

A comparative Study of International EIA Guidelines and the Sudan EIA Experience

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Abstract

This research was initiated to compare the international EIA guidelines in order to enhance the Sudan experience to improve its practice in managing the environmental resources. This is due to the fact that Sudan's experiences face many challenges such as lack of capacity, data, proper guidelines, enforcement, and most importantly awareness of the environment protection sector or its effectiveness. Moreover; it requires reviewing and tools improvements to produce effective environmental management of development and engineering projects. Therefore, provision of detailed guidelines for EIA can help to improve the practice in the management of environmental resources. This paper reviews the EIA legislation in the Sudan in comparison with international legislation and guidelines with emphasis on the EIA practice. It also assesses the contribution of various sectoral development projects in the Sudan to the Nile environment degradation using selected EIAs. Finally this paper recommends an EIA process revision to be implemented for effective EIA practice in the Sudan.

The paper also intends to present selected international EIA guidelines in a comparative form and this is expected to raise awareness, professional experience of EIA issues, enhance EIA carrying capacity, and lead, ultimately, to improvements in available EIA legislations and guidelines and increase compatibility among them.

In addition, the paper analyzed some EIAs carried in the Sudan which share a common environmental resource (the Nile system) with the other ten Nile basin countries, and discussed how improvements of guidelines and unification of legislation can improve cooperation among these countries.

1. INTRODUCTION

Guidelines, in general, are the step that follows aspiration to produce policy, initiate acts and laws. They follow legislation in the management hierarchy and they are usually produced by the specific bodies (Figure 1) to facilitate implementation of laws and policies. Environmental Impact Assessment (EIA) guidelines are prepared by a wide range of agencies and institutions overseeing environmental compliance to implement legislation. They differ markedly in their aims and purposes and in their content. For example, some set out institutional procedures and regulations, some seek to guide impact assessment practice, others aimed at different target groups such as decision-makers, planners, EIS reviewers, EIA practitioners, developers and the public. It is very difficult to make comparisons between guidelines addressing such multiple purposes and audiences. Some guidelines are excellent and serve their purposes well and a number have been prepared following thorough processes involving research and broad consultation.

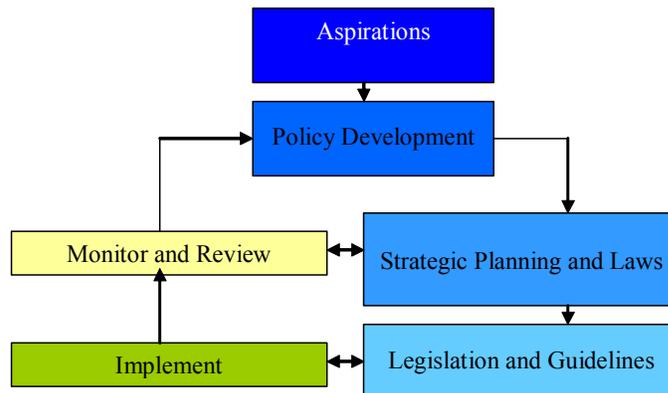


Figure 1 Policy cycle

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Guidelines are one of several tools available to impact assessment practitioners and process managers. They are defined by a number of different considerations, including the policies and priorities of the agencies concerned. Often guidelines contain implicit assumptions about such issues as access to science and technology, project cycle management, and even models for economic development. Furthermore, the use of guidelines varies from country to country, from organization to organization, amongst institutions at different stages of development in impact assessment practice, and according to specific social, economic, ecological, and political contexts.

Results obtained by Spooner (Spooner, 1998) from a worldwide survey of EIA practitioners (and other EIA guideline users belonging to development assistance agencies, government departments, environment agencies, non governmental organizations, private companies, researchers and independent practitioners) revealed very poor use of existing guidelines between these groups. These results raise an important question: Do practitioners and process managers who fail to use guidelines, or use them only occasionally, have the competencies required managing or undertaking effective impact assessment anyway; and if they do, are they sufficiently aware of procedural requirements?

