988. These laws contain specific provisions that prohibit certain activities or conduct which are detrimental to the wholesomeness and safety of the environment and impose varying sanctions for violations and non-compliance with the pertinent provisions of the respective laws.

Promulgated under the auspices of the Federal Environmental Protection Agency (the national regulatory body), the EIA Decree requires the preparation of Environmental Impact Assessments by industry undertaking new projects, in order to mitigate and ameliorate the potential adverse environmental impacts of the project activities. This too involves the assessment of socioeconomic/ecological status of the project area and the production of a report.

By the same token, the petroleum industry in particular, whose activities are concentrated in the Niger Delta, although under the same regulatory framework, is supervised directly by the Department of Petroleum Resources (DPR) of the Petroleum Ministry. The DPR 1991 Environmental Guidelines and Standards for the Petroleum Industries in Nigeria, provide detailed statutory requirements to which the oil and gas industry is supposed to adhere. Part VIII, Section A (Environmental Impact Assessment Process), Articles 1.3 and 1.6 require that EIA study be conducted before E & P operations in order to protect and prudently enhance the environmental resources for a better environment for man. Article 1.4 gives the applicable

regulations and makes the preparation of an EIA report mandatory. It is against the above statutory background and institutional framework, and the necessity to comply with the environmental laws as well as operate within the principles of sustainable development, that the EIA tool is applied by many of the E & P companies who plan new development projects.

The DPR's environmental guidelines and standards have standardized environmental abatement procedures under which the EIA process is expressly stated. As one of two tools being used to protect and preserve the Niger Delta's and Nigeria's ecosystems – the other being an Environmental Evaluation (post-impact) Report (EER) – the Environmental Impact Assessment process and Report is being vigorously pursued and implemented in Nigeria.

The systematic process to be followed in preparing the report starts with a project proponent/operator determining the preliminary assessment of impacts through a screening process before an initial report is submitted to DPR. It is only when significant impacts are identified for a project or activity that full EIA studies and report preparation is commissioned. Draft EIA reports are expected to be accepted by the regulators within 21 days. And such studies and reports are supposed to be handled by persons or parties who possess a certificate of eligibility issued by the regulators themselves. EIA reviewers are expected to be competent individuals.

The EIA process and procedure do not however end with the DPR institution (i.e. oil industry and related EIAs). The national body is also a powerful regulator and it alone has authority to present all EIAs to the public for hearings and comments. Public presentations of EIAs are usually implemented by displaying such reports in designated centres/zonal offices for a period also of 21 days for the public to make reviews and offer comments on any aspect of the EIA report. Comments of significance are to be incorporated in final EISs (Environmental Impact Statements).

The DPR documents, Environmental Guidance Standards (EGS) mentioned earlier, have provisions for procedures to be followed in collecting and analyzing samples and regulating parameters of interest. Unfortunately there are no comparable guidelines for socioeconomic (social impact assessment) studies.

By necessity, social impact assessments are conducted simultaneously with EIAs. However, few companies have determined explicit guidelines for conducting SIAs, and as a result the majority of industry social assessments provide only a limited description of potential impacts and the range of alternative management practices available to a company. While it is widely acknowledged today that 'social analysis' must be an integral part of integrated project planning, the process of devising appropriate techniques for social analysis is still ongoing, although the SIA Guidelines/Manual of

the SIEP released in 1996 tries to streamline methodologies for conducting SIAs in the oil and gas industries.

While some of the lessons of EIA are applicable, others are not, and SIA in particular represents a novel and far more complex domain. Specifically, while SIA must be concerned with the potential consequences of a project for a given human population and its way of life, it is necessarily concerned as much with the possible implications of that social environment for the success of the project itself. For unlike the natural landscape, human behaviour does not conform to simple rules (Ross, 1994).

### **ASSESSMENT METHODS AND APPROACHES**

Environmental systems are functionally and structurally complex. This is especially true of deltas which integrate land and water systems. Not only is the Niger Delta complex but, as numerous researchers have pointed out, it is not well understood (Bourn, 1992). More importantly, the intricate social systems of the hundreds of riverine communities are equally poorly known. General policies that ignore complex details, while often appropriate at the central planning levels, should by necessity be adapted to local conditions before implementation (Ascher, 1990). By implication, it can be pointed out that ignoring this complexity, policies are frequently poorly matched to the communities and ecosystems they are intended to benefit or modify. A cascade of unanticipated side effects usually result.

On a project level, social and environmental impact assessments can provide the necessary information to maximize the net benefits from policy decisions. Social impact assessments within the general framework of environmental assessments of E & P operations, if properly conducted, are expected, to become necessary for ensuring that activities in the Delta consider the complex interrelationships that constitute the Niger Delta.

### **THE INTERACTIVE AND PARTICIPATORY APPROACH TO SIA STUDIES:**

#### **The Niger Delta examples**

Two field development plans/projects of oil and gas were planned in two different ecological zones but essentially the same social cultural setting of present day Bayelsa State in the Niger Delta. The third case study involved a seismic lines rehabilitation/revegetation project, again in a very volatile sector of Delta State. The economy of the study areas is mainly agrarian, with farming as the occupation of over 75 per cent of the population and a third involved in subsistent fishing. Personal incomes, however, are very low in all of the study communities with a population of over 6000 people; over 50 per cent earn less than N25,000 (US\$300) annually. At the other FDP, communities nearby earn even less; slightly over 21 per cent earn anything over N24,000 (US\$282).

In one of the three case studies which involved seismic lines revegetation, the project schedule unfortunately coincided with a time when there were serious communal clashes.

Armed personnel were of necessity strategically located in the most visible and larger communities. However, socioeconomic data gathering was seriously hampered as tempers were hot and strangers were looked at suspiciously. The level of aggression was so high that in one of the communities consultants were almost lynched, being mistaken for an enemy.

Against the above background, representative communities and people were selected. Instead of the more generally accepted method of questionnaire surveys aided by video and photographic coverage, the interactive approach alone was used and a selected group of community representatives were contacted and information sought. Consultants were warned that they should not even walk around communities, and should not become involved in household interaction.

Realizing the logistical problems imposed by the terrain, poor information and education and the very high sensitivity of the people occasioned by the feelings of long years of neglect, strategies were planned so as to take advantage of the knowledge at hand.

Since the integration of social impact assessments in environmental assessment, project developers have come to realize that an SIA properly executed could be a strong and powerful PR strategy for soft entry/landing into the project sites. While SIAs are conducted simultaneously with EIAs, the EIA practice would be to send the SIA consultants in advance so as to soften the mood of the locals before others could come in.

The SIA process includes the following steps:

- A reconnaissance survey of the project area is initiated, using the project developers' representative/supervisor, a community liaison officer in charge of the area (CLO), the EIA team leader and the SIA consultant. At such visits, all settlements, permanent and temporary (camps) within the project area are identified.
- The traditional/cultural hierarchy is also identified and a formal request for a community forum comprising the elders, chiefs, youth and women leaders, as well as other opinion formers, is initiated for a scheduled date and time.
- Recognizing the socio-cultural heritage of the people of the Niger Delta where kola nuts and drinks are a traditional part of such occasions, adequate provision for these is made at the community's scheduled meeting.

- At the meeting, community representatives are given details of the proposed project and study, citing the necessary statutory backing. While the SIA consultant acts both as company's PRO and community/socio-economics studies consultant, a community's spokesperson is at hand to interpret all that is said.
- While permission for work is being sought, peaceful coexistence and cooperation is solicited.
- At these meetings, knotty issues such as number of workers to be employed from the community, the wages to be paid etc. are reconciled. This also includes the community development/assistance project(s) to be embarked upon by contractors or major client depending on the magnitude of the project proposed. At this stage of the SIA study however, the main tools are the video and photographic cameras which are used for documentation.
- It is only after permission is granted by the community that the SIA enters its second stage. Here interviewing and questionnaire survey methods are employed to gather the necessary information. Utilizing traditional knowledge, groups of members of the community who have been identified to be knowledgeable enough about the community's affairs are regarded as the key informants. At less formal group discussions group opinions are tapped to enrich the SIA objectives.
- Questionnaire surveys are also undertaken as the last tier of the SIA information gathering hierarchy process. Well structured open ended and closed ended questionnaires are administered to households, assisted by well trained/instructed personnel from outside and within the communities. The major drawbacks of this technique in the field are logistical (transport) and socio-cultural problems. Communities which are not contiguous are difficult to reach while people were suspicious of personnel and questionnaires. Above everything else, the low level of educational awareness compounds the situation. However, attempts are made to conduct the surveys in the most comfortable manner, choosing a representative fraction/sample which ensures that the views of important categories of the population are gathered, especially those relating to household data. Individual responses reflecting knowledge and attitudes towards the proposed projects and their impacts, including how they feel, and how the perceived negative impacts associated with the project should be handled are collected.

## RESULTS AND IMPLICATIONS

Educational attainment of the inhabitants is usually less than encouraging. At Okoroba community, for example 31 per cent of the people had no formal education, over 40 per cent primary education and about 24 per cent had attained secondary education. At Diebu FDP however, with over five main communities spread within 25 km of the project site, 40 per cent of the people had attained primary school education, and about 34 per cent secondary, with some 20 per cent having no formal educational training. Against the foregoing background, one can conclude that unless a proper and much more interactive participatory approach is undertaken, attempts to improve community participation in development activities are easily hampered by poor information and education. Participation quickly becomes limited to the most articulate and well connected individuals. The divide and rule tactics or attitudes of most project developers (and especially the oil companies in the Niger Delta) have tended to increase friction between them and the rural people.

All too often, environmental surveys/assessments get trapped in the mechanical acquisition and calibration of data because they lack a clear focus on the social meaning of the exercise and a sense of its political context. Concern for people and their fate which ought to form the chief interest of all technical endeavours unfortunately is relegated to the background. In its place diagrams and equations are elevated.

Rising indignation and social unrest/tension engendered by the realization of continuing neglect in the face of abundant resources by the rural people in most part of the world, and the Niger Delta of Nigeria in particular, has brought to the fore the necessity for detailed community/socioeconomic understanding within the general framework of environmental assessments.

Sustainable development, as it is being espoused, encompasses all social, economic and political activities aimed at improving the quality of human life within the self regenerative capacity of the supporting ecological system. It implies community control over the natural resources of the community. This much the local people are clamouring for.

It is in the understanding of the above requirements that the participatory and interactive approach was considered most appropriate in the social impact assessment studies of E & P field development plans/projects and other related activities. The results obtained were very satisfactory and statistically appropriate for the projects needs.

In the first place, an understanding of the social and natural environment was established. With full interaction and participation of the community's members, all interests were seen to be respected, and differing shades of opinion were sifted for better data collection, analysis and policy consideration.

It was also discovered that when communities are actively involved in the data gathering, interpretation and subsequent usage, an openness is displayed, better quality information is obtained and minimum time is expended in the process. The confidence placed in those chosen for group discussion and considered repositories of local knowledge bolstered morale and locals are always very ready to make available any information on hand. Unlike most assessments based on literature and conjecture, quality data based on facts are easily gathered and informed analyses carried out.

Aware of the documentation process (video and photographic coverage), community members are more careful about the truth since they could be called upon to defend whatever they have proffered in the way of information or advice.

The use of local people in questionnaire administration (mostly teachers) also enhances the data gathering process. The capacity building potential of this methodology is obvious. Local knowledge is utilized to facilitate the impact assessment process.

Communities also fare better when this open system is adopted. The cause of social tensions in some of these communities is usually the charge of impropriety against the so called community leaders by the youth. The attitude of most project developers whereby a select few of the articulate and politically conscious are patronized, and in most cases bribed, to the total neglect of the community, is considered most unwholesome. So, to be seen to be consulting with the majority of community members is much more representative of opinions of how the communities feel about their situation.

## **CONCLUSIONS AND RECOMMENDATIONS**

There is abundant evidence that a project has little chance of success if it runs counter to, or ignores, the traditions, values, and social organization of the intended beneficiaries, or if its objectives are too abstract to be understood by them or too remote from their everyday concerns. While social analysis now forms an integral part of integrated project planning, appropriate techniques have to be devised for thorough understanding.

SIA is a novel and far more complex domain. Unlike the environmental assessment of the biophysical environment, SIA, concerned with the potential consequences of a project for a given human population and its way of life, appears much more demanding. The fact is that the range of considerations is potentially vast. And when placed against an even more complex ecological system as the Niger Delta with its vast socio-cultural and environmental systems, then the tasks would appear more than daunting. Difficult as it may be to develop a satisfactory methodology for SIA with universal acceptance, which can provide credible predictive insight into the processes of social change, far more problematical is the task of drawing

local people into a meaningful consultative process. While the temptation is always to regard this as a form of social management, the fact remains that it is by far the most important dimension of SIA, the aspect that is most likely to provide the needed facts and data which would inform governments and companies about local sensitivities and needs. In the words of the World Bank, credible impact assessment must be based upon 'participatory assessment'.

Good environmental assessment practice requires meticulous handling of the socioeconomic dimensions of the study to be able to make meaningful decisions which can be cost-effective and sustainable for the companies as well as the host communities of project sites/areas. Undertaking social impact assessment in the Niger Delta must take cognisance of the politico-economic and social contexts and factors which may mar or make accurate studies.

By necessity a reconnaissance visit must be made to the project sites at the planning of environmental assessment studies to identify communities within the area. At such times too, minimal contact is made with the inhabitants, but enough to identify in the process the cultural-traditional hierarchies.

Interaction at these three levels is also useful – first at the community level where elders, youths and women leaders are consulted on a village-wide issues, and secondly at a group discussion level, involving key informants, to tap relevant group opinions and knowledge.

At the third level of interaction is the household which will be involved in questionnaire survey. Questions must be simple enough – closed and open ended formats preferred – to allow for individual opinions. Content analysis of a well structured questionnaires can be made easier if local personnel, well instructed, are used so that interpretation of questions and filling in of answers is enhanced.

In summary, attempts have been made for sometime now to integrate social impact assessments in the general environmental assessment framework. Until recently however, it can hardly be said that a systematic methodology or approach has been devised to undertake such studies. Several SIA techniques have been suggested. The present study tries to reinforce the notion that far more successful socioeconomic data and impact prediction can be generated and made by a combined interactive and participatory approach. By examining the prevailing environmental assessment regime, E & P operations can be more effectively executed if social analysis is undertaken with regard to the relative socioeconomic importance of an area, characterizing the diverse population as a consequence and involving the people in the study process itself.

A general recommendation in the execution of environmental assessment processes is, therefore, not to emphasize and strive for biophysical data

collection alone but to establish a well integrated, interactive and participatory assessment, self-sustaining structure founded on local involvement, for the sake of gathering more accurate socioeconomic data and SIA predictions.

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#### **Key words**

**integrated  
impact  
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**social impact  
assessment**  
**participatory  
interactive  
assessment**

## New concepts for environmental impact assessment in Syria

*Imad Mahayri*

*The opinions and proposals in this report are the sole responsibility of the author. They do not necessarily represent the official view of the Syrian Ministry of Environment or the General Commission for Environmental Affairs.*

### ABSTRACT

Syria is in a phase of transition, which involves major economic activities and change. At the same time, the environmental resources in Syria are being continuously degraded.

In this paper, the current situation of EIA in Syria (in 1999) is briefly reviewed. The main shortcomings identified relate to: the absence of binding EIA related legislation; weak environmental institutions and weak environmental authorities; lack of awareness and experience; lack of environmental data; lack of coordination and cooperation; the weak role of the private sector and the public in EIA.

The analyses showed that an integrated solution could be developed that would aim at:

- securing high level political will and support for the environment;
- enhancing the existing legal base and bringing it into force;
- maintaining effective communication, coordination and cooperation;
- improving information flow and management; establishing a national Geographic Information Systems data centre;
- reforming the administrative structure; and
- carrying out continuous training and raising awareness programmes.

Also, strategic environmental assessment (SEA) should play a major role by steering and controlling high level planning to promote sustainable development. Indeed implementing effective EIA and SEA would be a major element and potentially powerful tool that supports the national environmental strategy outlined in the National Environmental Action Plan (NEAP).

As a result of the review, a number of major recommendations are made. These would involve: seeking a high level political will and support for the environment in Syria; strengthening SEA implementation; strengthening communication, coordination and cooperation between the different actors

**See Topic14**

**UNEP EIA Training  
Resource Manual**

*Strategic  
Environmental  
Assessment*

involved; strengthening the environmental capacity in the public and private sectors; and introducing new fields of science to Syria, such as environmental economics.

## INTRODUCTION

During the past few years, the Arab Republic of Syria has witnessed many changes, *inter alia*, in the economic situation. For 1995, however, a real economic growth of approximately 4 per cent has been estimated.

Reform of economic policy in Syria is gradually shifting the country's economy from a centrally planned socialist economy to a market based one which would involve more private sector economic and industrial activities.

Investment Law No. 10, introduced in 1991 to encourage private investment, is a key player in this area. This law provides incentives, including special investor tax and duty rates and facilitates the investments of Syrians abroad as well as other Arabs and foreigners in Syria. During the years 1991-1996, Investment Law No. 10 contributed 1494 projects at a cost of approximately US\$ 7.3 billion, which is a significant investment in the Syria economy (Arabicnews 19 November 1997).

However, it is crucial that this economic development must be paralleled by developments in other sectors. For the long term, environmental considerations stand out as a priority for sustainable progress.

According to 1996 estimates, the Syrian population is 15 608 648 (The World Factbook 1998b). However, with an annual growth rate of 3.4 per cent, it is estimated that this number will reach 20 million by the year 2005 (ERM 1998). Moreover, the rate of urbanization is very high, caused by a similar high rate of rural-urban migration. In 1996, 51 per cent of the total population was living in the major cities of Syria. Illegal settlement areas have increased significantly and currently accommodate an estimated 10 per cent of the total population. This situation is a cause of significant degradation of living and environmental conditions. It has also contributed to an increasing uneven income distribution (ERM 1998).

The Syrian environmental situation is being continuously degraded. Surface and ground water resources are almost completely exploited. Water resources face another problem. Discharges of domestic and industrial waste water is causing severe water pollution especially near big cities (ERM 1998).

Land degradation affects more than 50 per cent of the currently productive agricultural land. Erosion, desertification or salination are crucial factors. In addition, increasing urbanization is taking out green areas surrounding cities and converting them into domestic, industrial or waste disposal sites. The country's rich genetic and biological diversity is currently depleted and endangered. Also, dumping collected waste, estimated at 5 000 tonnes per day, near to the edge of towns and cities with no segregation or treatment is causing

acute environmental problems of groundwater pollution, while waste burning is causing air pollution. Moreover, air pollution caused by traffic and industry is severe. The air quality in major cities is poor and, sometimes, is five fold World Health Organization (WHO) standards (ERM 1998).

The Ministry of Environment (MSE) has two executive agencies: the General Commission for Environmental Affairs (GCEA), the technical arm; and the Scientific and Environmental Research Centre (SERC), the research arm. EIA is the responsibility of GCEA which contains the EIA Unit. GCEA has no enforcement powers, as the Environmental Protection Act (EPA) and the EIA Decree are not yet in force. Thus, the GCEA lacks legislative authority. Furthermore, other Ministries see activities of GCEA as interfering with their authority and are anxious that environmental concerns might slow down economic growth.

### **THE CURRENT PRACTICE OF EIA**

Currently EIAs are carried out by the EIA Unit itself as Syria lacks environmental consultancies and the EIA related law is not endorsed.

According to an unattributable source, 741 EIAs were carried out in the period 1994-1996. Given the human resources available in the EIA Unit and the current circumstances that prevail, this rate of EIA performance seems to be unrealistically high. Unfortunately, the author has no access to any of the EISs produced in order to assess the validity of this statement. On the other hand, ERM (1998) indicated that only three EIAs were performed in 1996, while in 1997 no EIAs were produced at all. Probably, this means that the 741 EIAs were performed without producing Environmental Impact Statements (EISs) and only three EIAs in 1996 led to the production of EISs. It also means that in 1997 no EIAs led to an EIS.

While working for approximately one year (during 1996) in GCEA, the author observed that most EIAs do not follow the full procedures and generally EIA were carried out without an EIS being produced and with the assessment completed in just one day.