Additionally, EIA guidelines enhance the EIA practice and experience considerably and therefore enhance regional and international compatibility and cooperation. EIA guidelines also play an important role in conflict prevention among entities having shared environmental resources or implementing projects of trans-boundary nature if harmonized and well developed (Spooner, 1998).

In the Sudan, there are critical challenges in some areas that rather than becoming an accepted part of the planning process, EIA will remain an optional technique to be applied when political expediency dictates (Ahmed and Abdella, 2006). In addition the following key issues need to be addressed:

1. The need to determine the extent of mitigation-planning and mitigation-identification responsibility which an agency should undertake before issuing an EIA.
2. The need for a methodology or procedure for systematically addressing cumulative impacts of proposed actions. This is a difficult issue to address. Some reasons, that cumulative impacts are only marginally considered, in the Sudan, are:
 - a. The absence of a coordinated planning system,
 - b. The limited development of methods and policies
 - c. Study constraints in timing and funding
 - d. Limited guidance from governmental agencies
3. The need for a usable methodology or procedure (Guidelines) for conducting a reasonable foreseeability analysis (analogous to worst-case scenario analysis) of the consequences of a proposed action, particularly when information is incomplete or absent.
4. The need for follow-up environmental auditing to document experienced impacts and compare them to pre-project predicted ones.

2. METHODOLOGY

Although there are many propositions of EIA best practices, but the most fulfilling is considered to be the International Association for Impact Assessment and UK Institute of Environmental Assessment [currently the Institute of Environmental Management and Assessment] list of EIA best practices, which include that the EIA should be Purposive, Rigorous, Practical, Cost-effective, Efficient, Focused, Adaptive, Participative, Interdisciplinary, Credible, Integrated, Transparent, and Systematic (IAIA, 1999). EIA guidelines should be able to reflect these best practices in addition to any additional needs required by the specific environmental agency.

As basis for comparison, the EIA Guidelines of some international organizations are looked at. The guidelines looked at involved: the EU guidelines, EIA guidelines for the United States of America (USA), World Bank (WB) EIA guidelines, and the FAO EIA guidelines for Irrigation and Drainage projects. These are internationally accepted and recognized guidelines.

As a first step to compare the EU, FAO, WB, and the US EIA guidelines a model EIA process has to be constructed. Based on this model, each EIA guideline can be diagnosed and the issues addressed by each guideline can be presented. Figure 2 shows the generic ideal EIA process flow and the EU, FAO, WB, and the US process superimposed on it. This generic and ideal EIA process flow is shown in Figure 2.

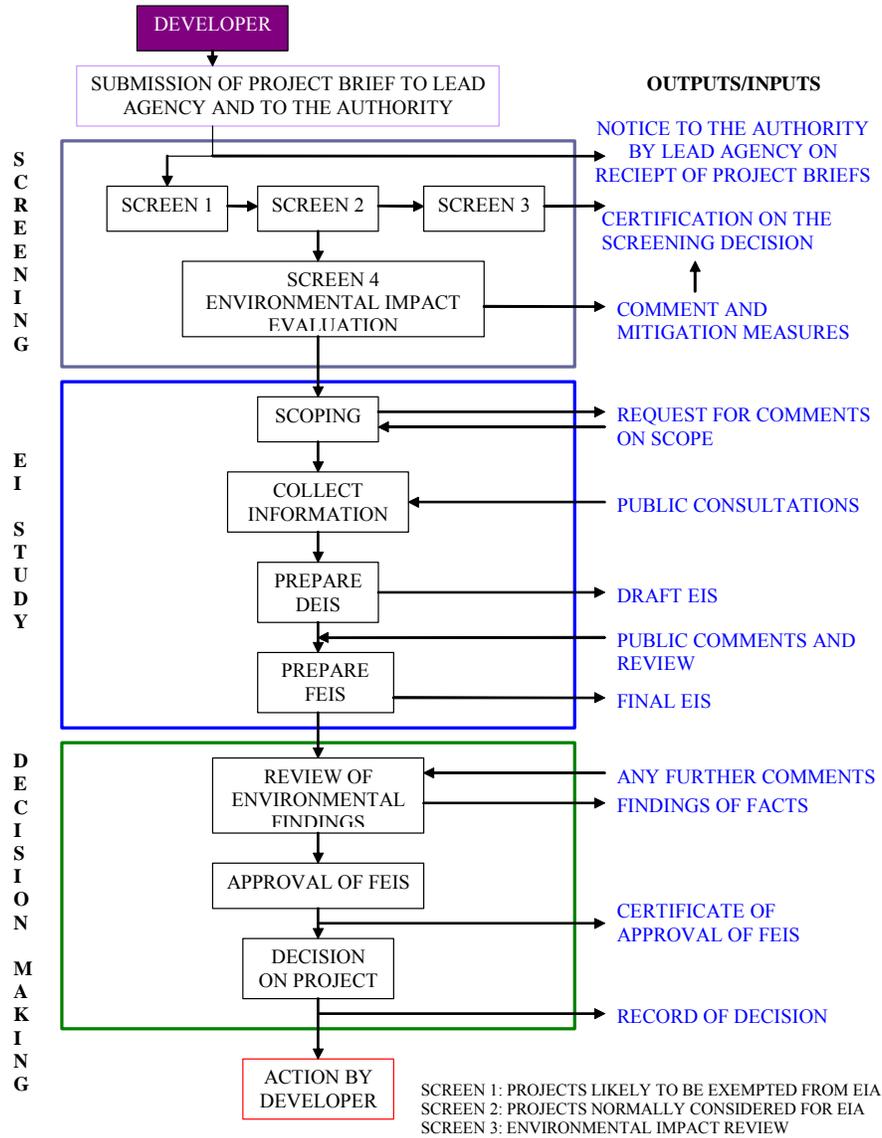


Figure 2 EIA process flow

Selected EIA reports covering the most important development sectors in Sudan which are also the most effective sectors on Sudanese development and environmental quality (Oil exploration (3), Agriculture (1), Power generation (2), Roads and Highways (3), and River Engineering (2) sectors), were critically reviewed. Since there is an absence of local guidelines, the EIA reports in each sector were analyzed based on the international guidelines and requirements.

A checklist for reviewing the EISs has also been developed according to the current legislation and international practice. The checklist has been influenced by two other checklists (Lee and Colley 1990 and the European Commission 1994). It consists of seven areas: (1) baseline conditions, i.e. description of present activity and surrounding environment; (2) description of the planned project and alternatives; (3) assessment of the impacts and effects on the environment, public health and management of natural resources and how the different effects are connected to how the surroundings may react; (4) mitigating measures; (5) layout and readability; (6) complementary questions, such as how public participation and opinions are dealt with; and (7) the adequacy of the whole statement.

3. THE EIA PROCESS INTERNATIONAL ORGANIZATIONS

The EIA guidelines of the US, WB, FAO, and EU are briefly described here and following is a comparison table to highlight major issues in each of them. It is very important to note that the FAO guidelines are for irrigation and drainage projects (sectoral guidelines) while the rest are not general guidelines.

3.1 The US-CEQ EIA Guidelines

The US EIA guidelines (Corbit, 1990 and Canter, 1996), were produced initially by the Council on Environmental Quality (CEQ) in 1971 and were amended in 1973. General comments include in the CEQ regulations regarding the preparation of EISs can be summarized as follows:

- EISs should be analytic rather than encyclopedic.
- Impacts should be discussed in proportion to their significance.
- EISs should be concise.
- EISs should state how alternatives considered and decisions made, based on the EIS, will or will not achieve the requirements of environmental laws and policies.
- Alternatives discussed should be limited to those which are expected to be considered by the agency decision-maker.
- The agency should not commit resources prejudicing selection of alternatives before making a final decision.
- EISs should be a mean of assessing the environmental impact of the proposed action, rather than a mean of justifying the decisions already made.
- A systematic and interdisciplinary approach should be used to prepare EISs.
- EISs should be written in plain language and appropriate graphics may be used so that decision makers and the public can readily understand the documents.
- Public participation should be actively sought during the scoping process and in the early planning stages of the project to identify significant issues.