It is generally the case that proponents from the private sector who have small-sized projects will be informed by another Ministry (the permitting authority) that, in order to proceed with the authorization of their project, they will need a signature from GCEA. The proponent will then apply to the EIA Unit. Afterwards, the proponent will have some discussions with the EIA Unit about the project and be given some advice and recommendations together with the required permit. In some cases, a short visit to the location is conducted by the staff of the EIA Unit.

Thus, it appears that, in reality, the number 741 does not indicate the number of EIAs conducted, but rather the number of permits applied to the EIA Unit by proponents. The vast majority of these permits, therefore, are processed and given permission without a proper EIA study having been conducted.

A very brief overview of the theoretical stages is summarized below with appropriate comments and issues included. However, the actual current practice may deviate significantly as there is yet no binding legislation.

#### *EIA stages*

First, the relationship between the EIA process and project authorization and implementation should be clarified. Permits needed for a project, before its authorization, are sectoral from the relevant Ministry and administrative from the relevant Governorate.

After receiving the sectoral permit, which is generally the first permit to be obtained, the proponent can begin construction work. However, production cannot begin until the administrative permit is obtained. The administrative permit, however, cannot be issued until the proponent has an environmental permit from the Governorate's environmental department. Recently, the EIA Unit has been involved on the basis of an informal agreement between the two governmental bodies, given the lack of legislation or formal procedures. This equates to the screening process.

More than 50 per cent of the applications submitted for permits to the EIA Unit are for projects which are already in operation and which have significant environmental impacts. Ahmad (1996) identified two possible decisions taken by the EIA Unit when this is the case. In the first situation, if mitigation measures can be undertaken, the permit will be given. Nevertheless, the enforcement of these mitigation measures is not in the hands of GCEA, but rather based on informal arrangements with the permitting authority (the Governorate) who may not necessarily act. In the second situation, when mitigation measures are not feasible, the decision will also be to issue the permit, but with a condition requiring the closure of the establishment or its relocation to a less sensitive area. Also in this case, action is in the hands of the Governorate.

Scoping is the next stage, where an EIA programme should be prepared. However, alternatives are not taken into consideration and the programme is developed by the EIA Unit itself. The public should be informed by the State Gazette. However, currently, only announcements on notice-boards in the Governorate in which the activity should be registered are used.

The next stage, according to the EIA Decree, is to implement the EIA programme. This includes the preparation and submission of an EIS. DHV *et al.* (1995a) indicated that the results of the scoping and the impact areas identified will be reported in the EIS. Also, it indicates that the aim of the assessment is to produce information that will help the authority to assess an impact's significance.

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*Non technical summary for decision makers*  
*Institutional requirements and conditions with which the project should comply*  
*A project description defining its objectives, site, design and size. etc.*  
*Baseline study for the situation before the project*  
*Identification and assessment of environmental impacts likely to result*  
*Alternatives and their analysis*  
*Detailed mitigation plan*  
*Environmental management plan that deals with the mitigation measures*  
*Monitoring plan*  
*References used in preparation of the EIS*

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*Table 1: The ten items representing the contents of an EIS*

The current practice in preparing EISs is limited to a description of the project, a baseline description and a prediction of likely impacts (Ahmad 1996). This situation is justified by the absence of binding legislation and by the fact that the people who prepare an EIS will also, at a later stage, be responsible for its review and for recommending a decision about it (the EIA Unit). This also reduces the objectivity of the current process.

The next step mentioned in the EIA Decree is a review of the EIA report by the EIA Unit. The European Commission review criteria were suggested by DHV *et al.* (1995a and b) as a review package. However, the current practice is that reviewing of EISs (if any), is performed by the same people who prepare them (the EIA Unit staff). This action lacks the required objectivity.

Subsequently, a decision statement, clarifying the results of the review, should be produced by the EIA Unit. In the statement, recommendations on the preferred alternative and the mitigation measures for a project that is to be approved, or the decision to reject the project, should be clarified.

Ahmad (1996) indicates that the decision is heavily influenced by political considerations. The EIA Unit prefers not to ruin good relations with other permitting authorities by rejecting important projects. A negative decision from the Unit might result in other governmental bodies ignoring environmental permits and EIA altogether in their future projects. However, Ahmad (1996) considers environmental protection is achieved by ensuring the implementation of good mitigation measures. Consequently, it could be argued that the EIA Unit, knowing that a decision must be positive in most cases, would support almost all developments without proper EIAs.

The EIA Decree mentions very briefly that appeals can be made to the Ministry of Environment against the decision statement. Also, the EPA gives proponents the right to appeal against the licensing authority at a later stage. So, an appeal could be made in two stages!

Monitoring is not mentioned in the EIA Decree, but is tackled in the EPA and other relevant documents by DHV *et al.* (1995a and b). Nevertheless, there are no details regarding what to monitor, where and when.

Violations and compliance are also tackled. It is the responsibility of GCEA to check compliance in cooperation with other governmental bodies. Nevertheless, the action is in the hands of the licensing authority, which is not identified in the EPA.

### **PROBLEMS AND WEAKNESSES OF THE EIA SITUATION IN SYRIA**

The major point is the absence of binding legislation, accompanied by a confusion over the distribution of EIA related tasks and procedures amongst different governmental bodies. The enforcement powers were assigned in the EPA and the EIA Decree to the licensing or permitting authority. The expression 'licensing authority' is used in the EPA, while the expression used in the EIA Decree is the 'permitting authority'. This authority is not identified in the EPA and could be understood as being GCEA. On the other hand, it is stated in the EIA Decree that this authority is not GCEA but the Governorate. However, generally, it is the Governorate that enforces the regulations when requested to do so by the EIA Unit.

This means that, even after bringing relevant legislation into force, the Act will always be in the hands of other agencies and the likelihood of the EIA Unit acting independently is small. This might create bureaucratic problems, as more procedures have to be followed when action is needed. Even the final decision will always be in the hands of the other agencies, as they have the authority which is, in effect, the most powerful tool. Therefore, a dilemma could arise when the other governmental body has another opinion about the matter. Basically, the environment will be the loser.

#### *Initialling the EIA to decision making*

According to Ahmad (1996), there are two authorization permits – sectoral and administrative. Construction can start after receipt of the sectoral permit, leaving production to be dealt with by the administrative permit, which involves EIA. Thus, the proponent will begin the construction works and maybe even finish them, before hearing whether an EIA will be required.

This delay means that, even if the project is rejected before production begins, the impacts of the construction phase will have already occurred. Moreover, supposing that proponents know about the need for an EIA at an early stage, they will seek to finish construction before dealing with the other permission, hoping that they will find a solution later for the additional bureaucratic procedure. Furthermore, a project is unlikely to be rejected after considerable resources have been invested in construction.

Ahmad (1996) commented upon the position of EIA in saying that it may come at various stages, sometimes during the first stage and often very late when the establishment is already in existence.

Some attention should focus on the scoping process which enable 741 EIAs to be carried out in two years by fewer than five people, the staff of the EIA Unit. No doubt many essential topics are missed.

Article 4 (a) of the EIA Decree indicates that Terms of Reference (ToRs) for EIAs should follow the general guidelines. However, the Decree also seems to indicate that the results of scoping should form the basis for the EIS. This is related to the fact that the Decree (excluding the definition of EIA), does not mention predicting and assessing significance of impacts. Also, it does not contain any EIS structure, although both are mentioned in the guidelines.

The guidelines will never be binding. The GCEA is already weak and in a weak position. So, it is difficult to see how it could enforce non-binding guidelines, which were, very briefly, referred to in the Decree. This might cause a problem in the future in enforcing the missing EIA stages that are not mentioned directly in the Decree and also in deciding when and how they are to be conducted.

It is worth noting that EIA expertise in the governmental sector is lacking. Those people who cooperate in the process will do the required analysis without having a sense of the reasoning behind it. This lack of understanding of the EIA framework might also influence its results or presentation. On the other hand, private environmental consultancies, as known in Europe for example, do not exist in Syria. Syrian EIA experts are very few. Therefore, the situation where EIAs are produced by proponents and their consultants will put great pressure on those experts who do exist. There are certainly not enough of them to perform all of the required work. Therefore, if EIA were to become a legal requirement for development projects and the current circumstances remained the same, EIA would be ineffective. Because EIA experts are limited in number, non-specialized people would become involved in producing the huge number of legally required EIAs. This also might encourage EIA to be seen as an unnecessary bureaucratic procedure.

Information flow in Syria does not run easily. If official information exchange procedures and high-level signatures do not exist, difficulties are faced in obtaining information, even among different governmental bodies. However, personal relations play a role in facilitating this aspect. Additionally, some information from governmental bodies is not compatible and some information just does not exist. Therefore, the private sector and its EIA consultants will face severe difficulties in obtaining the required data about a site in order to conduct a baseline study or impact prediction.

## **RECOMMENDED DECISION AND APPEALS**

A crucial point in the whole process involves political pressure on the decision statement produced by the EIA Unit. Currently, decisions might

not reflect the merit of the case from an environmental perspective, just simply expedience. Therefore, harmful projects may be authorized.

Ahmad (1996) indicated that the EIA Unit seeks to ensure good mitigation measures in such cases. However, currently, there is no legally binding provision to implement these measures. Furthermore, even after enactment of the EIA Decree, the author predicts difficulties in their enforcement. On the other hand, supposing that mitigation measures are implemented, they often will not have the potential effectiveness hoped for, especially when the project has significant impacts and should have been rejected originally.

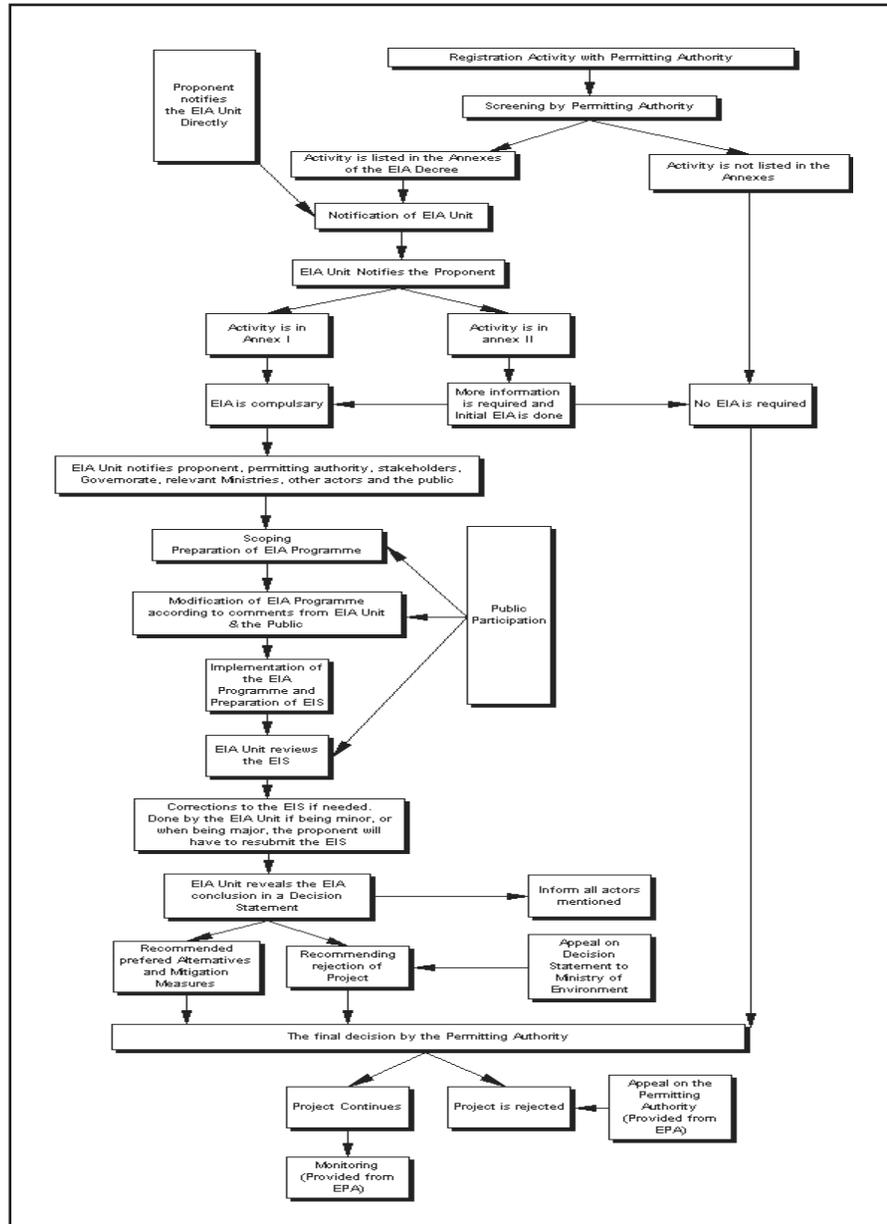


Figure 2: The proposed EIA procedures according to the drafts of the AEIA Decree and EPA

Therefore, it can be foreseen that EIA will be effective and binding only for the small private sector projects. Governmental projects and the big private sector actors, who can influence the situation, might manage to find solutions that lead to their projects being authorized. It could be argued that having two opportunities for appeal is a device that can be used to ensure that rejected projects are authorized. Thus, if a proponent failed to win the case against GCEA, there would still be another opportunity of appeal against the licensing authority (which is not defined in the EPA).

In addition to the above, the current situation of the EIA Unit and GCEA in general is not comfortable. Space, staff and resources are lacking. Also, there is a lack of updated information. Recently, government departments were provided with access to the Internet. Nevertheless, it is presently unavailable to the private sector and general public, although they may be given access in the future.

### **CONDITIONS FOR EFFECTIVE EIA IN SYRIA**

The conditions necessary for an effective Syrian EIA are identified in a set of six comprehensive but integrated proposals (Mahayri, 1998). First comes the need to enhance the existing legal base. The second is a key factor vital for all the other conditions, namely support in the form of high level political will. Third is the need to enforce relevant legislation. Fourth comes effective communication, coordination and cooperation. Fifth is the need for good information flow and management, which would be resolved by establishing a national GIS data centre. Then, to accommodate these conditions, the sixth proposal is for administrative reform. Other conditions, such as enhancing the relation between governmental, private sectors and the public are also important.

The implementation of these proposals is not supposed to be sequential. Rather, achieving these conditions should be sought simultaneously. This is especially true for administrative reform, which, for example, would be a basic requirement when implementing not only an enhanced legal base but also coordination in administrative processes. Some changes would be necessary to guarantee the efficacy of this reform. Awareness comes at the top of the list as it is severely lacking at present. Training and capacity building in all governmental sectors is needed. Lee (1988) discussed some training types, *inter alia*, 'on-the-job training'. Specialized 'on-the-job training' is necessary, as Syria lacks experienced, well qualified personnel.

Other parameters should be taken into consideration such as enhancing public participation; facilitating and encouraging the private sector to establish environmental consultancies; and establishing an effective Syrian Non-Governmental Organization (NGO) sector.

## **STRATEGIC ENVIRONMENTAL ASSESSMENT**

The EIA Decree is supposed to be a base for implementing Strategic Environmental Assessment (SEA). However, the Decree does not satisfy the procedural and legal requirements of SEA. A cornerstone requirement is the need for a separate SEA Decree. Some conditions identified earlier for EIA, such as high-level political will and support, information management and co-ordination, would also serve the development of SEA in Syria.

## **EIA AND THE ENVIRONMENTAL STRATEGY OF NEAP**

The National Environmental Action Plan (NEAP) for Syria was developed in June 1998. In NEAP, priority problems and priority actions were defined. On the other hand, 'enabling factors' to stop environmental degradation were discussed.

NEAP identified five strategic priority areas. The first, strengthening environmental management capacity within different governmental bodies, was considered a limiting factor for implementation of NEAP itself. Secondly came the need to review the policies encouraging the current misuse of land and water resources. The third priority was applying management systems, treatment facilities, environmental standards, emission limits, product standards and training that would protect human health against current pollution. The fourth strategic priority was the need for rural development and enforcement of urban planning norms in order to remedy the impacts of degraded urban environments caused by the increased urbanization. Lastly, the fifth priority dealt with protecting the degraded priceless Syrian cultural heritage, being one of the oldest human heritages (ERM 1998).

The overall goal of NEAP cannot be achieved without EIA. Effective EIA would minimize pressure factors and promote better planning and management of resources. It would ensure environmental factors were taken into consideration during the development and planning process. EIA would contribute in the internalization of environmental costs from an environmental economics viewpoint. The conditions identified for effective EIA in its crucial role of strengthening environmental management and capacity would be to improve the environmental planning and management institutions and complete the environmental legislation. At the same time, EIA would play a major role in coordination amongst different sectoral bodies and in raising awareness.

Notwithstanding, SEA is a key factor for the overall process. As a higher level of EIA, it would ensure that policies are environmentally friendly before dealing with the lower level of planning represented by projects. SEA plays the role of a framework for planning, which steers the general orientation of the development process leaving the details to be dealt with at the project level within EIA. An interactive integration of SEA and EIA

should be sought in order to accommodate the implementation of NEAP in Syria and to achieve better sustainable development.

## CONCLUSIONS

Syria is in a phase of transition, which involves major economic activities and change. At the same time, the environmental resources in Syria are being continuously degraded. EIA, including SEA, is a tool that would promote the sustainability of the current economic progress by ensuring consideration of environmental factors at an early stage in planning and decision making. However, the current situation with respect to EIA in Syria has many shortcomings. These are mainly a lack of: binding environmental legislation; enforced procedural framework; communication, coordination and cooperation; awareness; experience; resources; and information. This is leading to inefficient EIA. Indeed, there are even specific shortcomings in the draft legislation. The lack of authority given to personnel responsible of EIA has originated from many causes, mainly the absence of binding law, and is considered a key element contributing to the current unsatisfactory situation with respect to EIA.

There is a need to enhance the current legal base and to bring it into effect. High level political will and support is considered to be the ultimate element that would resolve the existent hindrances. This element will ensure that the legislation is brought into force; establish a more efficient communication, coordination and cooperation between all stakeholders involved in the EIA process; speed the information flow; and promote the conditions required to accommodate all the other proposals, namely, administrative reform. Some improvements such as: national coordination and cooperation; promotion of the private sector; enhancing information management; the national GIS information centre; awareness and training programmes, would not only provide for an efficient future EIA, but for the general development of the country.

The cornerstone of sustainable development in Syria in the future is likely to be NEAP. However, the goals and priorities of NEAP will not be achieved without an effective and integrative implementation of EIA and SEA in Syria.

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# Comprehensive planning for Naissaar Island, Estonia

*Ly Jalakas*

## INTRODUCTION

### *The Nature of the pilot project of comprehensive planning and environmental assessment*

In accordance with the Act on Planning and Building, approved on July 14, 1995, comprehensive planning should be established with the aim of setting the framework of territorial and economic development of each municipality in Estonia. This Act provides the basis for a planning reinforcement authority to require environmental assessment of the planning.

With Regulation of the Estonian Government No. 314 (1992), the requirement to conduct EA concerning both planning, programmes and development plans was established. The regulation includes stipulations concerning the procedure for conducting EIA for single subjects. However, it does not include concrete procedural rules for conducting EIA for strategic documents. At the time of passing the Regulation, the methodology for performing EIA in the course of developing planning, programmes and plans was not developed. Relevant experience was also missing at that time.

In order to fill in this gap, a special pilot project was initiated in the framework of cooperation agreement between the Finnish and Estonian Ministries of the Environment in the end of 1995. The objective was to conduct Strategic Environmental Assessment during the development of comprehensive planning for a selected municipality. The Finnish guidelines for organization of environmental assessment for comprehensive planning were used as a basis and the experience of Finnish experts in this area were drawn upon. The above also explains why not all rules for conducting EIA as defined in the above Regulation were punctually followed in the course of the pilot project.

The aim of the pilot project was to use the experience obtained throughout the EA process for development of a strategic environmental assessment methodology suitable for Estonian conditions.

**See Topic 14**

**UNEP EIA Training  
Resource Manual**

*Strategic  
Environmental  
Assessment*

### *The focus and objectives of the planning project*

The subject of the SEA to be conducted via the pilot project was to be Naissaar, an island located off the north coast of Estonia which belongs to the Viimsi commune (municipality). The reasons for this included the following considerations:

- No comprehensive planning had been developed for the island so far.
- The whole territory of the island belongs to the Nature Park (a protected area with recreational objectives) which was established in 1995 with Governmental Regulation No. 150—this sets certain restrictions to planning the nature management and human settlement of the island.
- For the last 50 years before Estonia's regaining of independence, the island was occupied by a Soviet army base—as a consequence, a number of areas have been severely polluted (with oil products and heavy metals).
- There was no civil population in the island. However, reprivatization of illegally seized land to former owners had already been begun; the highest value of the island is the natural environment itself with its virgin character and relative purity: 80% of the island is covered with forest, and numerous dunes, mire landscapes and species-rich plant communities are found.

The objectives of the pilot project included:

- focusing on environmental impact assessment of the developed comprehensive planning in practice;
- training of Estonian experts, authorities, planners and public in SEA;
- management of comprehensive planning process and the parallel conducting of SEA;
- promotion of the need to consider environmental aspects in the decision-making process;
- promotion of public awareness as an important aspect of SEA.

The objectives of Strategic Environmental Assessment included:

- consideration of environmental conditions in the planning process;
- promotion of the need to consider environmental aspects in the planning process;
- providing the public with a possibility to participate in the planning process;
- providing of environmental assessment to planning solutions;
- improvement of the quality of planning.

### *The key components of the SEA*

In the environmental assessment of the planning, an attempt was made to cover all stages of theoretical strategic environmental assessment.

The first stage concerned determination of the aim and objective of the planning as well as of SEA. This included collecting available source data, mapping the existing conditions and development of the preliminary overview of environmental conditions. On this basis, the alternatives were defined, and identification of potential impacts and scoping was performed.

In the next stage, prediction was made of the scope and significance of the potential impacts, as well as of the assessment of the impacts. The process was continued with comparison of the alternatives, taking into consideration the unwished/negative environmental impacts of applying the alternatives in practice, and comparison of the options for mitigation of those impacts.

As a result of this comparison of alternatives, the optimum solution was determined which was developed into a planning proposal. As the planning proposal was developed, more specific EA was conducted and recommendations were developed for monitoring the state of the environment. In the end of this process, the final SEA report was compiled. This included the interim reports developed through the SEA stages as well as other relevant materials concerning the planning and SEA process.

Emphasis throughout the process was on public involvement and participation, with provision for public participation as well as public hearings. Public meetings were organised and group seminars held for interested parties.

### **NATURE AND SCOPE OF ISSUES**

#### *The main players of the SEA process*

Through the different stages of the process, the planning initiator, competent authority, planning organisation together with environmental experts, decision-maker, and members of the public all participated in the activities.

The initiator in this case was the local municipality which in accordance with the Estonian Planning and Building Act is also the decision-maker (as concerns the context of EIA). Interests of the municipality were related to strategic land use planning and planning of the natural as well as cultural environment, taking into consideration criteria of sustainable development and the development objectives of the municipality. The municipality was also interested in considering the environmental conditions with the aim of preserving most of the island in its natural state, as well as in finding the optimum solutions to potential conflicts of interest between the different parties (i.e. state, municipality, future land-owners and other parties).

The objective of the local municipality as the decision-maker was the approval of comprehensive planning which would meet all legal requirements as well as everyone's interests.

An important role in the conducting of the SEA was played by EIA experts—in this case, environmental experts from Finland and Estonia. These experts conducted the environmental inventory and analysis of the planning territory, determined the factors of impact and assessed the potential impacts of the different activities. Their task was to cooperate with planning experts, manage the SEA process, cover all stages of SEA, and draw up the final report.

The competent authority in this SEA process was the county (regional) government which is supervisory body for the comprehensive planning. Its task was to review the final SEA report (together with comments on it from the public), determine that the planning meets valid requirements, supervise the consideration of national interests, and find solutions to conflicts arising in the course of the process in case this is not otherwise stipulated. The county government was also responsible for setting requirements for the putting into practice of activities following the comprehensive planning process, as well as for monitoring of the state of the environment.

The largest group participating in the SEA process was undoubtedly the public-interested persons or persons potentially affected by the planning. These included future land-owners, associations of scientists, entrepreneurs, professional societies/unions, movements, and other private or legal persons. The aim of participation in the process was to represent interests related to development of the planning territory, assisting in specification of the problems coming up in the process, and making sure that their interests would be duly considered at decision-making.

### **PROCESS AND PROCEDURAL CONTEXT**

As stated above, the project was carried out in cooperation with the Finnish Ministry of the Environment and with a clear training component. Therefore the process was conducted following the methodology used in Finland for SEA of comprehensive planning.

#### *The EIA system in which SEA took place*

The procedure for conducting EIA in Estonia was established with Governmental Regulation No. 314 of November 13, 1992, which stipulates the terminology to be used in this area, the procedure for collection and distribution of materials, the procedure for conducting EIA concerning a single project, and the rights and responsibilities of different parties, as well as the options for solution of conflicts arising in the process of EIA.

Depending on the specifics, location and scope of the EIA object/project, EIA projects of the national and regional level are distinguished between.

Lists of activities which are subject to national and regional EIA, respectively, are given in the Appendix of the Regulation.

In the case of all projects of national importance as well as of projects of first rank regional importance, the conducting of EIA is mandatory.

The requirement for conducting EIA concerns not only new (planned) activities but also projects for which reconstruction, liquidation or change of ownership is planned.

With Regulation of the Minister of the Environment No.8 of March 14, 1994, 'Methodological guidelines for conduction EIA in Estonia' were approved. In this document questions not stipulated in the above Governmental Regulation are settled. Some stipulations are further specified; guidelines concerning data to be submitted by the proponent to the competent authority are given. The regulation also includes guidelines for EIA experts (or expert groups) for drawing up an EIA report.

In accordance with the Act on Sustainable Development, EIA is mandatory assessment of planned activities such as projects, programmes, planning, in order to judge whether they meet environmental requirements and the main principles of sustainable development, with the aim of finding the optimum alternative. The objective of EIA is to conduct the assessment of information concerning the potential environmental impacts related to the project, as well as concerning the feasibility of the planned use of natural resources and the efficiency of preventive and mitigation measures.

#### *Key principles of EIA according to the Governmental Regulation*

As each new project needs to be approved by environmental authorities, the local government (municipality) in its role of decision-maker submits data and materials received from the proponent to the environmental department of the county government which then decides on the necessity for conducting an EIA.

The Governmental Regulation concerning the EIA procedure defines lists of areas of activity which are likely to cause significant environmental impacts, for the environmental approval of which the conduct of an EIA at the national or regional level is required.

For regional level EIA projects, the conducting of EIA is organised by the district environmental department. In the case of a project subject to national level assessment, the materials are forwarded to the Ministry of the Environment for conduct of a national level EIA.

After taking a decision concerning the necessity for conducting an EIA, the competent authority (at the regional level—district government, at the national level—Ministry of the Environment) informs the proponent and publicly announces the decision to conduct an EIA. The competent authority either decides on the EA experts or announces public tender to find experts.

The experts conducting the EA have to be licensed for this by the Ministry of the Environment and have a valid license. The competent authority together with the experts decide on the areas of EA and draw up the EA programme.

The experts conduct the EIA, in the course of which the following main stages of the process need to be covered:

- processing and analysis of source data;
- analysis of public reactions and opinion;
- investigation and description of potential impacts of the development on the environment ;
- presentation of alternative solutions;
- identification of key impacts and scoping;
- prediction and assessment of impacts' magnitude and significance (including those on the social and cultural environment as well as on public health);
- analysis of the scope and effectiveness of mitigation measures;
- comparison of alternatives and selection of the optimum alternative.

After completing these stages, the EIA report for which a guideline has been approved with the ministerial regulation is compiled. The competent authority submits the draft version of the EA report for comments to the public and to interested parties. After receiving the comments from the public, the competent authority analyses these and appends them to the EIA report.

The competent authority submits to the decision-maker its opinion and the requirements based on the EIA report. It is also entitled to require that the proponent conduct environmental monitoring after the completion of the project at the proponent's own expense.

The decision-maker takes a decision based on the EIA concerning the implementation of the project, issues a construction permit, and informs the public about its decision.

The conduct of the EIA is financed by the proponent. The conclusions of the EIA are considered valid for two years. The environmental restrictions and requirements set by the competent authority on the basis of EIA are mandatory for the proponent.

#### *Interrelations between EIA and the permitting and decision-making process*

The need to conduct an EA may be brought about by a desire to start a planned activity for which the proponent needs to apply to the local government for a construction permit. Later, permits concerning use of natural resources might also be necessary. These are issued by the environmental department of the county government. Thus, EIA precedes

the process of issuing permits (designing permit, building permit and utilisation permit of natural environment and resources, and permits for emitting pollutants and disposing of wastes into the environment).

Conclusions drawn on the basis of the EIA results are in the form of recommendations to the decision maker. If the decision-maker cannot consider the EA conclusions in making its decision, it needs to justify this and take into consideration the possibility that interested parties not satisfied with the decision have the right to take legal action.

#### *Environmental assessment of strategic documents.*

The EIA Regulation stipulated that national concepts, programmes and development plans of areas related to nature management as well as land use planning are subject to SEA. For acts, regulations and strategies approved by the Riigikogu (Parliament of Estonia) and governmental regulations, the conduct of SEA is currently not legally required.

Based on the Act on Sustainable Development, interrelations between programmes, development plans and planning drawn up for development of economic activity and for balancing economic activities with the state of the environment and nature management can be pointed out. These programmes include:

- National programmes of areas of most significant threat to life and natural environment
- Development plans for an environmentally highly threatened region
- County Planning
- Comprehensive planning for municipalities
- Detailed planning in municipalities (which prepares building activities for the nearest upcoming years)
- Building projects

In the development of all the above mentioned strategic documents, the state of the environment needs to be considered; environmental analysis has to be conducted and environmental impacts need to be assessed.

#### *Decision-making process in which the SEA took place*

The EA conducted in the course of the planning process (of the pilot project) was managed by a planning working group (which included environmental experts) in cooperation with representatives of the local government. The county government in its responsibility for supervision concerning the planning was regularly informed about the progress. The county government was also responsible for reviewing and approving the SEA report. The local government considered the EA results both at making the

intermediate decision–selection of the suitable alternative–and at making the final decision–approving the planning.

It should be emphasized that the conclusions drawn by experts are not binding to the decision-maker. The EA report provides the decision maker with objective data facilitating decision making. It is up to the decision-maker to use this information or not. If the decision maker decides to ignore the conclusion made by experts, such a decision should be justified well enough to convince the public.

In accordance with the Act on Planning and Building, comprehensive planning of a municipality or town defines the main functions for use of the territory as well as the requirements concerning use of land and water areas and restrictions to building/construction activities. Thus, comprehensive planning is not directly related to building/construction activities and does not provide bases for issuing of construction permits not permits for use of natural resources. However, requirements concerning use of landscapes and natural communities are established with comprehensive planning and, if necessary, recommendations concerning the taking of land areas and single objects into protection or making of amendments in their protection rules can be made.

### CASE ANALYSIS

In the process of development of the comprehensive planning environmental assessment was divided into stages.

Both the mentioned processes were carried out in parallel and were closely connected, contributing to and having influence on each other.

#### *The stages of the planning and EA process*

Planning	Environmental Assessment	Public Participation
0. Preparatory activities, development of work schedule	0. Preparatory activities, development of work schedule	Information on the initiated planning
1. Development strategy Source data and investigations Development objectives	1. Environmental aspects of the strategy Environmental investigations Environmental objectives	Public discussion
2. Proposing of development alternatives (planning alternatives)	2. Programme for environmental assessment Scoping	Public discussion

	Prognosis of magnitude and significance of impacts for relevant alternatives Additional investigations	
3. Draft planning proposal	3. Preparation of SEA report on preferred alternative (draft planning proposal)	Public discussion
4. Planning proposal	4. SEA report	Public display and consideration of the results of the public display
5. Implementation of the planning in practice, monitoring	5. Implementation of mitigation measures Monitoring and post-auditing	

### *First stage*

The first stage of the process proved to be very effective thanks to the involvement of representatives of district and commune authorities, land-owners of the area and representatives of other interested parties. With their participation the first public meeting was held where SWOT analysis (strengths, weaknesses, opportunities, threats) was conducted among the participants. At the meeting, the initial opinion of the different parties was defined, and problems of the island and development possibilities of the territory were identified.

### *Second stage*

The second stage of the planning process was also successful. It was begun with planning the development alternatives. In parallel to this, the state of the environment of the island was further investigated on the basis of available data and site visits with the aim of identification of influencing factors and scoping the topics to be considered at the conducting of the EA. Four development alternatives were drawn up by the planning and EA working group; the fifth alternative was added later from outside this group. The proposed development alternatives for Naissaar were the following:

Alternative 0-	The island is left by itself, without any concrete action plan developed (No-action alternative)
Alternative 0+	Necessary cleaning up is performed in the island, small-scale building activities and use of the island is possible
Alternative 1	Increase of local population as well as tourism and recreation activities, development of the service sector and construction activities
Alternative 2	Considerable increase of local population as well as tourism and recreation activities, construction of new roads in the island, varied service sector, regulated movement
Alternative 3	A theoretical alternative based on the principle that activities are concentrated in the very south and north end of the island. The extreme option for this alternative foresees the settlement of tens of thousands of people in the island

For identification and assessment of environmental impacts, the matrix analysis method was used. Environmental components, at which impacts arising from implementation of the planning would be directed, were presented in horizontal lines:

- nature and landscape (ground and surface water; weather; fauna; biological diversity; etc.);
- structure of population and man-made environment (buildings; facilities; infrastructure; historical heritage; etc.);
- man and society (living; working; service; health; safety; private property, etc.);
- activities bringing about the impacts (presented in vertical columns);
- activities causing the impacts: short-term activities (construction; risks; dangerous situations; etc.) and continuous or long-term activities (living; tourism; recreational activities; traffic; economic activities; etc.);
- description of the impacts (frequency; scope; strength; etc.);
- the significance of the impacts; and
- possibilities for avoiding or mitigating the impacts.

The identified factors of influence were assessed in broad categories so as to facilitate easier understanding of the differences between alternatives as concerns their environmental impact. As a result of this matrix analysis, activities causing significant negative impact were identified as well as environmental components which would suffer the most from those activities.

At the second public meeting, the planning process and EA process were introduced, development alternatives of the comprehensive planning were described and their potential environmental impacts were commented upon. Representatives of the interested parties participated in conducting the matrix analysis, as a result of which the vision of the public concerning the environmental impacts of the alternatives was presented. The positions of the working groups differed mostly in their emphases, however, some conclusions could be drawn on the basis of those.

Environmental experts of the working group continued working more thoroughly on the significant environmental impacts as identified with participation of the public.

Special attention was paid to landscapes, coastal plant cover, sand dunes and mire areas. Ground water quality was analysed and factors influencing the diversity of fauna, flora and landscapes were investigated. Impacts on the social environment, especially on security, structure of the society, recreational activity, quality of the living environment and land use were also considered to be of high importance. In the assessment process, potential risks associated with development of the transport system and tourism, forest (timber) processing and waste management were analysed. In parallel with assessment of the impacts, analysis of their mitigation measures and the efficiency of those was conducted.

In this stage of the planning process, comparison was made between the environmental impacts of the alternatives considering the opinion of both the environmental experts, the public, interested parties and officials. As the interests and wishes of all participants in the process coincided in this case, the selection of the optimum alternative proved to be easy.

It was decided that development alternative No.1 would be taken as the basis for drawing up of comprehensive planning as this was most easy to be merged with environmental requirements and would still enable settlement and recreational activities on a modest scale.

On the basis of alternatives presented in the planning as well as SEA results, the municipality also decided to take development alternative No.1 as a basis for drawing up the planning proposal.

### *Third stage*

In the third stage of the planning process, work was continued with developing a planning proposal based on the selected alternative, in the course of which attention was focused on the characteristic features of this option and on the finding of planning solution. In parallel to this, the potential environmental impacts were further specified and final assessment was given to those together with recommendations concerning measures for prevention or mitigation of environmental damage.

The third public meeting was held, at which the draft version of the planning proposal was introduced to participants. Both positive and negative environmental impacts and their mitigation measures were described. Comments and proposals of representatives of the public concerning mitigation measures were presented and discussed.

#### *Documentation of the SEA process and SEA report*

Documentation of the more important topics as well as of positions influencing the progress and decision-making throughout the process facilitated the compilation of the final EA report. At the development of the report, earlier interim reports were made use of and more detailed assessments concerning the environmental impacts of the planning proposal were added. The report also included recommendations concerning the mitigation measures to be implemented while applying the comprehensive planning in practice. The necessity for monitoring was discussed and guidelines for organisation of monitoring of environmental components in the island were given.

Before presenting the planning to the public, the county government (competent authority) reviewed the planning proposal and draft SEA report and made its decision concerning the necessity of additional approval of these documents.

After that comprehensive planning was introduced to, and officially approved by, the neighbouring municipalities and all relevant authorities. In accordance with the Act on Planning and Building the proposal was put on public display for four weeks, together with the EIA report. During this time, it was possible to submit comments concerning the planning. The views presented during the public display period were analysed and incorporated into the planning.

#### *Supervision of the Planning and EA report*

After public display of the documents, the county government verified whether:

- the planning met the requirements of sustainable development and all valid legal requirements;
- environmental objectives were duly taken into account and measures for solving environmental problems were foreseen;
- conditions necessary for maintaining environmental quality were met;
- the conducted environmental assessment was sufficient and the report included all necessary data;
- the conditions for participation of the public in the process had been sufficient.

Public opinion and comments were considered at the making of decision.

The whole process of development of the comprehensive planning for Naissaar took 17 months having started in December 1995, and being completed in April 1997, with the approval of the comprehensive planning.

#### *Evaluation of the SEA process*

SEA conducted in parallel to the development of comprehensive planning resulted in directing the planning process already in its course towards environmentally sound solutions, while taking into account the interests of different interested parties related to the planning territory. As a consequence, no considerable problems or seriously differing opinions arose in the final stage of the planning—the implementation stage.

One of the most important and successful stages of the process was public involvement and participation. Timely and early informing of the public enabled the avoidance of conflicts, finding new creative solutions and receiving information concerning the preferences of interested parties and inhabitants. Good organisation of the public involvement process made it possible to avoid the situation in which changes would need to be made in the planning implementation stage.

The effectiveness of the process was also enhanced by the division of the planning and EA process into stages. Thus, it was easier to scope the topics to be considered, focus attention on the key problems and recommend alternative solutions to those. In the course of the intermediate stages it was possible to obtain varied information for solution of the identified problems and to analyse the potential impacts of decisions made in the course of the process.

More important facts were documented during each stage, and identified problems together with the assessments and recommended solutions as well as interim decisions were presented in written form.

The opinion of the competent authority concerning the effectiveness of the process was positive. The implemented pilot project proved that the integration of EA into the very process of development of planning is the only way to reach a solution optimum from the viewpoint of both the natural environment and the society while using the minimum of resources.

Officials of the local government considered the process of development of the planning highly useful and informative and they were also impressed by the rational use of both time and material resources throughout the process. The fact that environmental impact assessment was carried out in parallel to the development of the planning considerably facilitated the process of approval of the planning and decision-making.

The weakest aspects of the process were the following:

- Source data concerning the state of some environmental components of the island were partly lacking. Gaps and partial insufficiency were

identified in data concerning biological (mainly faunistic) and geological (especially concerning the genesis) and geomorphological information. Consequently, the identification of environmental impacts in these areas proved to need further investigation.

- While considering development alternatives, the possibilities for making changes among the areas reserved for different types of activities were not well enough considered.
- The role of the decision-maker (the municipality) appeared to be relatively modest since the municipality could not adopt intermediate decisions sufficiently fast. The main deficiency was the lack of experience in planning and EIA, and some ignorance in environmental law and regulations.

#### *Enforcement of the planning*

The comprehensive planning approach was adopted by the municipality in April, 1997. The comprehensive planning has to be followed by detailed planning for dense settlements and for building and land use in dispersed settlements. Since the process of land and property restitution is still under way and permanent transport connections as well as an energy supply network are lacking, implementation of the comprehensive planning is in its initial stage as yet. Thus, it is currently not possible to emphasize specific results nor evaluate the effectiveness of implementation and the validity of the predicted environmental impacts. As of today, there is also no feasible need and possibility of establishing a monitoring system on the island.

#### **NOTE**

The objective of the pilot project was development of a landuse plan for a municipality. The main aim of decision-making concerning land use within the selected planning territory was the maintenance of a Nature Park together with development of recreational activities and restricted residential building.