In the US the EIA is guided through stages described as follows: Screening, Scoping, EI Study and EIS Review. SEA is provided by carrying out EIA on policies, strategies and legislation.

In the screening stage the documents provide a list of projects with categorical exclusion and a brief description of the content of an EA.

In determining the scope of environmental impacts, CEQ requires that agencies consider three types of actions, three types of alternatives, and three types of impacts. These include:

- A. Actions (other than unconnected single actions) which may be; connected, cumulative, or similar actions.
- B. Alternatives, which include; No action alternative, other reasonable courses of action, and mitigation measures (not in the proposed action).
- C. Impacts, which may be direct, indirect, or cumulative.

For the EI study stage, the CEQ guidelines give a detailed document on the methods and tools of assessment of Environment Impacts. It usually starts with a description of the proposed action. Following the project description, a baseline Study is required. To establish the baseline requires a study of the environmental setting or location and conditions under which the proposed action is to take place. A detailed description on how to identify different types of impacts and affected environments in addition to impact evaluation methods is given for all types of project alternatives including the mitigation measures. In the EIS Review Stage, the Guideline provides guidance on timing issues, reporting, public participation methods, and the steps of review and decision making including monitoring as appropriate.

3.2 Summary of World Bank Environmental Assessment Procedure (WB, 1999)

Project Identification

Screening: All proposals submitted to the World Bank must undergo environmental screening. Environmental screening results in a project being classified into one of three EIA categories:

- Category-A proposals require full EA;
- Category-B proposals require partial EA; and
- Category-C proposals do not require EA.

Scoping: Once a project is categorized, a scoping process is undertaken to identify the key issues and develop the Terms of Reference (TOR) for the EA.

Public Consultation: Consultation with affected communities is recognized as the key towards identifying the environmental impacts and designing their mitigation measures. The consultation with affected groups and local NGOs, during at least two stages of the EA process, is almost compulsory:

- i. At the scoping stage, shortly after the EA category has been assigned,
- ii. After a draft EA report has been prepared.

Preparation of EA Report

The EA report shall include Executive Summary, Policy, Legal and Administrative Framework, Project Description, and Baseline Data.

Appraisal Process

Includes Impact Assessment, Analysis of Alternatives, and Public Consultations.

Implementation Plan

Shall include Mitigation or Management Plan, Environmental Monitoring Plan, and Project Implementation.

Environmental Impact Evaluation

EIA Review and Project Appraisal (Evaluation of EIS): Once the draft of EIA report is finalized, the borrower submits it to the Bank for review by the environmental specialists. If it was found to be satisfactory, then the Bank project team is authorized to proceed with the next step of the appraisal of the project.

3.3 The FAO EIA Guidelines (for Irrigation and Drainage Projects)

FAO (Daugherty and Hall, 1995) describes and recommends an EIA process that should be used and applied in its projects. The main steps of the EIA process include: Screening, Scoping, Prediction and Mitigation, Management and Monitoring, Audit.

In the screening stage, the project is supposed to be categorized, and this results in a decision on whether the project requires a full EIA or not to be carried out. This decision may be made by size (of land, flow of water to be diverted or capital expenditure) or site specific information. However, it stipulates that the screening process is country specific depending on the laws and norms of the country.

In the scoping stage, the most critical environmental issues to study are determined. This is taken to be the most important stage of the entire EIA process. The main output of the scoping study will be the TOR's of the EI study. The main techniques for scoping assessments include; baseline studies, Checklists, Matrices, and Network Diagrams.

During the Detailed Prediction and Mitigation studies stage, quantifying the environmental impacts and proposing mitigation measures is done. All the impacts should be compared to the "without project" scenario. The major techniques applied include mathematical modeling, Expert Advice (especially with experts familiar with the locality), Checklists, Matrices, Network Diagrams, Graphical representations and overlays. After the impacts have been quantified, they can be compared by applying weightings to them or using economic cost-benefit analysis or a combination of the two.