The stages of SEA as covered during project implementation are given in the 'Case Analysis' part of this case study.

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#### **Key words**

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# Progress of environmental impact assessment and its methods in Colombia

*Israel Acosta*

## ABSTRACT

The following paper is developed in two parts, the first of which is an overview of the history of environmental impact assessment in Colombia, from its beginnings in 1974 to the present. The second part is a critical review of nine Environmental Statements produced in Colombia between 1997 and 1999, focusing on the following new elements of analysis: Environmental Risk Assessment (ERA); Regional Development Environmental Impact Assessment (RDEIA); and Social Impact Assessment (SIA). Additionally, a search was carried out to locate studies on Strategic Environmental Assessment (SEA).

## EIA HISTORY IN COLOMBIA

Colombia has a 25 year experience in applying environmental assessments to development proposals which are potentially harmful to the environment. It became the first country in Latin America to face the environmental movement of the 70s by issuing, in 1974, the Law 2811/1974: 'Code for the Renewable Natural Resources and Environmental Protection'.

Among many other things, this Law, with its 340 Articles, established basic concepts about the environment as a common property of society, established an environmental policy, defined regulations for the management of all natural renewable resources and established what was called the *Declaration of Environmental Effect*. This Declaration implied that investment projects should be subjected to an ecological and environmental study, which included economic and social aspects, in order to be awarded a Licence that would allow their final development.

Although the approval of this law was very important for the country, some major restrictions affected the EIA implementation process. Three of the most important obstacles were:

- the lack of well-trained professionals in the new area of expertise;
- the generalized social belief that environmental matters were not important; and
- the fact that Inderena, the decentralized institution responsible for environmental matters and the implementation of the new law, was

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nevertheless a dependant branch of the Ministry of Agriculture and thus limited in its sphere of action. This means that important sectors of the national economy such as health, infrastructure, industry, oil, mining, urban problems, etc., all independent ministries, would often question Inderena's authority and undermine the impact of the its actions.

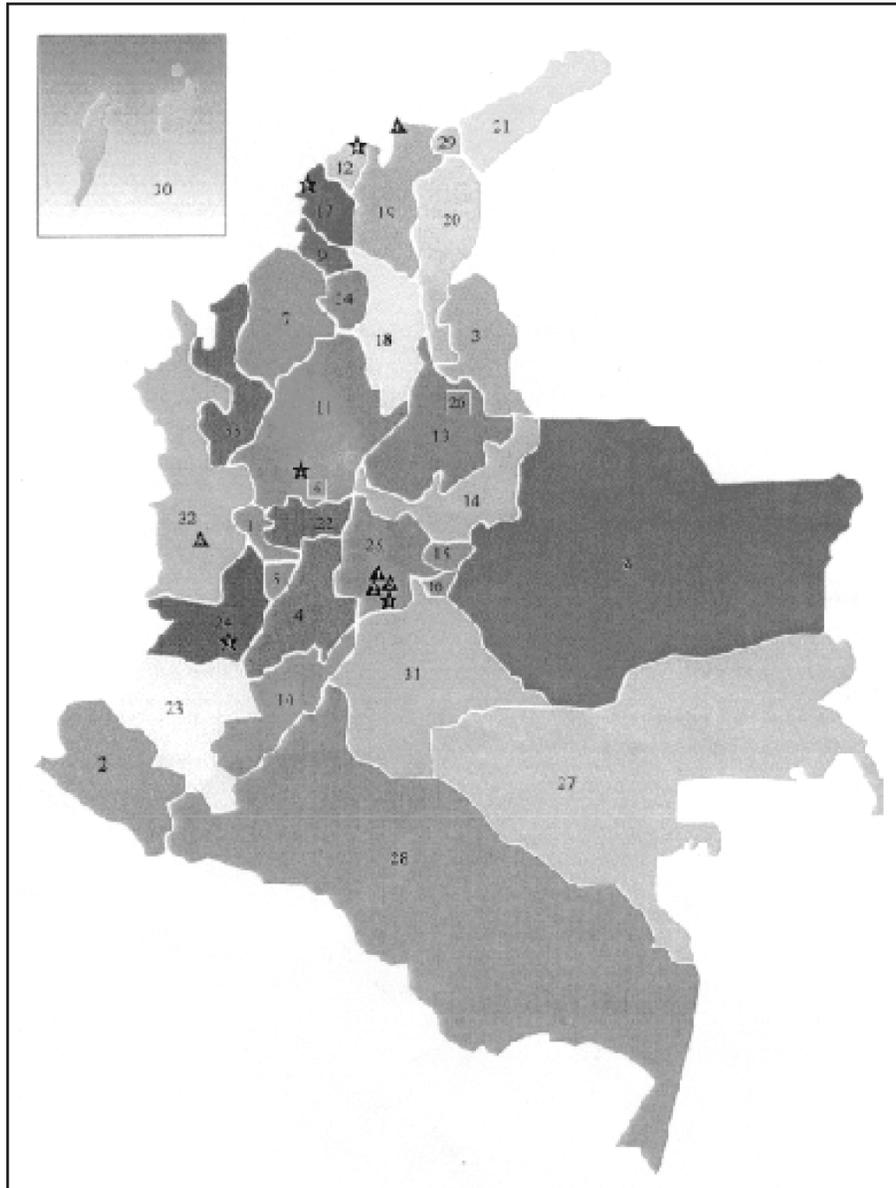


Figure 1: Colombia – Regional Autonomous Corporations

After several years of discussions, consultations and political debate, and with pressure originating in the results of 'The Earth Summit', Rio 1991, the

Ministry of the Environment of Colombia was created through Law 99 of 1993, with sustainable development as the fundamental basis for the new environmental legislation.

Beside the many different aspects of sustainable development, environmental processes and public involvement, the Law clearly defined the EIA process, the requirements for obtaining the environmental license to build and operate projects and, if so required, the submission of an environmental alternatives analysis of the proposed project.

This Law defined 31 geographical areas called Regional Autonomous Corporations (see Figure 1) and established that the administration of the environment and the natural renewable resources in the national territory will be managed by these Corporations. At the same time, the Law defined the type of projects that, due to their characteristics and magnitude, must carry out all formalities required to obtain the environmental license directly with the Ministry and those who must do it with the Regional Autonomous Corporations.

#### **EIA-RELATED ACTIVITIES OF THE MINISTRY**

As has been described, many different – and independent – authorities take part in the EIA decision-making process in Colombia. For this reason, one of the principal fields of action of the Ministry has been the preparation of procedures, guidelines, handbooks, and even ToR's for some specific types of projects. Consultation with private sector has been used to produce most of the new norms, a positive feature since the developers themselves have been active participants in defining the compromises to which they will comply later on. Other fields of action of the Ministry have been the training of Corporation personnel and the design of guidelines for their EIA work.

From January 1994, when it began activities, to March 1999, the Ministry has received 1536 environmental statements for analysis and consideration for awarding of Environmental Licences, distributed by sectors as follows:

Infrastructure	493
Hydrocarbons	753
Agrochemicals	104
Mining	49
Electrical	137

There are no statistics about the number of Environmental Statements received by the Regional Autonomous Corporations.

One crucial issue in the working relationship between Ministry and Corporations has to do with quality control of the EIA process. The Ministry has enough experts in different areas to integrate teams for the review and evaluation of Statements, to determine whether or not these were adequate

and whether or not the quality and quantity of information is sufficient. This does not happen in most of the Corporations, largely due to the permanent budget problems that cause a lack of proper personnel, both in number and in training.

### **CRITICAL REVIEW OF RECENT ENVIRONMENTAL STATEMENTS**

Taking into account that environmental assessment practice and theory keeps growing and new methodologies are proposed and implemented in the process, it was decided to specifically review how and to what extent the following techniques are being introduced in Colombia's environmental assessment studies:

- Environmental risk assessment (ERA)
- Regional development environmental impact assessment (RDEIA)
- Social impact assessment (SIA)
- Strategic environmental assessment (SEA).

Nine recent (January 1997 - February 1999) environmental assessment studies presented to the Ministry of the Environment were reviewed, all of which correspond to major projects in Colombia: oil exploration (3); mining (2); electrical sector (2); roads (2).

The Environmental Statement Review package (Lee and Colley, 1990), with some adjustments, was used as a guideline to carry out this exercise. Four review areas were included:

- Description of the development, local environment and base line conditions
- Social impact assessment
- Environmental risk assessment
- Regional development environmental impact assessment.

The assessment symbols used were:

- A. Relevant tasks well performed, no important tasks left incomplete
- B. Generally satisfactory and complete, only minor omissions
- C. Just satisfactory despite omissions and /or inadequacies
- D. Parts are well attempted but must, as a whole be considered unsatisfactory because of omissions and/or inadequacies
- E. Not satisfactory, significant omissions or inadequacies
- F. Very unsatisfactory, important tasks poorly done or not attempted
- NA Not applicable– the review topic is not included in the context of this statement.

<i>Assessment</i>	<i>Review Areas</i>			
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
A	1	0	3	NA
B	7	0	2	NA
C	1	0	1	NA
D	0	9	2	NA
E	0	0	0	NA
F	0	0	1	NA
Total	9	9	9	9

The overall assessment of the quality of the nine statements in relation to the four review areas is shown in the table above. The findings clearly show that enough expertise is available to describe the development, purposes and objectives, its size and appearance within the receiving environment, the site description, types and quantities of residuals and/or waste matter, the geographical extent of the affected environment and its description, and baseline conditions.

A social component was included in all statements in a descriptive way presenting general and specific data, but without developing a process of identification of impacts and effects of the proposed project on individuals and the social system around the area of direct influence of the project. For this reason, no analysis oriented towards identification and evaluation of key impacts and alternatives and mitigation measures was undertaken.

Risk assessments were found to be quite satisfactory, developed with clear methodologies and reaching conclusions that afforded good recommendations for the environmental management plan, a component that all studies should present to the Ministry of the Environment.

Regarding the fourth review area, Regional Development Environmental Impact Assessment, it is a source of some concern that none of the statements even try to make a general presentation of this topic in relation to the project. As practice has proven, the project-based methods of EIA alone cannot meet the requirement of controlling the total amount of pollutants and rational industrial location; furthermore, the project-based approach cannot deal effectively with the cumulative effects induced by the interaction between projects.

The last element evaluated was the Strategic Environmental Assessment. Knowing that strategies and policies are essential for economic growth and environmental protection, and that ineffective public policies could contribute to environmental pollution and deficient levels of sustainable development, studies, guidelines or standards were ineffectively sought. Although it is clear that the Ministry recognizes the importance and urgency of establishing this new type of environmental assessment, it has not defined an immediate course of action toward this goal.

## **CONCLUSIONS**

Important advances are continually being carried out in Colombia under the leadership of the Ministry of the Environment, the availability of guidelines

and procedures by sectors and for specific projects, being the fundamental tool for the consolidation of an efficient EIA process.

The environmental administrative structure, with over 30 autonomous environmental authorities, requires continuing efforts on the part of the Ministry of the Environment to promote and maintain the quality of the EIA process.

Environmental Risk Assessment is methodologically well handled within the environmental statements in the larger projects under the direct control of the Ministry. It is necessary that the Ministry divulge these experiences to the Corporations.

Social Impact Assessment is not being addressed. As its name would indicate; the topic is always touched upon in the Statements, but merely in a descriptive way and without developing a process of identification of impacts and effects. The Ministry should prepare and distribute detailed guidelines and train EIA practitioners on this matter, using the vast amount of information already available on this topic.

Except some general comments found in one of the reviewed Statements, the topic of Regional Development Environmental Assessment is not developed in the studies. The Ministry must carry out similar actions as those suggested for SIA.

Finally, although the importance and advances in the field of Strategic Environmental Assessment are recognized, it is necessary that the environmental authority begins as soon as possible to train practitioners and from there begins a process of preparation of procedures and guidelines on the subject.

#### LIST OF RELEVANT PUBLISHED PAPERS AND OTHER SOURCE MATERIAL

Lee, N. and R. Colley. 1990. *Reviewing the quality of environmental statements*. EIA Centre, University of Manchester.

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EIA **quality**  
  
EIA **progress**

# Advancing the EIA system in the Philippines

*Maya Gabriela Villaluz*

## THE PRESENT SYSTEM

The Philippine Environmental Impact Assessment (EIA) System was formally established in 1978 with the enactment of Presidential Decree no. 1586. The institutionalizing of its implementing rules and regulations was completed four years later. A number of laws have been passed through the years aimed at strengthening, expanding and refining the existing systems and procedures. The Department of Environment and Natural Resources was given the task of administering the EIA system through the Environmental Management Bureau and its regional offices. Projects with potentially significant environmental impacts were categorized either as environmentally critical or located in environmentally critical areas. Projects under the first category had to undergo full-scale EIA studies while those in the latter category were submitted to Initial Environmental Examinations. Government entities were given mandates to establish their own environmental units, integrate environmental concerns in their planning and project cycles and assist in expediting the review process.

A detailed procedural manual issued in 1992 discussed the step-by-step procedure in the preparation and review of Environmental Impact Statements. The manual contained guidelines for (among other things):

- the form and content of the documentation requirements;
- the conduct of consultations to show proof of social acceptability;
- the composition of the external Review Committee;
- the allocations in an Environmental Guarantee Fund; and
- the creation of a multi-partite Monitoring Team.

The second edition of the manual provided a detailed discussion of the guidelines in the conduct of the following:

- scoping
- the procedural and substantive review
- Environmental Risk Assessment
- Environmental Management Plans
- public hearings and consultations.

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A window for an accelerated processing of applications was opened to proponents who chose to contribute to an Environmental Review Fund that was set up to defray the cost of pooling a dedicated team of external experts to review and process the applications. The accelerated processing time should be no more than 120 days. An average contribution would be around half a million pesos (13,160 USD) per project. A breakdown of the cost of review is also provided in the manual.

In spite of its strengthened features, there is a mounting concern that the EIA system, even in combination with existing environmental legislation, is still not enough to combat the escalating deterioration of the environment. In response to this concern, the government is implementing a number of projects aimed at pilot-testing the integration of different strategies and frameworks in environmental management.

## **ISSUES AND CONCERNS**

### *Intent and timing of the EIA process*

The EIA system has been largely perceived as catering only to the needs of the industrial sector. The predominant practice is to subject to an EIA study specific projects in pre-determined locations rather than analyze the environmental impacts of a mix of projects and locations. In many cases, a major stumbling block to the EIA process is the lack of a deliberate move from all sectors to embark on the process right at the beginning of the project cycle. This dilemma is compounded by the seemingly lack of political will to ensure earlier assessment.

### *Institutional capacity of the implementing agency*

Devolving the task to the regional offices to issue and monitor environmental clearances covering the whole range of projects is taking a long time to implement, due to the lack of both competent government personnel and readily available expertise and resources at the national and local levels. The law itself did not create permanent career positions for EIA professionals in the government service.

The regulations do not prescribe the methodologies to be used during the conduct of the study; neither do the reviewers verify it during in their review of the EIS. There still remains a large gap in the procedural guidelines of the review. The monitoring capability of government needs a lot of strengthening. There are no programmes in place, no equipment available, and there are not enough trained staff or accredited laboratories to analyze the samples.

Due to the absence of baseline environmental data, consultants generally have to gather baseline information for every EIA study they conduct, or collect secondary data generated by similar studies, which in many cases are

scanty and unreliable. More often than not, the period of sampling is shortened and does not capture the varying conditions attributable to the changing seasons and other natural or man-made phenomena. There is no central repository of environmental data that can be easily accessed by the consultants or stakeholders nor is there a database of the baseline information contained in the various EIA studies submitted.

There is also an apparent lack of coordination and an overlapping of functions between the government agencies making the process more circuitous, time-consuming and ineffective.

For the most part, public hearings and public consultations are haphazardly conducted and poorly presented due to time constraints and the lack of skills within government to handle social issues. Documents are not freely accessible to the public due to fear, uncertainty and a lack of experience in handling seemingly contentious matters.

## **RECOMMENDATIONS**

The Government should strengthen the use of the EIA system as a planning and monitoring tool rather than a command and control instrument in order to optimize scarce resources and effectively implement the system. The government needs to rationalize its present structure in order to provide opportunities for growth and satisfaction to its personnel. Training and career opportunities should also be provided to keep experienced and competent staff from leaving the government service.

The methodologies used in the preparation of environmental assessment studies, the conduct of reviews and the monitoring of compliance should be apparent to the stakeholders. Systems should be put in place so as to raise confidence among the stakeholders involved in the decision-making process. It is of the utmost importance that transparency in the conduct of the study should be observed in order to maintain the impartiality of the entire process. The accreditation of the consultants and the reviewers should be strictly enforced in order to maintain the integrity and the professionalism of the process.

There should be a dedicated commitment from the government to strengthen the laws, rules and guidelines pertaining to the EIA system. There is a growing need to integrate the different environmental regulations into one coherent law so as to make the entire process more effective and consistent. Legislation should reflect the present aspirations of society and should not delay in addressing those needs. The public should be given the right to participate in, and be informed of, the decisions made in matters concerning the environment so as to increase their awareness and participation in a process that greatly determines their well-being and their entire future.

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## EIA of the proposed midlands dam project: Mauritius

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### ABSTRACT

The Midlands Dam project will, upon completion, constitute the largest reservoir in Mauritius, transferring water from a relatively wetter region to the drier northern districts. Four hundred and thirty eight hectares of predominantly forest/scrub land will be lost and about 250 squatter-residents will have to be relocated. In view of its wide ranging environmental impacts, both on-site and off-site, an impact assessment was prepared to enhance project acceptability and identify measures aimed at mitigating the negative impacts. The full EIA followed an earlier scoping exercise that identified the significant impacts. However, in the absence of reliable environmental baseline data, the assessment adopted a 'best professional judgment' approach. This paper highlights the main features of the project and the procedural context within which the EIA was prepared, and discusses some of the main issues that need to be addressed to improve the whole EIA process.

### INTRODUCTION

The Midlands Dam project involves the construction of a 42 Mm<sup>3</sup> reservoir in two phases (25 Mm<sup>3</sup> + 17 Mm<sup>3</sup>) to enable the transfer of water from the relatively wetter central part of the country to the drier northern districts. As legislative requirements provide for the preparation of an environmental impact assessment for projects that may have adverse effects upon the environment, the proposed development was subjected to the statutory EIA process. The main objective was to provide for a formal mechanism to ensure that the proposed development is environmentally sound and sustainable and that the concerns of all affected parties were thoroughly addressed. It aimed at enhancing project acceptability by maximizing the benefits while minimizing adverse impacts. The process was also encouraged by aid donor agencies and countries as they are increasingly relying on EIAs to arrive at better informed decisions.

The reservoir project was initiated in response to the growing demand for water in the northern districts of the island. This region has in fact witnessed an above national average rate of urbanization over the past two decades and present water storage capacity needs to be increased to satisfy future

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water demand for residential, irrigation and industrial purposes. The dam will upon completion be the largest in Mauritius and will involve the construction of an embankment-type earth fill dam founded on natural ground, a spillway structure, an outlet canal, and a new road to replace those feeder roads that would be flooded. The project will also entail significant quarrying activities close by to provide for aggregates.

### **NATURE AND SCOPE OF ISSUES**

The dam and reservoir sites involved represent little ecological interest, except as the last known natural habitat for an endemic plant, the *Crinum Mauritianum*, which has been the focus of research in cancer treatment. The sites also support the last few remaining natural populations of the rush (*Juncus Bulbosus*) in Mauritius. Water quality issues were, however, considered more significant taking into account national physical development planning proposals to allow urbanization of sections of the reservoir's catchment area. In terms of land conversion, the project was considered to be in line with government policy to convert land presently under tea to more profitable uses. Of the 438 hectares of land that would have to be flooded, 410 hectares are forest/scrub land. With adequate mitigatory measures, environmental protection policies would be largely satisfied. The most sensitive issue, however, related to the relocation of about 240 people, all squatters on an abandoned tea village that would be flooded. The off-site impacts were also considered to be significant enough to warrant investigation. Such impacts related to reduced water flows downstream, increased sewage volumes as a result of improved sanitary facilities, and increased agricultural production following increased availability of irrigation water.