The EI Statement from step above also provides a detailed plan for managing and monitoring of the environmental impacts both during and after implementation, this is known as the Environmental Action Plan or Environmental Management Plan. A clear definition should be made to which agencies are responsible for data collection, collation, interpretation and implementation of management measures. The guidelines goes ahead to give the weak areas of concern for monitoring, and emphasizes the use of satellite imagery as a technique for monitoring.

The Audit stage is carried out sometime after implementation of the project, it is provided to serve as a feedback and learning function for the EIA process. It is to be done by a separate team of specialists. It should include an analysis of the technical, procedural and decision-making aspects of the EIA. It includes an analysis of the Baseline studies, accuracy of predictions, and the suitability of mitigation measures. Also the procedural aspects of the EIA process should be included, that is, the efficiency of the procedure, the fairness of the public involvement measures and degree of coordination of roles and responsibilities. Plus decision making aspects like utility of the process for decision making and implications of the development.

3.4 The European Union EIA Guidelines

These guidelines came about after an EU Directive of 1997, and are written to be practiced in the whole EU region. The EU published four detailed and concise documents entailing the current required EIA practice in June 2001 (EU, 1999). Each of these documents describes a specific stage in the EIA process. The EIA process is in four stages: Screening, Scoping, EI Study and EIS Review.

The screening stage is there to determine whether a project requires EIA or not. This document provides a step by step practical guidance on how to undertake screening. In addition to that, the document goes ahead to describe the screening tools to be used perform an EIA screening test on a project.

In the scoping stage, the content and extent of matters to be included in the environmental information are covered. The document provides guidance on scoping procedures and methods. In addition to that the document describes the kind of information and outputs to be looked out for from the project during the scoping stage.

For the EI study stage, the EU guidelines give a detailed document on the methods and tools of assessment of Environment Impacts. The guidelines give the pros and cons of every method, and under what circumstances the method or tool can be applied. In addition, the guidelines give what kind of information each kind of method can provide and concludes by giving a general approach to an EI Study. In the EIS Review Stage, the Guidelines provides guidance on how to establish whether the EI Statement submitted is adequate for the decision on development or not. It provides practical guidance on how the review should be carried out. It provides a checklist to be used as a tool for guiding on the adequacy of the EI Statement.

3.5 Comparison of International EIA Guidelines

A brief description of selected international EIA guidelines was provided and a brief comparison is given in Table 1. There are many areas where the older guidelines are more detailed than recent ones such as the US and WB as compared to the EU guidelines. However, the US guidelines provide timing issues more detailed than the WB and on the other hand the WB provide more detailed consideration of transboundary issues than the US.

4. THE SUDAN EIA EXPERIENCE

Legislation pertaining to environmental management is found in the Environment Policy Act of 2001 which, under section 9, stipulates that EIA be undertaken where the quality of the environment is to be adversely affected upon implementation of major development projects. The authority responsible for environment management is the Higher Council for Environment and Natural Resources (HCENR).

The general process for conducting EIA is presented in Figure 3. It is composed of the preparation of an EIA by the project developer or proponent' environmental consultant and its submission it to the HCENR for evaluation. Upon final acceptance of the EIA the project proponent is given a permission to implement the project.

To find out the effectiveness of the EIA process enshrined in the legal and institutional framework of the Sudan, some projects have been reviewed as case studies (nine projects). Review of EIA process for these selected projects is given in Table 2. These EIAs, although done in accordance with prevailing legislation and guidelines, reveal the serious shortcomings in conducting the assessments for the projects such as the absence of major steps in conducting EIA, Cost-Benefit Analysis, or post project follow up. These lapses can be accounted for in upgrading policies, legislation and guidelines of the Sudan.