### **PROCESS AND PROCEDURAL CONTEXT**

After nearly two decades of unparalleled and sustained high rates of economic growth, there has been growing concern that the fragile environment of the island may have been severely degraded and that, if corrective actions are not introduced immediately, future economic development may be jeopardized. In the late eighties, the Government adopted an environmental action plan thereby committing itself to sustainable development. Such commitment was further stressed at international meetings and by actively participating in a number of international programmes. The Government's aims are, specifically, to:

- increase efforts to mitigate the adverse effects of environmental degradation;
- monitor environmental performance of industries, commercial concerns and the agricultural sector; take strong and pro-active action on emerging environmental issues facing the nation;

- build partnerships with community groups, non-governmental organizations, business and industries; and
- facilitate public awareness and provide educational opportunities for people to learn about conservation and sustainable human development.

The enactment of the Environment Protection Act (EPA) in 1991 was another milestone in the country's effort towards sustainable development. In line with provisions contained in Section 13 of the Act (as amended in 1993), EIAs are therefore being increasingly introduced into the national decision-making process and are basically aimed at alerting the decision-makers to the consequences of the proposed development for the environment. The process is also applied with regard to more vigorous policies enunciated by international funding agencies and aid donor countries who want to ensure that development projects they are funding do not conflict with local environmental protection objectives. This follows Principle 2 of the Rio Declaration on Environment and Development which stresses the responsibility of nations to avoid causing damage to the environments of other nations.

The impact assessment carried out in connection with the project under reference is furthermore structured along several internationally accepted principles which emphasize preventive, holistic, strategic approaches to environmental protection. It is thus guided basically by four principles laid down in the EU Programmes on the environment, namely:

- prevention is better than remedial measures;
- environmental damage should be rectified at the source;
- the polluter should pay the cost of measures taken to protect the environment; and
- environmental policies should form a component of other policies.

EC Directive 85/337 contains information on the methods used in environmental impact assessment. The guidelines laid down by the World Bank have also been extensively utilized to determine the significance of potential impacts of development projects. Finally the principles laid down by local regulations have been adhered to.

### **APPROACH TAKEN**

The impact assessment followed a scoping stage undertaken by a different consultant. Though the findings of the scoping team enabled the EIA team to focus their attention on a certain number of issues, GIBB Environmental (UK) decided to carry out a full project screening exercise. Sessions were arranged with almost all interested parties, which included government departments, NGOs, individual scientists and other consulting firms. A report summarizing the meetings and the findings was produced and

circulated among a restricted group of interested parties. Once the Consultant was certain that no significant element was missing, the full EIA was prepared and a draft report produced. The Client was required to submit comments and once feedback was obtained, the report was finalized. As required by law, the final report was submitted to the Department of the Environment for approval. This process included a 21-day public consultation and comment period.

In preparing the report, the Consultant made use of a couple of local consulting firms. This is in line with recommendations of organizations like the World Bank which try to encourage greater participation of local expertise in major projects with a view to enhancing local capabilities. Other foreign teams were pulled in to constitute a multi-disciplinary team with varying experience and skills. As Mauritius does not have an established and easily accessible environmental base line data bank, the approach adopted was based on the 'best professional judgment' methodology. Such an approach makes the best use of each team member's experience and develops appropriate mitigatory measures to reduce any potentially significant impacts on the environment.

The project does not seem to have generated much controversy and approval was fairly easy to secure. More interestingly, somehow dams and reservoirs are not included in the scheduled list of undertakings requiring full fledged EIAs when the necessary legislation was prepared. Technically this project should not have gone through the EIA process and the Department of Environment was therefore rather confused in dealing with the report. It nevertheless decided to pass the report given that the funding agencies were expecting such an approval before giving their final OK.

## **RESULTS AND IMPLICATIONS**

The EIA study concluded that the project was not in serious conflict with any major national physical or environmental protection policy. The on-site or off-site impacts identified were of varying significance and these could be adequately mitigated to reduce any threat to the environment. The three main areas of potential conflict that were identified are: protection of agricultural land against threat from other uses, protection of vulnerable habitats and rare species, and national physical planning policies that provide for urbanization of sections of the proposed catchment area of the reservoir.

The environmental management plan developed in the assessment specifically called for greater coordination among interested parties to try to monitor certain impacts. Deeper investigation was required to determine how the plant species that has an international importance and that is threatened can best be protected. The report assumes that the plant can be transferred to identical sites elsewhere and returned to the original site once the project is completed. But there is a chance that this procedure fails, in

which case the whole reservoir project may be jeopardized. This issue was not dealt with at the EIA stage and it appears that it was conveniently assumed that the plant can be easily propagated.

This is typical of many EIAs prepared worldwide. In fact, many surveys have gathered evidence to show that a large majority of environmental assessments are unsatisfactory. There are numerous explanations for this, but the main argument relies on the premise that the environment is so complex that it is virtually impossible to predict all the impacts of a project. Impacts, in fact, have four main characteristics: they can be on-site (affecting the site where they are generated), off-site (affecting sites away from source), intertemporal (manifesting themselves at a future time) or be a combination of all three. The paucity of data complicates matters and in the absence of reliable data on a number of environmental issues, it is difficult to use most of the methodologies developed so far in environmental impact assessment studies. Of all the environmental impact assessment methods developed so far, the matrix remains the most effective way of determining the significance of the impacts a project may have on the physical and socioeconomic environment.

The analysis of impacts is made with the help of a matrix including on one axis the actions which cause environmental impact and on the other existing environmental conditions that might be affected. This provides a format for comprehensive review to remind the investigators of the variety of interactions that might be involved. It also helps in the identification of alternatives which might lessen impact. Two aspects of each action come into play:

- the magnitude (degree, intensiveness, or scale) of the impact upon specific sectors of the environment; and
- the significance (weight) of the particular action on the environmental factor under analysis.

While the magnitude of an impact can be evaluated on the basis of facts, evaluation of the significance of impact will be based more on value judgments.

Assessments based on matrices therefore remain at best very subjective. In fact, significance has to be determined against accepted norms and standards. This implies the definition of a threshold, which unfortunately in Mauritius is yet to be precisely determined.

Furthermore the EIA relies on coordination and comprehensive decision making styles for its success. But one has to bear in mind that comprehensive decision-making is faced with two main sets of impediments: one is made up of constraints imposed by existing institutions and attitudes, while the second concerns limits imposed by the way decisions are made in both the government and private sectors. Current institutional biases and thinking run counter to principles of comprehensive

decision-making. Integrated environmental management is a multi-disciplinary exercise requiring inputs from a whole range of departments and experts.

Expertise means narrow and specialized expertise. A multi-disciplinary team of experts does not, therefore necessarily provide a comprehensive view of an issue. Only a few persons, by training, experience and predilection can engage and promote comprehensive environmental decision-making. The other problems concern the fragmented way in which individual policies evolve. Incremental decision making is considered a more pragmatic approach because of no clear evidence of man's capability for objective rationality. Problems are dealt with one at a time, through trial and error. Other government agencies/departments/ministries are trying hard to retain their independence to make individual decisions.

### **LESSONS LEARNED**

The whole EIA process with the scoping exercise has proven to be rather inadequate in dealing with broader environmental management issues. The introduction of strategic impact assessment in the process would go a long way to providing the appropriate framework for project-specific assessments to be carried out. Issues related to cumulative effects, greenhouse policies and sustainable development are probably better addressed at the SEA level. The project-specific EIA is also unable to deal with matters such as the cumulative effects of a number of projects of different types. Since the inter-temporal nature of impacts is difficult to comprehend within the EIA of a single project, the introduction of regional environmental plans (REPs) can significantly contribute towards a better coordinated action in environmental management of a region. Such a REP process can also help establish a solid data base by coordinating the collection, storage and the dissemination of data, the paucity of which hinders the proper assessment of impacts due to the absence of an adequate environmental baseline.

Furthermore the local consultants should be more involved in the development of the methodology and the assessment of impacts as a whole. As it is, local expertise is used in marginal tasks only (as in data collection). Such an involvement does not contribute towards local capability development and this is contrary to accepted international principles.

### **LIST OF RELEVANT PUBLISHED PAPERS OR OTHER SOURCE MATERIALS**

The Environment Protection Act (and its amendment of 1993).

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**Key words**

**sustainability  
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# Environmental management of the Bagmati River Basin

*Arjun Paudel*

## ABSTRACT

The Bagmati River is the principal river of the Bagmati Basin (ca. 3640km<sup>2</sup>) in central Nepal. The river, fed by springs and monsoon rainfall, originates in the north of Kathmandu Valley (the capital of Nepal) and drains across the Mahabharat Range to the Gangetic plain. The Basin transacts three distinct latitudinal physiographic zones (Mountain, Siwalik and Terai) of the Nepal Himalayas. Hard rock geological formations at the Basin headwaters stand out as a resistant ridge complex compared to the weak and fragile rock formations at the middle stretches of the Basin.

The Bagmati Basin currently faces a number of serious environmental and ecological challenges. Urbanization and industrialization of the Basin headwaters at Kathmandu contributed to water quality deterioration with regional consequences on the aquatic ecosystem and on the health of the downstream sub-basin's user groups. Increasing population pressure on the fragile mountain slopes has also resulted in the rapid degradation of the natural resources. As a consequence, deforestation, soil erosion, landslides, siltation etc. are occurring in the upper and middle sections whereas sedimentation and flooding is frequent in the lower stretches of the watershed. This synergetic effect is of concern for the sustainable use of the resources and infrastructures.

The overall damage caused by the 1993 flood in the Basin has provided impetus to Nepalese planners, engineers, environmentalists, policy makers and stakeholders to think on the Basin-wide environmental perspectives for the overall sustainability of the project. This paper deals with the various facets of environmental management and monitoring of the watershed for its sustainable development.

## INTRODUCTION

The Bagmati River originates just below the summit of Shivapuri Hill and is fed by springs and monsoon rainfall and a number of tributaries as it flows down from the Kathmandu valley floor and passes through the valley at Chovar. The river is fed by a number of tributaries originating at Mahabharat and in the Chure Range before it reaches the Terai at Karmaiya. The Bagmati River Basin, based on morphology, land-use etc., can be

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divided into different sub-basins *viz.* Upper Bagmati, Upper Middle Bagmati, Lower Middle (Terai) Bagmati and the Lower Bagmati (Terai) sub-basin. The total area of the Basin within Nepalese territory is about 3638km<sup>2</sup>.

In the 1991 census, the total Basin population was given as 1.6 million of which 61.5 per cent inhabit the Upper Bagmati sub-basin, where the capital city of the Kingdom of Nepal, along with other four municipalities including a number of village development committees, are situated. It is also reported that a total of 2174 out of 4271 water polluting industries operating in the country are now in operation in the Upper Bagmati sub-basin.

Increasing degradation of the Bagmati Basin has been evident in recent years due to rapid population growth and expansion of the urban areas within the upper Bagmati sub-basin. Uncontrolled disposal of untreated wastewater (domestic, industrial, solid waste leachate, agricultural runoff etc.) in the rivers has far surpassed the assimilative capacity of the river. Likewise, deforestation, soil erosion and landslides have been causal factors of Basin degradation which is being increasingly threatened by damage to the infrastructure of reservoir, barrage, canals, bridges and roads from debris, tree and logs carried by the river during the monsoon season.

A comprehensive environmental study of the Bagmati River Basin was carried out by the Water and Energy Commission Secretariat using a team of experts to formulate concrete proposals for mitigation measures for:

- pollution abatement and improvement of the river water of the river thereby enhancing its assimilative capacity;
- decreasing suspended solids and siltation in river beds, canals and irrigated fields; and to
- minimizing threats to the stability of infrastructures.

The concept of Basin-wide planning for sustainable development is still new to Nepal. A development programme based on, and implemented by, administrative units could not handle and foresee the environmental impacts in the surrounding vicinity. A basin is a land unit defined by the natural barriers and the natural resources within such boundaries have intricate relationships. Exploitation of one resource has a direct impact on the other. The study was intended to evaluate the environmental conditions of the existing Bagmati River Basin in order to help in the appropriate selection of development projects for the Basin development in a sustainable manner.

#### **NATURE AND SCOPE OF ISSUES**

The Bagmati River Basin currently faces a number of serious environmental and ecological challenges. Uncontrolled discharge of untreated wastewater and solid waste into the Bagmati River in the upper sub-basin has degraded the quality of surface water beyond acceptable limits. The impacts of water

quality deterioration have regional consequences on the aquatic eco-system and on the health and cultural, religious and aesthetic values of the downstream sub-basin user groups. Similarly, the increased population pressure on the fragile mountain slopes has resulted in the conversion of marginal land into agricultural land, enhancing the rapid degradation in the quality of the natural resources. Deforestation, soil erosion, landslides, siltation etc., the results of excessive resource exploitation in the head reaches of the Basin, have posed serious threats to the stability and sustainable use of downstream infrastructures – the Bagmati barrage of the Bagmati Irrigation Project and the Kulekhani reservoir of the Kulekhani Hydroelectric Project.

Issues relating to the physical, biological, socio-economic and cultural environment within the River Basin were reviewed and studied. The specific issues considered during the study were to:

- assess environmental conditions of the Bagmati River Basin;
- conduct a comprehensive environmental analysis of the sub-Basin of the Bagmati River Basin;
- make concrete recommendations for the mitigation of river pollution, solid waste disposal and management, ill effects arising from the extreme use of river water for drinking water and sewerage problems in the Bagmati river Basin; and
- investigate the perceived threat to the Bagmati Barrage at Karmaiya due to accumulation of debris and floating trees by landslides upstream to the barrage and to propose concrete measures to avert the threat.

### **PROCESS AND PROCEDURAL CONTEXT**

Environmental assessment study of development projects has been introduced very recently in Nepal. After the preparation and approval of the National Environmental Impact Assessment Guidelines, 1993, by His Majesty's Government, environmental impact assessment studies of the larger projects have taken place. After the promulgation and enforcement of the Environmental Protection Act, 2053, and Environmental Conservation Regulations, 2054, in 1997 EIA has been mandatory. Since the scope of this study differs from the project specific activities, the study processes did not exactly follow the provisions made in the Act, Regulations and the Guideline. The following study processes were adopted to accomplish the task by the team of experts:

#### *Approval of scope of work*

The proponent, using the available information and literature, finalised the scope of the work and prepared draft Terms of Reference. Based on the draft

Terms of Reference the consultants prepared and submitted the technical and financial proposals to the proponent and the agreement was reached between the parties.

#### *Scoping finalisation*

The consultants prepared an inception report identifying issues related to the Basin and submitted it to the proponent for finalisation. A scoping seminar was then arranged representing experts and stakeholders. The environmental issues were presented, discussed and then finalised for the study.

#### *Field study*

The field study was undertaken by the team of experts in order to collect first hand the information on socioeconomic conditions, existing environmental conditions, present activities in the Basin and collection and analyses of river water samples at different stretches of the Bagmati River and its tributaries. The information collected from secondary sources was also verified during this period. Public hearings and discussions at different locations within the sub-basin were conducted to get people's perceptions about the existing Basin environment and mitigation measures.

#### *Report preparation and submission*

Data concerning the sub-basin area was collected from different sources and compiled, analyzed and interpreted. A report was prepared and submitted to the client for review and comment. A seminar was conducted to present the study findings at the central level. Detailed discussions were held on the environmental issues and mitigation measures suggested for Basin-wide planning. Based on the comments and suggestions made during the presentation seminar, the consultants finalized the environmental study report and submitted it to the client.

### **APPROACH TAKEN**

The study approach was initiated through the collection of secondary information. The collected information was reviewed, analyzed, interpreted and evaluated in a meaningful way to meet the study objectives. Most of the secondary information available in the limits of political boundaries was transformed into the Basin context. As the study emphasizes river pollution and the effects of erosion and sedimentation at the Karmaiya barrage site, the field study was mainly focused on these issues. However, other environmental issues were also dealt with, to some extent, with the objective of assessing their effects in terms of the sub-basins. In order to collect baseline data and information about the state of the existing environment in the Basin, separate matrices on baseline conditions and problems concerning natural resources and environment were developed and used for this

purpose. The matrix on baseline conditions and problems definition regarding natural resources was designed to incorporate information about the importance, extent of current use, availability of resources for future economic development, likely future demand, conflicts and availability of alternative resources. Likewise, the matrix to collect data on baseline conditions regarding the environment included the significance, extent and trends of environment degradation, effectiveness of current control measures, extent of environmental degradation with new protection measures and the need for new environmental protection measures. A checklist on the status of data availability on the Basin was also developed and used to facilitate the study objectives.

Study approaches taken in order to accomplish the task were the following:

Physical Resources

#### *Maps collection, analysis and interpretation*

Land use, land system, land capability and geological maps of the Basin were collected and analyzed. Based on these maps, different thematic maps on land stability, hazards and soil erosion potentials were prepared and used to qualify the existing environmental conditions of the Basin. Similarly, topographic maps and meteorological maps were collected to prepare drainage and elevation and physiographic maps.

#### *Water quality*

Water quality data available were transformed into the Basin river stretches to qualify the river water quality status in the Basin. For this purpose, river water pollution from both point and non-point sources based on population, livestock, agricultural inputs etc., was evaluated in the Basin in order to assess the river water quality of the Bagmati River system. In addition river water samples at different locations were collected and analyzed to monitor the present status of source pollution indicative parameters.

#### *Hydrology and meteorology*

Hydrological assessment of runoff from the Bagmati River Basin was carried out on the basis of the available hydrological data. Frequency analysis was carried out on the annual extreme series on annual extreme flows of streams. Computation of average rainfall over the Basin and rainfall characteristics such as monthly mean and the maximum daily rainfall were also computed. Frequency analysis was carried out on the annual extreme series of daily rainfall. Based on the rainfall data a relationship between monthly precipitation and monthly runoff was established and was used for the purpose.

### *Sediment transport*

Suspended sediment data collected from secondary sources was analyzed and a relationship between sediment load and river discharge was determined using suspended sediment data with river flows and Basin rainfall.

### *Soil erosion*

The Basin conditions with respect to soil erosion were evaluated using available secondary information. Information on soil types, vegetation cover, landslide inventory maps, land utilization maps, settlement patterns, human & livestock activities and soil erosion potential and hazard maps was collected and verified with limited field observations in the Bagmati Basin.

### *Biological resources*

Available information on vegetation, flora and fauna, land-use pattern, maps, and other publications were reviewed to analyze the status of biodiversity. A limited field survey was conducted to fill the data gaps on aspects of the terrestrial biological. Similarly, a limited field survey using structured and unstructured questionnaire formats for the local fishermen was conducted to analyze the status of aquatic bio-diversity, listing of rare and endangered species, identification of critical river stretches and relationship between water quality and aquatic life.

### *Socioeconomic resources*

Information on population, health and education, water supply, sanitation and solid waste management, economic activities, professional status, agriculture and industries was collected and analyzed. Different techniques and tools were used to verify the information during the field survey period.

### *Cultural resources*

Secondary information on the ethnic composition of the people residing in the Basin was utilized to broadly categorize the cultural traditions and their interrelationship with the environment. Places of archeological significance and their state of conservation were discussed, based on secondary information with verification during the field survey.

Major environmental issues were first identified and analyzed for their environmental implications in terms of extent and magnitude in the Basin area.

## **RESULTS AND IMPLICATIONS**

The extent and magnitude of the impacts of the issues concerning the Basin environment and their implications vary greatly in different parts of the Bagmati River Basin. The environmental impacts of the following issues were considered to be the major ones in the Basin.

### Water quality of the Bagmati River

Several studies have been carried out over the last decade to assess the Bagmati River water quality. However, these studies are considered within the Upper Bagmati sub-basin (Kathmandu valley river stretch) only. Apart from the study conducted by the Department of Hydrology and Meteorology for a period of four years (1992 -1995), other studies do not provide time series data on the river quality for all seasons of the year. All the studies have reported that the water quality of the Bagmati River in the Kathmandu valley is of very poor quality, chemically and bacteriologically, and unsuitable for any freshwater fauna and flora for most of the dry season. However, in the rainy season (June - September), water quality improves considerably due to the increase in the assimilative capacity of the river. River water quality in the upper Bagmati River stretch is rapidly declining so much that the river is merely a sewer in the dry season. Stanley *et al.*, 1994 have mentioned that the Bagmati River water within the Kathmandu valley is not fit for drinking water, recreation and irrigation purposes.

Paudel *et al.*, 1995 have estimated that the daily BOD<sub>5</sub> generation in the Kathmandu valley from industries and people is about 42 tons. In the dry season the Bagmati drains only 40 per cent of the daily BOD<sub>5</sub> generation and the remaining is retained in the valley itself which is becoming a major source of land and ground water pollution.

S.No	Location	Distance (km) Bagdwar = 0	pH	Con ( $\mu$ mos/cm)	TDS (mg/l)	DO (mg/l)	COD (mg/l)	NH <sub>3</sub> (mg/l)
1	Gokarna		7.6	70	56	6.7	21.6	0.16
2	Gaurighat		6.5	360	288	<0.5	273.6	16.8
3	Shankhamul	26.875	7.1	410	328	<0.5	90	18.6
4	Sundarighat	32.875	7.1	740	592	<0.5	378	42.8
5	Chovar		7.1	720	576	<0.5	367	38.8
6	Khokana	39.375	7.4	600	480	<0.5	108	36.0
7	Kulekhani dovan before		7.9	440	352	6.4	80	19.7
	Kulekhani dovan after		6.9	600	480	5.6	-	-
8	Khokojar Taldhunge		8.0	220	176	7.3	10.3	ND
9	Banchare, kayan khola	136.625	8.5	180	144	8.0	19	0.04
10	Karmaiya	144.2	8.3	200	160	7.2	6.5	0.02
11	Bramhapuri		8.2	230	184	8.4	66.0	0.21
12								

Table 1: Water quality along the Bagmati River

Source : WECS/NESS, 1997.

From water quality analyses results, it is found that the water quality of tributaries of the Bagmati River outside the valley is found to be good and can be used for a variety of purposes. River water quality at different sections of the Bagmati River is presented in Table 1 above and Figures 2-4.

River water quality analysis data shows that the river water within the valley is bad but as the River passes through the valley the quality of water improves slowly. After mixing with Kulekhani River water, Bagmati River water quality improves considerably. This situation continues after mixing with other tributaries originating in the hills and Chure as well. Water quality along the Bagmati River outside the valley seems to be improved till it passes through Karmaiya. However, the river water quality seems to deteriorate at Bramhapuri due to the disposal of partially treated industrial effluent from a Sugar Mill. WECS/NESS 1997 has mentioned that the sugar mill has already started the construction of an effluent treatment plant and by the time this is completed the main pollution source will be controlled in the region.

The deterioration of water quality in the upper Bagmati sub-basin has far reaching implications for the entire Bagmati river stretches because of the location of the sub-basin at the Bagmati headwaters.

It is reported that the decline in the river water quality has a direct detrimental impact on the health of the water user groups downstream of the Bagmati Basin. Incidents of diarrhoea, typhoid, jaundice, cholera and skin diseases are of common occurrence among the user groups. However, there are no specific surveys with regard to this. The riverside inhabitants complain of the occurrence of such diseases in the dry season when they have no option other than using the river water to meet daily demand. Livestock toll is even higher in the dry months due to water related diseases.

The polluted river water has seriously impaired the aquatic ecology and biodiversity along the Bagmati River. Fresh water fish have been completely wiped out from their habitats in the upper sub-basin and are declining in the river stretches of the upper middle and lower middle sub-basins.

The river is losing its religious and spiritual significance. The sacred river water for Hindu devotees has now become filthy and unsuitable for use on religious and cultural grounds.

#### *Sedimentation and flooding*

Sedimentation and flooding in the Bagmati Barrage and Kulekhani Reservoir have been identified as one of the major environmental issues in the Basin posing serious threats to the sustainability and the effective use of the infrastructures. Excessive erosion in the upland mountains and flooding and sedimentation in the plains and valleys are envisaged to be the common features in years to come. In other words the Bagmati Barrage & Kulekhani Reservoir will be under a constant threat of floods with a high concentration

of sediment load. The environmental implications for such structures, in the event of floods, are well exemplified by the flood of July 1993. Sediment deposits in front of the barrage at Karmaiya caused wide-spread floods in the Sarlahi and Rautahat districts. The damage to human lives and property was immense. Similarly, it has been estimated that over 7.71 million m<sup>3</sup> of sediments were deposited in the Kulekhani reservoir in three days of rainfall in July 1993, which is very high compared to 1.18 million m<sup>3</sup> of sediment deposited per year during the last 15 years.

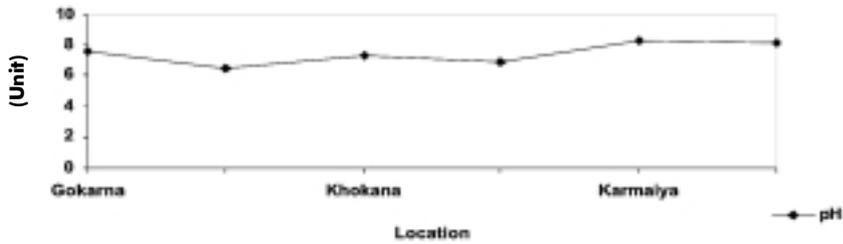


Figure 2: pH variation along the Bagmati River

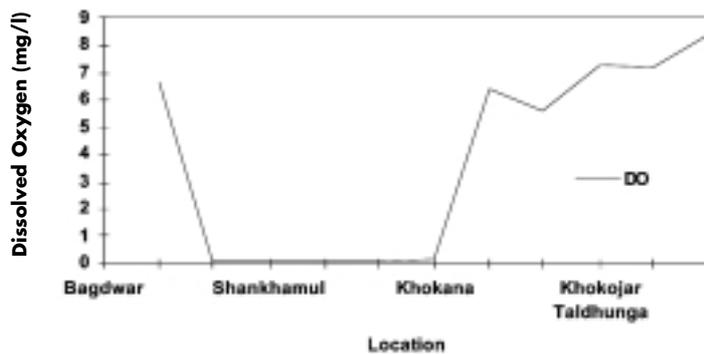


Figure 3: DO variation along the Bagmati River

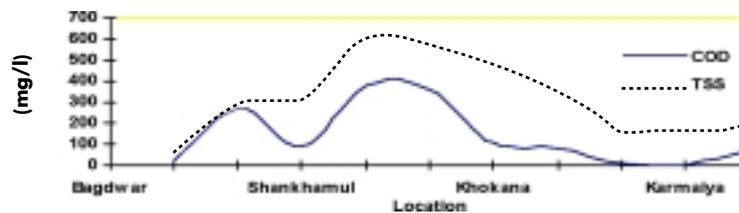


Figure 4: COD and TES variation along the Bagmati River

### Mitigation measures

Mitigation measures were formulated with the objective of minimizing the negative impacts on river water and erosion and sedimentation in the Basin.

The mitigation measures for river pollution include:

- setting of effluent standards;
- setting of ambient river quality standard;
- construction of wastewater treatment plants in the Kathmandu Valley;
- on-site sanitation;
- effective solid waste management;
- ban on river bed sand mining in the upper Bagmati sub-basin; and
- increase assimilative capacity of the river in the upper Bagmati sub-basin.

The mitigation measures for erosion control and sediment transport at the Bagmati Barrage and Kulekhani Hydroelectric Power Reservoir include:

Short term measure

- physical intervention

Long term measures

- land stabilization and erosion control;
- conservation of forest resources;
- reforestation of degraded forest;
- discouraging conversion of forest into agricultural land; and
- discouraging traditional agriculture practice on sloping or unlevelled surfaces.

In view of the present institutional arrangements, availability of information and management, establishment of a National Water Resources Research and Information Centre has been suggested.

### **LESSONS LEARNED**

The concept of Basin-wide planning for sustainable development is still new to Nepal. The present practice of planning and implementation programmes, based on administration boundaries i.e. districts and village development committees irrespective of the Basin, has serious environmental implications in the balanced natural environment in Nepal. The environmental constraints posed by the natural boundaries of the ecosystems are very important in sharing the fruits of development on an equitable and sustainable basis. Exploitation of one resource has a direct impact on the other. But this factor was never considered in most of the earlier development initiatives in Nepal vis-à-vis the development effort which could not achieve the goal of poverty alleviation of the Nepalese people. Development activities thus implemented have resulted in serious

negative impacts on adjacent areas due to the creation of imbalances in the existing environment.

Uncontrolled disposal of raw sewage and industrial effluents in the Bagmati River system has created serious health concerns for the downstream water user groups. Likewise deforestation, agricultural malpractice in the uplands and excessive exploitation of natural resources has increased the rate of erosion, and mass wasting and sedimentation in downstream areas has posed serious and constant threats to the overall stability of infrastructures.

In view of the experiences and the lessons learnt from the past, the concept of Basin-wide planning has been felt necessary for sustainable development in Nepal. Mitigation measures have been formulated, based on the present environmental conditions and study recommendations, with regard to river water pollution and short term and long term measures to curb the present rate of erosion and sedimentation are envisaged to be effective for the Basin environmental management.

#### LIST OF RELEVANT PUBLISHED PAPERS OR OTHER SOURCE MATERIAL

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procedures

# Assessed impacts of the proposed Bodhghat Hydroelectric project

*Asha Rajvanshi*

## INTRODUCTION

The purpose of this paper is to present a select Indian case of environmental appraisal of a hydro-power development project. An attempt has been made to focus on the implications of the Bodhghat Hydroelectric project for the wilderness values of the project area. The paper also presents an account of how public pressure, legislative framework and EIA procedures and practices have been effective in arresting a major ecological disaster even when EIA was not a mandatory requirement in India for determining the project feasibility. This case represents a situation that is unique in the way in which the development projects are generally pursued in developing countries, India included. In most cases, once a project is conceived, there is generally no looking back. At the most, what is really attempted is the mitigation of the impacts. The mitigation planning rarely takes into consideration the formulation of strategies that can be effective in mitigating all of the social and ecological impacts that are considered to be significant. These assessments which ignore the socioeconomic concerns and biodiversity impacts of the project often fail to produce a timely decision on the project implementation. For such projects, attempts are made to compensate for the delays in environmental clearance by advancing construction work and other preparatory activities in anticipation of the clearance which then tends to become the overriding justification for the clearance of the projects. This project has been an exception to the approach that is adopted in the case of many water projects. This project has been amongst those few projects in the country that was abandoned even after the project had made a sufficient headway on the grounds that the environmental appraisal failed to justify its recommendation.

## PROJECT BACKGROUND

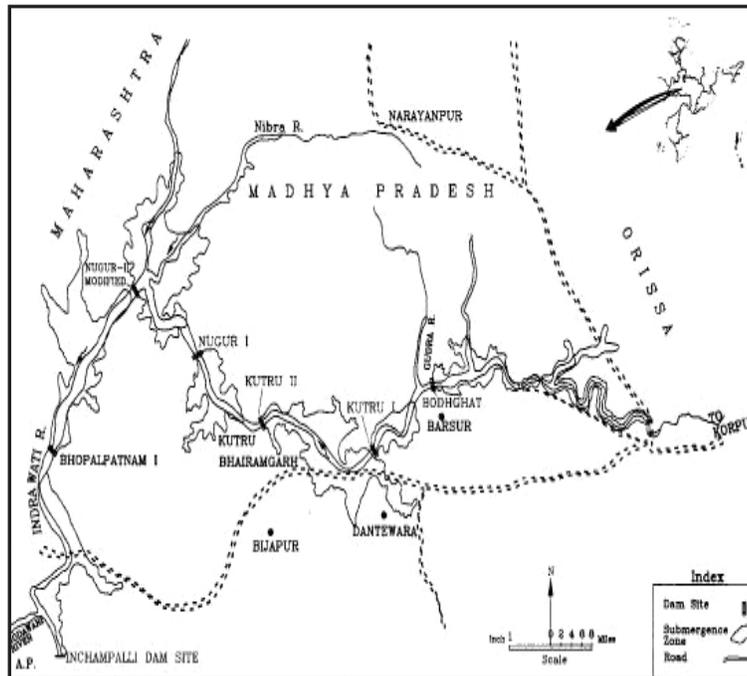
The Bodhghat project is a river valley project, involving the construction of a major dam on the Indravati River in Bastar district. This project, conceived as a precursor to a series of dams, (Kutru I and II, Nugur I and II, Bhopalpatnam and Inchampalli) was planned on the Indravati River near Barsoor a village (19°12' latitude and 81°24' longitude) situated about 100 km from Jagdalpur, the headquarters of the Bastar district (Figure 1).

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Figure 1: Bodhghat and other proposed dams on the Indravati River



The project involved the construction of the following :

- A composite dam of a total length of 1720 m at the dam top level consisting of a 855 m long and 90 m high concrete gravity dam and fill dams of 500 m and 365 m lengths on the left and right flanks respectively.
- A 3 km long (with 12.5 m diameter) head race tunnel.
- A 5 km long tail race canal.
- A surface powerhouse to support 4 generating units, each of 125 MW.

This project was designed as a peaking station with an installed capacity of 500 MW (4 units of 125 MW) to provide a large peaking potential to the power station of M.P. State. The total land requirement for the project was 13 783 147 ha of which 5 704 332 ha comprised of forest land. The forest area was made up of areas under Reserved Forest, Protected Forest and Undemarcated Forest (also referred to as Orange Areas). The project involved the displacement of nearly 10 000 tribal people from 42 villages.

#### NATURE AND SCOPE OF ISSUES

- The Bodhghat Dam was particularly regarded as environmentally damaging because its functional effectiveness was directly linked to the projects proposed downstream. Together, these projects could

impose a great stress on the ecology of the Indravati Tiger Reserve, Bhairamgarh Wild Buffalo Sanctuary and other surrounding habitats of Indian wild buffalo (*Bubalis bubalis*).

- The dam would result in the forced displacement of some 10 000 tribal people whose sustainable way of life based on a mixed economy of agriculture, herding, fishing and forest use would be entirely destroyed.
- The project would also lead to the inundation of a large area of forest, a resource fundamental to tribal people and whose dependency on the resources from forest is almost total and complete. The consequential movement of people into the forest interiors that are currently free from biotic disturbance would pose the major threat to the relatively undisturbed tracts of the forest and the wildlife habitat.
- The project would result in a total loss of 20 000 hectare of wildlife habitats.
- The non availability of cultivable land and the wood lots for meeting the resource needs of people for fuel wood, timber, food and fodder would have adverse effects on people driven from the project area.
- The entire project area, which provides an ideal setting for designation as a 'Biosphere Reserve' owing to its biological richness and its pristine nature, would become open to ecological destruction.
- The Bodhghat project would inevitably lead to the justification and the imposition of Bhopalpatnam, Inchampalli and the other projects located downstream.

#### **PROCESS AND PROCEDURAL CONTEXT**

At the time of development of the proposed project, legislation for mandatory EIA did not exist in India. The environmental appraisal of projects till the late seventies was based on a formalized scrutiny of proposals generally conducted by the Department of Environment (DOE). With the promulgation of the Forest Conservation Act in 1980 and the formulation of Environmental Guidelines by DOE for River Valley projects in 1984, and the enforcement of the Environmental Protection Act in 1986, the environmental appraisal of the river valley projects became a more focused effort to ensure the adherence of the developmental planning to the legislative framework that gradually emerged.

This project with an estimated cost of Rs.209.3 *crores* (equivalent to US\$50 million approximately) was accorded investment approval in the year 1979

by the Planning Commission, Government of India. The project was subsequently granted clearance by the Department of Environment (DOE), Government of India, in 1979. The project was to be completed within a period of six years from the date of its approval by the Government of India but could not progress due to the paucity of funds. The Government of India subsequently decided to submit the project for financial assistance from the World Bank and accordingly a revised project report was submitted to the World Bank in April 1983 with revised cost estimates. In 1984, the World Bank approved the loans totalling US\$300.4 million to the project after a brief appraisal mission had evaluated the financial and technical aspects of the dam. The project in its revised form was again submitted to the Government of India for clearance from the environmental angle. With the Promulgation of the Forest Conservation Act (FCA) in 1980, the project was also required to obtain clearance under the FCA. On the insistence of the Department of Forest, the DOE constituted a working group, which visited the site in 1985 for the environmental appraisal of the project. Subsequently, the DOE granted conditional clearance to the project with the provision that the project should be submitted to a professional agency for an independent evaluation of its impacts on the floral and faunal values that are critical for conservation.

In the mean time, the project also came to the limelight in the wake of belated concerns about the ecological balance voiced at the national level in different forums particularly after the controversy over the Silent Valley. The project also led to widespread discontentment amongst the people of the area because of the rehabilitation package that was visualized. Resentment against the dam also started building among the NGOs, the environmental lobbies, welfare societies and individuals who forwarded their representations for stopping the project to the Prime Minister of India. As a result, the Government of India (GOI) was forced to consider all the representations received by the Prime Minister's Office from different agencies/organizations. A special committee was constituted in 1987 under the then Secretary for Environment & Forests, Government of India, to re-look at the environmental and social issues related to the project.

At the same time DOE, Government of India, directed the Wildlife Institute of India (WII) to undertake the environmental impact assessment of the project with a view to provide an independent assessment of the impacts on the wildlife and forests. The study was initiated in October 1989 and was completed in April 1990.

### **APPROACHES TAKEN**

Besides adherence and compliance with environmental regulations and guidelines, proactive and participatory methodology on and off field was adopted. For the preparation of EIA report, primary and secondary data and

information were generated through systematic field studies. The field studies primarily focused on:

- assessment of the impacts of the project on biophysical environment;
- assessment of the status of wildlife habitats with special reference to wild buffalo habitat;
- assessment of the human dependencies on natural resources of the project area;
- review of the impacts of the project on wildlife values and the socio-economic status of the resource dependent community; and
- review of the rehabilitation policy for project-affected people.

Field investigations were made at all sites likely to be impacted by the construction of the proposed dam. These included areas under submergence, downstream areas of the dam, and the sites of powerhouse location and the access roads and areas outside the submergence zone, which could ultimately become the receiving area for displaced wildlife and human population.

Consultation with local and national agencies, both governmental and non-governmental, was used as an aid to supplement the field based data and information.

## RESULTS AND IMPLICATIONS

This section highlights the significant findings of ecological assessment and socioeconomic surveys conducted by the team of the Wildlife Institute of India.

### *Conservation values of the project area*

Forests of Bastar fall under 'Southern moist tropical deciduous' and 'Southern tropical dry deciduous' forest types (Champion & Seth, 1968). Bastar forests are unique in the country where sal (*Shorea robusta*) & teak (*Tectona grandis*) mixed with bamboo forests occur together on an easy terrain with favourable growing conditions. The forests of the project area are predominantly composed of miscellaneous forests. The upper canopy is distinctly composed of *Anogeissus latifolia*, *Buchanania lanzan*, *Lagerstroemia parviflora*, *Garuga pinnata*, *Chloroxylon swietenia* and *Cassia fistula*. The average height of the forest ranges between 18 to 20 metres and the average tree density is 695 per ha. The dense forests on the slopes and valleys and riparian forests and grasslands along the Indravati and its tributaries form excellent habitats for diverse wildlife.

The forests of the project area are home to a wide variety of wild animals. The area offers an excellent habitat for the carnivores such as tiger (*Panthera tigris*), leopard (*Panthera pardus*), hyena (*Hyaena hyaena*), and jackal (*Canis*

*aureus*) and the herbivores such as spotted deer (*Axis axis*), four horned antelope (*Tetracerus quadricornis*), barking deer (*Muntiacus muntjak*), Indian bison or Gaur (*Bos gaurus*) and the critically endangered wild buffalo (*Bubalis bubalis*). Some of the other mammalian species of conservation importance occurring in the project area include the giant squirrel (*Ratuffa indica*) and the smooth Indian otter (*Lutra perspicillata*).

The Indian wild buffalo is an endangered species listed in Red Data Book (IUCN 1994). Its numbers have dwindled dramatically since the early forties in the Central India. Today, four relict populations are known from Bastar district. Of these, two populations occur in the Protected Areas located in the vicinity of Bodhghat and other projects proposed downstream. The largest is in the Indravati National Park with a little less than 100 individuals recorded in 1988. A second population is 60 km upstream on the Indravati river at Bhairamgarh Wildlife Sanctuary comprising of about 10-20 individuals (Divekar & Bhushan, 1988). The wild buffaloes of Bastar are considered to be the purest wild genetic stock and their conservation is therefore critical.

#### Ecological issues

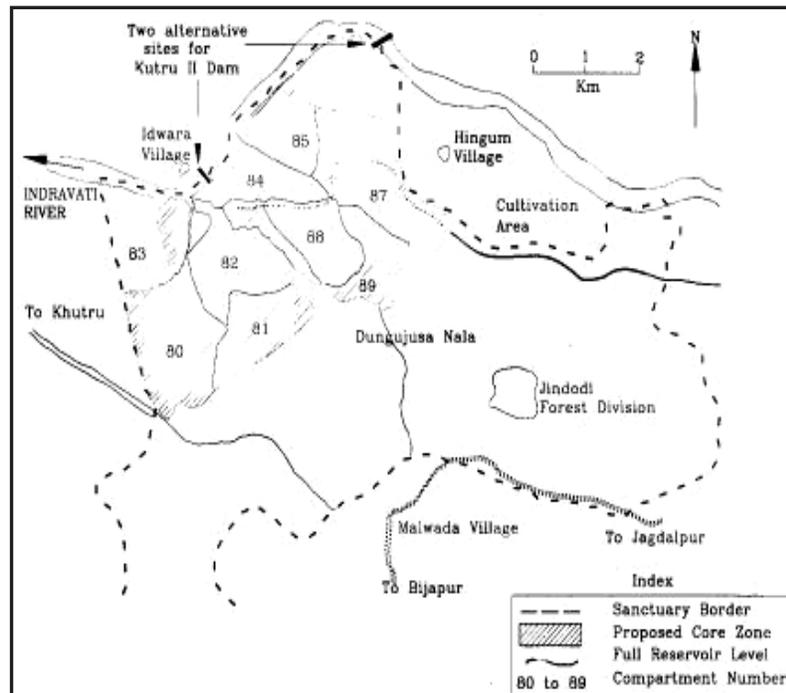


Figure 2: Submergence of the wild buffalo habitat within the Bhairamgarh Wildlife Sanctuary would be an immediate consequence of the Kutru 11 project

Bodhghat Hydroelectric project is expected to cater to the peaking power requirements in the evening. All the four turbines will operate together during the evening hours resulting in heavy discharges that would be many

times the rate of normal lean summer discharge. This sudden increase in water discharge would result in the flooding of the grassland habitats within Bhairamgarh Wildlife Sanctuary located 60 km downstream of the project location. Based on daily schedules of the turbine operations and discharges into the river, it is anticipated that the grasslands in Bhairamgarh Sanctuary would be flooded between 8 pm and 11 pm. This would coincide with the main foraging time of wild buffalo in summer, when such river bed grasslands are their critical food resource. The changed water discharge regime due to the project will thus severely jeopardize wild buffalo habitat in Bhairamgarh Sanctuary. This is particularly so because, out of the total areas of the Sanctuary the prime wild buffalo habitat is only about a fourth of this area falling in compartment numbers 80 to 85 and 87 to 89 (Figure 2).

The enormous quantity of water held here in the reservoir of Bodhghat project will naturally be the justification for more downstream hydroelectric projects. It is also a known fact that five hydroelectric projects (Kutru I, Kutru II, Nugur I, Nugur II and Bhopalpatnam) are planned on the stretch of Indravati that is upstream of the proposed major multi purpose project at Inchampalli on the Godavari near its confluence with the Indravati (Refer Fig. 1). From the preliminary details that were made available for these proposed projects (Anon, 1988), it is seen that if Kutru II Dam were constructed at the site proposed near village Idwara, it would almost entirely submerge the prime wild buffalo grassland habitat along the river in the compartments numbered 84 and 85 (Figure 2).

Further, all these five projects are so planned that the discharge level from the tail race of the upstream project would be nearly at the same level as the Full Reservoir Level (FRL) of the immediately succeeding downstream project (Fig. 3). This would mean that almost the entire length of the Indravati River from the location of Kutru 1 project to Bhopalpatnam Dam would no longer remain natural. The series of reservoirs that would be constructed would completely isolate the areas to the north and west of the Indravati River from those on its south and east. Moreover, almost the entire stretch of the rich riparian wildlife habitat would be submerged. Thus, both from the point of view of the prime habitat loss and the disintegration of movement corridors, this series of dams would cause irreparable damage to the ecology of the area and to the wildlife buffalo in particular.

#### *Socioeconomic issues*

The Tribes of Bastar, as any other hill tribes, have an affinity to the forests in which they live. Their sustenance is closely inter-woven with the forests. Over 90 per cent of the people inhabiting the watershed belong to the tribal community that comprises the Bison Horn Maria, Jhoria Muria and Raj Muria Tribes. These tribes inhabiting the project area predominantly derive sustenance from forest resources. A calendar of the activities of the people of the project area establishes the intricate relationship that the people of the project area have with the forest in their immediate surrounds (Table 1).

Main Activity	Months											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cultivation & Agricultural labor					■	■	■	■	■			
Collection of flowers of Mahua sp. and tamarind fruits			■	■	■							
Collection of leaves & seeds of Diospyr melanoxyton and Shorea robusta					■	■	■					
Collection of honey, and resins, etc.		■	■	■								
Collection of tubers, bamboo shoots, mushrooms etc.						■	■	■	■			
Collection of forage and fishing	■	■	■	■	■	■	■	■	■	■		
Forest labor			■	■	■							
Hunting, netting and trapping of animals	■	■	■	■								
Making of basket, mats, traps etc.	■	■			■	■					■	■
Repair of houses and agricultural imple				■	■	■				■	■	
Storage of fuel wood				■	■	■				■	■	

Table 1: Seasonal calendar of the activities of the people in the project area

The results of the socio-economic surveys further indicate that agriculture provides only about 50 per cent of the sustenance. The remaining 50 per cent of sustenance is based on consumption of forest resources and on goods and services provided by the common property resources (Figure 4).

The combined income from the sale of Minor Forest Produce (MFP) and products like baskets, mats, ropes and plates made out of the raw material collected from the forest is insignificant and is variable among the villages located in the forest interiors and the distant villages.

The resources of prime importance for consumption are the fuel wood and the forest food (Figure 5). Fish and meat obtained from hunting gathering lifestyle and also through the traditional practice of community hunting (locally referred to as 'Parad') additionally supplements the food resources from the forest.

Dependence on the forest for livestock grazing is almost complete as the total livestock population belonging to the villagers of the project area graze in the forests of the proposed submergence zone. Although estimation of fodder in terms of quantities removed from the forest was not made during the course of our study, fodder beyond doubt constitutes the single largest forest resource on which the people who own the livestock heavily depend.

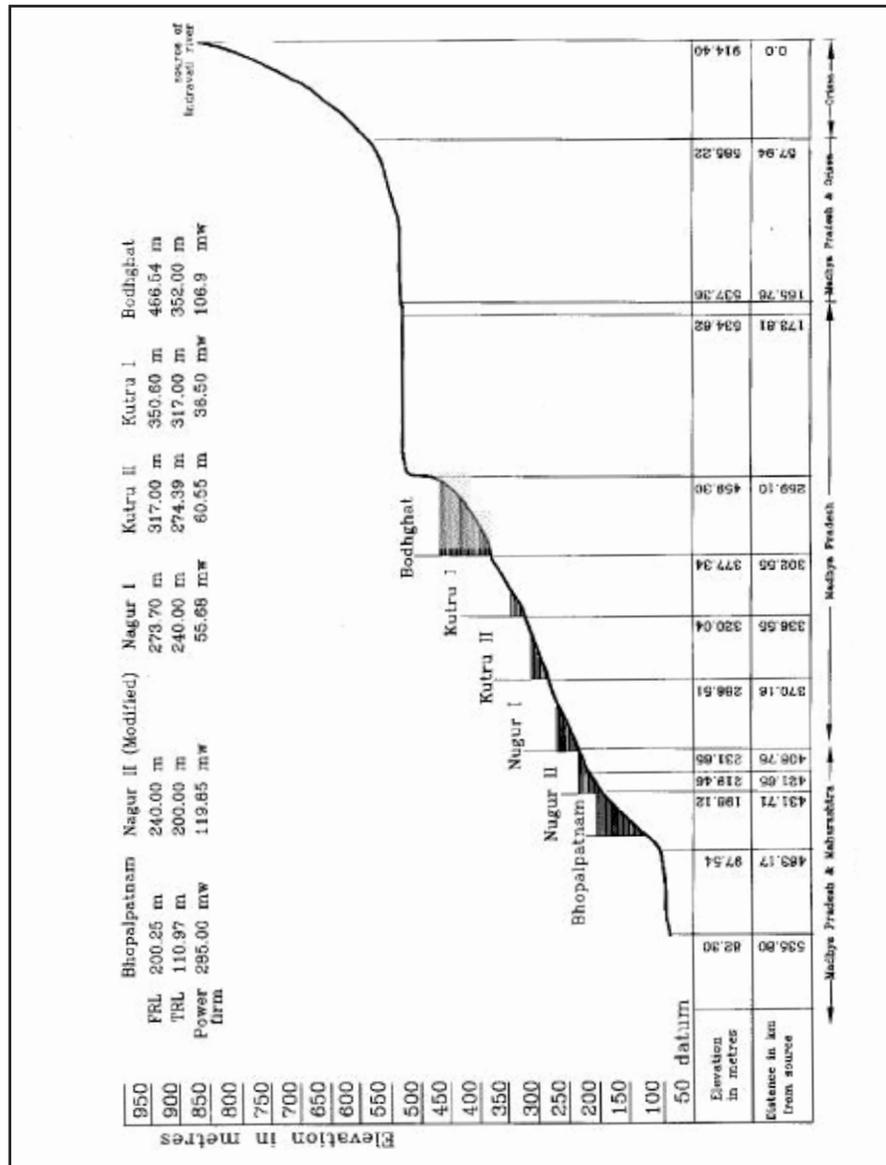


Figure 3: Proposed hydroelectric projects on the Indravati River

Since the economic well being of the people of the project area is dependent on the sustenance driven demands from the forest resources, the implementation of the Bodhghat Hydroelectric project would inevitably threaten the existing and intricate relationship of the people with the forest.

The fact that Bodhghat project does not have an irrigation component failed to evince any special interest among the people of the area who would have seen the project in the different light if it would have offered to them



irrigation possibilities in its command areas. The obvious scenario that would emerge in the event of the project being implemented is the generation of the power at the project site for transmission to northern industrial districts of M.P. that are completely removed from the project-induced impacts and the ground realities. While these northern districts would reap the economic benefits of power-driven industrial expansion, the people of the project would suffer from underdevelopment resulting from the lack of the political will to promote village development programmes in areas likely to be submerged in the event of the project's implementation.

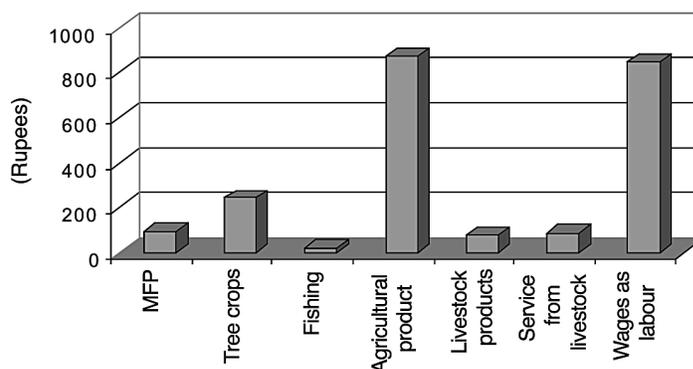


Figure 4: Average income of the people of the project area from different sources

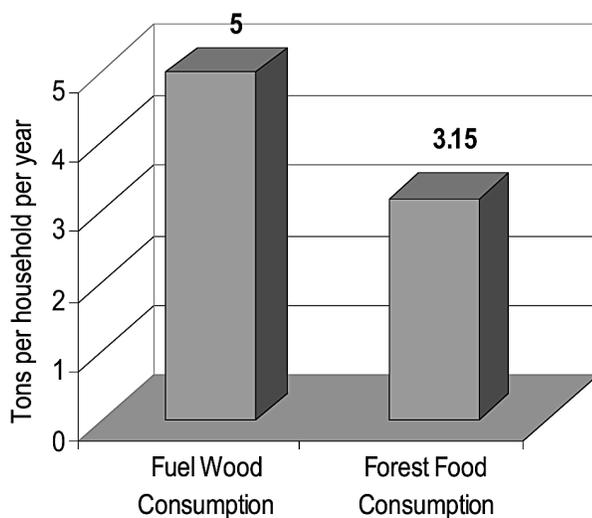


Figure 5: Consumption of major forest resources by the tribal population of the project area

The review of the rehabilitation policy provides another distressing picture because there appears to be a repetition of the blunders that in the past have

caused most rehabilitation programmes to suffer from inherent failure to promote productivity of land. The rehabilitation sites for people displaced by the project have been carved out by scarifying the existing areas under the village commons. This would obviously place greater demands for resources on remaining areas under the commons leading to the decline in the productivity of land. This would also lead to a fall in the per capita share of goods and services from common property resources as a larger number of people would be forced to share a much reduced area due to appropriation for rehabilitation.

The smaller agricultural holdings at the new sites would not be able to sustain the people in the long run. This is obvious as the agricultural income from still smaller parcels of land may not suffice to meet other resource needs (MFPs, fodder for livestock, timber for housing and forest food) of the people who would require financial investment in the changed scenario.

Common knowledge and experience of other projects suggest that stressed man-to-land ratio at the rehabilitation sites and resource crises would force people to encroach upon forest interiors that would inevitably become open to biotic pressures (Rajvanshi 1994). The direct impacts of submergence of wildlife habitats and the degradation of remnant habitats due to the sudden influx of people should be considered to be the most obvious implication of the project and one that would severely threaten the integrity of the wildlife habitats and the viability of the populations of some of the highly endangered species of central Indian fauna.

### **KEY CONCLUSIONS AND IMPLICATIONS**

From the EIA studies conducted by the Wildlife Institute of India, it could be concluded that the ecological and social impacts of the Bodhghat project far outweigh its economic benefits. In view of the findings of the ecological and socioeconomic assessment undertaken by the WII team and the independent observations of the Special Committee of the Government of India that visited the project site in 1987, the project could not be granted clearance under the Forest Conservation Act (1980). As a result, even the environmental clearance that was granted on the condition that the project would have to first obtain clearance under the FCA (1980) was revoked in 1994.

The rejection of the project came in 1994 after a substantial progress was made in the construction activities at the proposed site in the anticipation of the forest clearance coming through. The construction work that was completed prior to the rejection of the project included the construction of storage facilities, township and residential colony, health and educational centre for the staff, downstream bridge across the Indravati River, approach channels to intake structures up to the head race and the two additional tunnels to the head race tunnel. The excavation works that were completed

prior to the decision on clearance of the project included powerhouse excavation and the dam foundation.

### LESSONS LEARNED

- The importance of economic and engineering paradigms in development alone can not lead to sustainable development and economic prosperity. A better understanding of the interplay between development and the natural environment in which development takes place is necessary at the time of project planning to ensure environmental security and economic prosperity.
- The environmental impact assessment process highlights the need for paying greater attention to cumulative and synergistic impacts viewed from the standpoint of the ecosystem and the fact that the project will be a precursor to several similar projects in the area.
- The habitat trade-off analysis can be a significant issue in decision making.
- Sustainability principles need to be included in the methodological guidelines for the conduct of EIA and adequate significance needs to be given to biodiversity impact issues.
- Good EIA requires careful handling of the socioeconomic dimension particularly if these are linked to resources that are expected to be diverted to the project.
- The project has little chance of success if it runs counter to, or ignores, the traditions, values and social organizations of the intended beneficiaries or if its objective is too removed from fulfilling their every day needs.
- Public pressure can often help environmental conservation especially if political will is wanting or found wavering.

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#### **Key words**

**sustainable  
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**cumulative  
effects**

# EIA as applied in the case of the 402 MW Arun-III Hydroelectric project

*Laxman K. Chettry*

## ABSTRACT

Arun III Hydroelectric project was Nepal's biggest project which was due for implementation in 1994 with the World Bank as the major financing agency. Besides meeting the domestic power needs, the project was expected to open the possibility of exporting electricity and thus provide a new dimension in the economic development of Nepal. The project, however, came under criticism by local, and some western, NGOs and individuals as being risky, costly and liable to bring about severe environmental and social impacts. Consequently the project was dropped on institutional, national, economic and financial grounds. Although environmental impact assessment (EIA) was carried out for the project it did not appear to have addressed all relevant issues in a comprehensive manner.

## INTRODUCTION

The Arun-III Hydroelectric project was an attempt to tap 402 MW electricity from the huge water resource potential of Nepal. Besides meeting the domestic power needs, the project was expected to open the possibility of exporting electricity. It was to be built in the snow fed River Arun in the eastern Nepal. Of the three projects deemed feasible in the river (1995 study), Arun III was the first project considered for implementation. The other two projects are the Upper (335 MW) and the Lower (308 MW) Arun Hydroelectric projects that are located respectively upstream and downstream of the Arun III project.

The project was to be financed by a number of agencies including the World Bank and was Nepal's biggest development project. The construction was to begin in 1994 and the power generation to be started from 2001. In August 1995 the World Bank decided not to fund the project. As a result, despite all the planning and design exercises, the future of Arun III is uncertain. It was a run-of-the-river project, to be run by the normal flow of the river. A small artificial lake of 50 hectares was, however, to be created by building a 155m long and 68m high dam in the river. Water from the reservoir was to be conveyed by two 11.5km long tunnels to an underground power house for generation of electricity. The flow coming out of the power house was then to be returned to the parent river.

**See Topic 15**

**UNEP EIA Training  
Resource Manual**

*Future directions*

The project site is located in a remote area that is accessible by foot trail only. Thus for the construction and operation of the project an access road of length 122km was to be built first. A 450km long, 220 kilovolt transmission line was to be constructed to transmit the power up to Kathmandu.

The social and environmental features of the project area and its surroundings represents the typical Himalayan ecosystem (Stone, 1992). Besides the huge water resources, the area is characterized by a rich biological, cultural and ethnic diversity, and specific mountain advantages – the scenic beauty, hilly landscape, tranquility, salubrious climate, and inaccessible wilderness areas. These positive aspects of the ecosystem are, however, in contrast to its natural and man made fragile nature which is marked by high seismicity; mass wasting; glacial lakes outburst floods; erosion and sedimentation; and climatic extremes. The socio-economy of its dense population is dependent primarily on forest, pasture and farmland. The increasing population pressure and the fragile nature of its ecosystem through a vicious circle are constantly depleting and degrading these primary resources, increasing human hardship and in turn degrading water and biodiversity resources.

This case study will attempt to present the procedure that was adopted in carrying out the project EIA and the extent to which the EIA has been useful as a tool in decision making and in assessing the sustainability of the project.

#### **NATURE AND SCOPE OF ISSUES**

A number of related issues were raised in connection with implementation of the project. On the basis of the areas from where these issues have been raised or their origin, it can be categorized into the following four groups.

The first category of issues were those raised against the project by some NGOs and individuals in Nepal and in the donor countries. These include:

- the high cost of the project;
- the high risk associated with depending on a single project that would generate more than half of the national production; and
- the high social and environmental costs for the valley's inhabitants (Lindeman L. et al.1997).

In the second place are those issues on the basis of which the World Bank decided against funding:

- limited capacity of institutions in Nepal;
- the danger of crowding out priority social expenditures; and
- the difficulties in firming up the financing plan in the near future (Lindeman L. et al.1997).

The third category consists of environment and development related issues in the context of Nepal and the Arun valley. Being among the least

developed countries, and given the present socio-economy in which the natural resources and human well being are both under constant degradation, the need of economic development of Nepal and advancement in the well being of its people is indisputable. Its huge water resource potential needs to be explored in this regard. However in the social and environmental context of Nepal and the project area, this development needs the following considerations:

- preservation of ecology, biodiversity, and cultural resources;
- preservation of the local people from marginalization;
- equitable distribution of benefits; and
- work force and indigenous knowledge engaged in management of the natural resources need to be protected and promoted.

Finally, it has also become necessary to discourage the global trend that is undermining any hydropower development due to the controversy associated with most of the large and conventional projects of the past and the lobbying against these.

#### PROCESS AND PROCEDURAL CONTEXT

Nepal did not have any specific guidelines and methodology for EIA until the early nineties. It was only in 1990 that the task of preparation of national and sectoral guidelines was undertaken by the National Planning Commission in collaboration with IUCN (the World Conservation Union). The national guidelines were endorsed and published for implementation in July 1993. Recent sectoral guidelines on forestry and industry have also been endorsed and published and those on other sectors including hydropower are still in the pipeline and nearing completion.

As at the time of the prefeasibility study of the project, which was carried out in 1987, EIA guidelines were non existent and the Arun III project was not bound by national EIA requirements. The National Conservation Strategy (1988) was the only related policy declaration. However, it only entailed the requirement of an EIA for major development projects.

The only EIA procedure relevant for, and required for, the Arun III project was that of the World Bank. According to the World Bank Operational Directive 1989 (World Bank, 1991), a project-specific EIA should normally cover:

- existing environmental baseline conditions;
- potential environmental impacts, direct and indirect, including opportunities for environmental enhancement;
- systematic environmental comparison of alternative investments, sites, technologies and design;
- preventive, mitigation, and compensatory measures, generally in the

form of an action plan;

- environmental management and training; and
- monitoring.

Involvement of affected groups and NGOs is emphasized, and regarding analysis of alternatives it is further stated that: 'Proposed investment design, site, technology, and operational alternatives should be compared systematically in terms of their potential environmental impacts; capital and recurrent costs; suitability under local conditions; and institutional, training, and monitoring requirements. To the extent possible, for each of the alternatives, the environmental costs and benefits should be quantified, and economic values attached where feasible'.

In addition, as with other developed procedures, the World Bank procedure also includes the crucial EIA steps of:

- initial examination;
- scoping and preparation of the terms of reference (TOR);
- EIA preparation;
- review; and
- monitoring.

In the World Bank policy, it is the borrower's responsibility to prepare the ToR and other analysis and to obtain the necessary experts to carry it out.

#### **APPROACH TAKEN**

The environmental studies and analysis carried out for the project are in a large number of reports totalling several thousand pages (NEA, 1993). These studies have been accomplished by at least five different parties in the form of the following five different categories of environmental scrutiny (NEA, 1993):

- Recommendations of a variety of independent national and international observers: at least two reports with an overview of environmental management and development ecology in the valley.
- The project design team (NEA and their national and international consultants): three major environmental impact studies, the EIA report, and input to other project reports, the engineering design and specifications, and the tender documents.
- A 'Panel of Experts' (independent specialists, including an environmentalist, engaged by NEA to review the design team's recommendations and progress): seven reports.
- A national conservation and development NGO, the King Mahendra

Trust for Nature Conservation, as a consultant to the World Bank: The Management of Basinwide Environmental Impacts Study, a major report on management of indirect and induced impacts in the Arun Valley.

- Funding agency missions.

The EIA report, Arun III Hydroelectric Project, Environmental Assessment and Management, Executive Summary (NEA, 1993), was prepared later as per the World Bank Operational Directive, OD 4.00-Annex A1 (World Bank, 1991) based on the summary of findings and recommendations of these reports.

Of the five study reports, the first one is considered as an early independent report which discussed the values at risk in the valley and emphasized the need for further analysis; the second, third and fifth were project-specific again, focused on the analysis of indirect and induced changes, including economic opportunities, and mechanisms for managing these processes. All these reports have been produced through an iterative process between the World Bank and the Nepal Electricity Authority, the proponent (Smidt, 1994).

Regarding the methodology: Some of the environmental assessment work has been undertaken with assistance from the United Nations Development Programme, the World Bank and Kreditanstalt fuer Wiederaufbau. Thus the primary source of guidance on methodology has been these institutions. However, the final stages of analysis and preparation of the EIA report have taken into account the requirements of all the agencies involved in financing the project (NEA, 1993).

The EIA report neither included, nor made mention of, a ToR that was followed during the preparation of the EIA. Involvement of local people was limited to participants as respondents in personal interviews and participatory sessions that were conducted by the study teams during their field visits. Involvement of NGOs and the public was also limited to a public hearing about the project organized by the NGOs themselves.

Regarding the project alternatives, in contrast to the need to consider the environmental and social impacts of various alternatives in the form of location, scale of hydropower exploitation, road alignment, technical structures etc., the EIA included alternatives for road alignment only. The assessment of environmental and socioeconomic impacts presented for the two alignments are not comprehensive enough to lead to a rational judgment. This is presented briefly as follows:

#### *Alternatives of road alignments as considered in the EIA*

There are two road alignments considered in the project design: the valley route and the hill route. The valley route is 122km long and it descends first

to the Arun River from the nearest road head at Hile (Dhankuta district), and follows the valley through to the intake site. The hill route is about 190km long and it goes through the hills covering major settlement of the district including the old and the new district headquarters, and it descends to the river only near the intake site. The valley route was as proposed by the 1986 feasibility study. The hill route was considered later in 1987 with a view to maximizing economic and social benefits to the region providing access to the major townships, Khandhbari and Chainpur.

Major points presented in the EIA report in favour of the valley route include:

- a shorter length and one year short construction period for the valley route; and
- in the case of the valley route project affected families (1146) and the land to be taken from them (196 hectares) are about two-thirds of those of the hill route.

Likewise points considered in favour of the hill route include:

- The hill route alignment is along a stable terrain and there is little risk of slope failure. The risk of similar slope failure is about three times more in the case of the valley route. In addition to this the valley route will be exposed to threats from floods including those due to the failure of glacial lake and landslide dam failures.
- Higher long term impacts on ecological values due to the valley route as it would provide better regional access, higher level of future economic activity and demand for forest products. This statement has been made on the basis of the few quantitative data available.

Following these discussions the selection of the valley route over the hill route was made on the basis that:

- the valley route is short and quick in access and required only a one year short construction period;
- 500 fewer families were affected in the case of the valley route; and
- it provided long term regional access.

This discussion on the selection of the valley route, however, does not seem to be rational due to the following reasons:

- The local people consider the project as important for them because of the road. As with any other remote places of Nepal, along with the accessibility and economic opportunities, these people want a road in order to get rid of their feeling of intellectual isolation and ignorance that they have due to absence of a road (Stone, 1992). Thus people in the area want the road to go through their area as its immediate benefits outweigh the cost of giving some of their land for the road.

The number of families who completely lose their land, if calculated, would probably be low and their resettlement possible without their marginalization. In this regard consideration of the number of affected families as a criteria for selection of the alignment is not complete. The situation calls for it to be based on the number of disadvantaged families and the cost for their resettlement.

- The risk of the valley route failures due to failures of slopes and those due to floods including those induced by failures of glacial lakes and land slide dams needs to be assessed and the cost and delay compared with the shorter length and short construction period.
- From the ecological and socioeconomic perspective, it was argued that the hill route has lower ecological and socioeconomic impacts as compared to valley route. These impacts will be immediate and localized to the project road alignment area of the district, whereas in the case of the valley route it will be like a trunk road from which link loads can be connected from other places of the region. It will thus encompass a longer time and a larger geographical scale and will be exposed to larger ecological consequences and socioeconomic impacts. Better accessibility will also enhance the feasibility of the upper and lower Arun hydroelectric projects which in turn will generate their own positive and negative consequences. So the analysis presented in the EIA in this regard has failed in setting the right geographical and time scale and the subsequent environmental and social targets upon which to base the assessment.

## **RESULTS AND IMPLICATIONS**

Besides the extensive studies and analysis carried out, the EIA as applied in the case of the Arun III project has failed to give a comprehensive analysis and to meet the fundamental objective of EIA:

- as a tool in decision making; and
- as a tool in assessing the sustainability of projects.

These aspects are presented briefly in the following paragraphs.

### ***EIA as a tool in decision making in the case of Arun III project***

In comparison to large hydroelectric projects associated with large reservoirs, the Arun III project is considered to be more environmentally feasible due to the:

- high ratio of power production to area inundation;
- the fact that no resettlement of people would be required and there would be insignificant loss of agricultural land due to inundation;

- conditions would not be suitable for the development of water borne disease and water weeds;
- short retention time for water and thus less time for anaerobic condition to be created; and
- low chances of bringing significant changes in river characteristics downstream.

However, the EIA has not analyzed these positive issues or other issues that are also relevant in the case (see the section on issues above) in a systematic way so that a comparison among these different issues could have been made. It has in this regard failed in making any input in the decision that was to be taken on the project. As such, despite the carrying out of so much work, the selection of the project was based primarily on the basis of marketing analysis (Smidt, 1994) without introducing and weighing the environmental and social costs and benefits.

### *EIA as a tool in assessing the sustainability of projects in the case of Arun III project*

The EIA as applied in the case of Arun III project has failed in assessing the sustainability of the project on the following grounds (Smidt, 1994).

#### Environmental sustainability

- The impact from the road to be constructed for the project could in the foreseeable future bring about direct and indirect negative impacts on the biodiversity and natural resources surpassing the geographical and time boundaries set in the EIA.
- The proposed mitigation measures against soil and ground water contamination given in the EIA seem to be inadequate. It is considered that the information given and measures mentioned in the EIA report to mitigate and remedy adverse environmental effects do not exclude the possibility of establishment of chemical dump sites without containment measures or of incineration without adequate emission control.
- Regarding the failure of the dam by earthquake or different types of floods, it is considered that the design strength of the dam as such, analysis of consequences of dam failure and flood management, hazard warning etc. should have been addressed in the EIA report.

#### Social sustainability

The EIA report has failed to describe different threads of the social, cultural and socio-economic mosaic such as:

- ethnic composition and organizational structure of the local community; religions and religious places;

- social coherence and leadership structures;
- means of living; poverty and the causes thereof;
- family structure; gender related work load sharing and family economy; dependency and use of local and external resources; and
- production and marketing systems and patterns.

This information, for the present as well as for the future without the project, is required for assessing the impacts of the project on the social and ethnic structure and socio-economy which are dependent on these factors.

Regarding the effects of the project on the socioeconomic situation, for a number of impacts mentioned in the EIA report, there is no evidence of in-depth quantitative analysis and, in some cases, no mitigation measures have been proposed.

#### Institutional sustainability

The EIA report does not give insight into the existing and required strengths of the institutions that will be responsible for project management, implementation of mitigating measures and execution of monitoring programme. The report has also been unable to give convincing evidence of staff recruitment, adequate training programmes and reservation of an adequate period of time to build up the necessary institutional strength.

### LESSONS LEARNED

The theoretical hydropower potential of Nepal is estimated to be about 83,000 MW and about half of this has been identified to be economically feasible through 66 projects including 30 sites suitable for storage schemes. This is a huge potential and can play a significant role in meeting the power needs of Nepal and other countries of the region, and thus form a basis for the economic development of Nepal. However, on the basis of experience with water resource projects that have been unsuccessful and subject to criticism on the grounds of environmental and social costs associated with them, a concerted approach needs to be adopted in which sustainability is assured beforehand. This demands implementation of comprehensive EIA both at the project and planning levels.

The EIA as applied in the case of the Arun III project has failed to provide systematic information on sustainability necessary for making decisions on the project. This is partly due to the exclusion of investigations in the EIA of alternatives to the project. At the single project level also, the EIA has failed to present a comprehensive integral analysis, leading to conclusions with regard to the social, the socioeconomic and environmental costs and leading to the choice of the project as the preferred alternative (Smidt, 1994).

These shortcomings in the single project level EIA can be attributed to:

- the lack of proper consideration of the different steps of EIA particularly the step of scoping and preparation of ToR; and

- the lack of a mechanism for the consideration of interests of local people and consultations with interested people, NGOs, and the scientific community.

In the context of Nepal, where there is lack of trained and experienced manpower in the field of EIA; it seems necessary to make investigations of capabilities available in the country and to emphasize the need for external help.

Appreciation and acknowledgment of the strengths of EIA by the concerned authorities and their usefulness in the context of the socioeconomic and environmental state of Nepal, specially when hydropower development is being undermined globally, and sincere application of the EIA procedures, becomes a must.

#### LIST OF RELEVANT PUBLISHED PAPERS OR OTHER SOURCE MATERIAL

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#### Key words

sustainable  
 development

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social  
 impacts

## Glossary

**abiotic**

Non-living eg rocks or minerals.

**ameliorative measures**

See mitigation.

**alternative**

A possible course of action, in place of another that would meet the same purpose and need of the proposal.

**audit**

See environmental audit.

**baseline studies**

Work done to collect and interpret information on the condition/trends of the existing environment.

**benefit-cost analysis**

A method of comparing alternative actions according to the relative costs incurred (technical, environmental and economic) and the relative benefits gained. The analysis can incorporate discounting calculations to take into account the time value of money.

**biodiversity**

See biological diversity.

**biological diversity**

The variety of life forms, the different plants, animals and micro-organisms, the genes they contain and the eco-systems they form. It is usually considered at three levels: genetic diversity, species diversity and ecosystem diversity.

**biophysical**

That part of the environment that does not originate with human activities (eg biological, physical and chemical processes).

**biota**

All the organisms, including animals, plants, fungi and micro-organisms in a given area.

**carrying capacity**

The rate of resource consumption and waste discharge that can be sustained indefinitely in a defined impact region without progressively impairing bioproductivity and ecological integrity.

**coherence in EIA**

Aiming to achieve the co-ordination of EIA procedures, guidelines, standards and criteria by those involved in funding or approving proposals.

**compensation**

Trade-offs between different parties affected by proposals to the mutual satisfaction of all concerned.

**cost-benefit analysis**

See benefit-cost analysis.

**cumulative effects assessment**

The assessment of the impact on the environment which results from the incremental impact of an action when added to other past, present or reasonably foreseeable actions regardless of what agency or person undertakes such actions. Cumulative impact can result from individually minor but collectively significant actions taking place over a period of time.

**decision-maker**

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

**development proposals**

Consists of a wide range of human activities which provide (a) favourable conditions for an increase in the transformation of the natural, biophysical environment to provide the goods and services available to society (eg. Structural adjustment programs, 'rolling' development plans) and (b) actions which directly produce the goods and services.

**discretionary process/decision**

A process or decision which the decision-maker is able to base on personal preference.

**ecological processes**

Processes which play an essential part in maintaining ecosystem integrity. Four fundamental ecological processes are the cycling of water, the cycling of nutrients, the flow of energy and biological diversity (as an expression of evolution).

**ecosystem**

A dynamic complex of plant, animal, fungal and microorganism communities and associated non-living environment interacting as an ecological unit.

**endemic**

Restricted to a specified region or locality.

**environment**

There is no generally agreed definition of environment in EIA. Increasingly, it means the complex web of inter-relationships between abiotic and biotic components which sustain all life on earth, including the social/health aspects of human group existence.

**environmental audit**

Process focusing on an existing installation, facility, or activity which involves a systematic, periodic evaluation of environmental management

to objectively review the performance of an organization, management and equipment with the aim of safeguarding the environment.

**environmental assessment**

See **environmental impact assessment**.

**environmental impact assessment (EIA)**

The systematic, reproducible and interdisciplinary identification, prediction and evaluation, mitigation and management of impacts from a proposed development and its reasonable alternatives. Sometimes known as environmental assessment.

**environmental impact report/statement**

Document in which the results of an EIA are presented to decision-makers and, usually, the public.

**environmental management**

Managing the productive use of natural resources without reducing their productivity and quality.

**environmental management plan**

See impact management plan.

**environmental management system**

A structured approach for determining, implementing and reviewing environmental policy through the use of a system which includes organizational structure, responsibilities, practices, procedures, processes and resources. Often formally carried out to meet the requirements of the ISO 14000 series.

**fauna**

All of the animals found in a given area.

**flora**

All of the plants found in a given area.

**health impact assessment**

Component of EIA which focuses on health impacts of development actions. Most attention is concentrated on morbidity and mortality, but increasingly, the World Health Organization (WHO) definition of health as being a state of 'social, physical and psychological well-being and not just the absence of disease' is being used to guide this type of assessment work.

**impact management plan**

A structured management plan that outlines the mitigation, monitoring and management requirements arising from an environmental impact assessment.

**impact monitoring**

Monitoring of environmental/social/health variables, which are expected to change after a project has been constructed and is operational, to test whether any observed changes are due to the project alone and not to any other external influences.

**initial environmental evaluation/examination**

A report containing a brief, preliminary evaluation of the types of impacts that would result from an action. Often used as a screening process to assess whether or not proposals should undergo full scale EIA.

**interdisciplinary team**

A group of people, from a range of disciplinary backgrounds, working together to ensure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision-making which may have an impact on man's environment.

**level of assessment**

See tiering.

**memoranda of understanding**

A written agreement between two or more levels or areas of government.

**mitigation**

The purposeful implementation of decisions or activities that are designed to reduce the undesirable impacts of a proposed action on the affected environment.

**monitoring**

Activity involving repeated observation, according to a pre-determined schedule, of one or more elements of the environment to detect their characteristics (status and trends).

**'moving' baseline**

Existing state of the environment projected into the future assuming no development proceeds. The projected baseline situation, rather than that existing at the time of EIA work, is theoretically the one to be compared with the state of the environment predicted in the event of a development action proceeding.

**natural resources**

Features that have ecological, economic, recreational, educational or aesthetic value.

**natural resource accounting**

Transformation of data, on environmental features (components and processes) and renewable/non-renewable resources, into a form that is comparable with data on the economy. Incorporation of the environmental data into the standard set of economic accounts (eg. gross national product) used in government policy-making.

**NEPA**

National Environmental Policy Act 1969 of the United States of America. This Act, which applied to Federal US agencies, was the first policy to require the preparation of a statement of the predicted environmental impact of a proposal. This statement has since become known as the Environmental Impact Statement (EIS).

**precautionary principle**

A principle of sustainability that where there are threats of serious or irreversible damage, the lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

**proponent**

Organization (private or public sector) or individual intending to implement a development proposal.

**proposal**

Any project, policy, program, plan or other activity.

**public consultation**

See public involvement.

**public involvement**

A range of techniques that can be used to inform, consult or interact with stakeholders affected by a proposal.

**resource**

Anything that is used directly by people. A renewable resource can renew itself or be renewed at a constant level. A non-renewable resource is one whose consumption necessarily involves its depletion.

**risk analysis**

Technique used to determine the likelihood or chance of hazardous events occurring (such as release of a certain quantity of a toxic gas) and the likely consequences. Originally developed for use in nuclear and chemical industry where certain possible events, of low probability, could have extremely serious results. Attempts are being made to use concepts from probabilistic risk analysis to characterize environmental impacts, whose occurrence and nature are not easy to predict with any degree of accuracy.

**secondary impact**

Indirect or induced changes in the environment, population, economic growth and land use and other environmental effects resulting from these changes in land use, population and economic growth. The potential effects of additional changes that are likely to occur later in time or at a different place as a result of the implementation of a particular action.

**scoping**

An early and open activity to identify the impacts that are most likely to be significant and require investigation during the EIA work. Can, also, be used to:

- identify alternative project designs/sites to be assessed;
- obtain local knowledge of site and surroundings; and
- prepare a plan for public involvement.

The results of scoping are frequently used to prepare a Terms of Reference for the EIA.

**screening**

Preliminary activity undertaken to classify proposals according to the level of assessment that should occur.

**social impact assessment**

The component of EIA concerned with changes in the structure and functioning of social orderings. In particular the changes that a development would create in: social relationships; community (population, structure, stability etc); people's quality and way of life; language; ritual; political/economic processes; attitudes/values. Can sometimes include health impacts.

**stakeholders**

Those who may be potentially affected by a proposal eg: local people, the proponent, government agencies, NGOs, donors and others.

**State of the Environment reports**

Reports that provide an assessment of the conditions of the environment, pressures on the environment and the responses of the environment to those pressures.

**strategic environmental assessment**

A formal process of systematic analysis of the environmental effects of development policies, plans, programmes and other proposed strategic actions. This process extends the aims and principles of EIA beyond the project level and when major alternatives are still open.

**synergistic**

By acting together, separate elements produce a greater effect than would be produced if they acted separately.

**tiering**

Addressing issues and impacts at the appropriate level of decision-making (eg from the policy to project levels).

**Terms of Reference (ToR)**

Written requirements governing EIA implementation, consultations to be held, data to be produced and form/contents of the EIA report. Often produced as an output from scoping.

**transboundary impacts**

Any impact, not exclusively of a global nature, within an area under the jurisdiction of a Party caused by a proposed activity the physical origin of which is situated wholly or in part within the area under the jurisdiction of another Party.

**value judgment**

The use of opinion or belief in analysis or decision-making.