Table 1 Comparison between US, WB and EU EIA guidelines

| No. | Issue | US | WB | EU |
|-----|-----------------|--|------------------------------------|---|
| 1 | EIA time frames | Time limits are defined between various stages of EIA process | Exist but not very clear | Not defined |
| 2 | EIA screening | Clear on exempted projects but not well explained for other projects | Detailed screening lists available | step by step practical guidance on how to undertake screening |

| | | | | |
|----|---|---|---|--|
| 3 | EIA scoping | Very well described with methods clearly explained | Detailed | Issues to be covered by EIAs are explicitly specified |
| 4 | Public participation | Methods, time, and forms specified | For all category A and B projects the borrower consults project-affected groups and local NGOs. | Public access to EIA report, and opportunity to comment (Article 6). |
| 5 | EIA report | Contents detailed | Contents detailed | Contents detailed |
| 6 | Quality review | Required and explained | Required and explained | required |
| 7 | Environmental baseline studies | Requirements listed | What should be reported is listed | Coverage of a range of issues (health, social, economic, cultural) required |
| 8 | Assessment of alternatives | Alternatives are listed including the 'no action alternative' | Investment alternatives are required | Alternatives for project site and scenario and the "do-nothing" alternative required; |
| 9 | Mitigation measures and impact management | Included in the alternatives evaluation | Description of mitigation measures requirements are given | measures to avoid, eliminate or compensate possible impacts required |
| 10 | EIA reporting | Explained and timeframe set | Not specified | Precise requirements for EIA report contents and the reporting procedure |
| 11 | Decision making | Well explained | Briefly described | Not defined (by each member state) |
| 12 | Post decision monitoring and audit | Required but detailed 'as appropriate' | Even parameters specified | None |
| 13 | Exemption from EIA | Exemptions listed | Exemptions are based on project categories | Based on screening |
| 14 | EIA in a transboundary context | No specific requirements | Compliance with all international treaties specified. | Assessment and consultation required (Article 7). |
| 15 | Special rules of EIA application | None | Issue resolution is important before project implementation | None |
| 16 | Sensitive issues | Required | Required and procedures for some are detailed | Not specifically addressed |
| 17 | Methodological aspects | Discretion of consultant | Followed up by WB | EI study stage, the EU guidelines instead give a detailed document on the methods and tools of assessment of Environment Impacts |

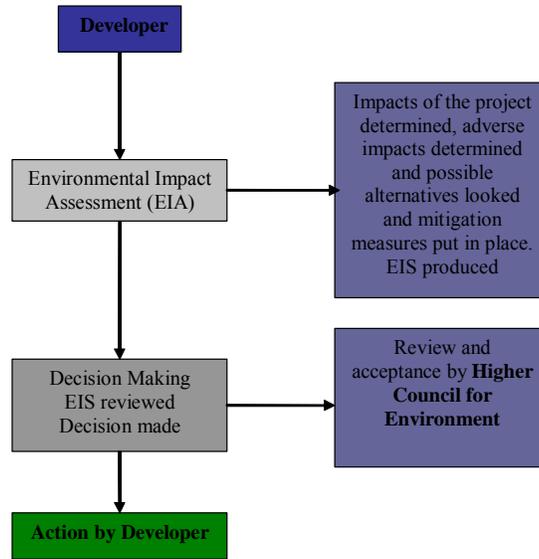


Figure 3 EIA process in the Sudan

Table 2 Assessment of EIA Process in the Sudan for Various Projects

| No | Project Sector | Project Name | Scoping | EIA Study | Public participation | EIA Approval | RA | CBA | Audit |
|----|-------------------|--|----------|----------------|----------------------|--------------|------|------|-------|
| 1 | Power | Khartoum kilo -x | Done | Appropriate | Limited | yes | none | none | none |
| 2 | | Khartoum north power station extension | Done | Appropriate | limited | yes | none | none | none |
| 3 | River Engineering | Merowe 1991 | Not done | Poor | none | yes | none | none | none |
| 4 | | Merowe 2002 | Not done | Poor | none | yes | none | none | none |
| 5 | | Mc-Nimir Bridge | Not done | In-appropriate | none | yes | none | none | none |
| 6 | Agriculture | Al Lar | done | Generic | none | yes | none | none | none |
| 7 | Transportation | Khartoum Ring Road | Done | Good | none | yes | none | none | none |
| 8 | Oil Exploration | Melute Basin Oil Development Project | Done | Generic | none | yes | none | none | none |
| 9 | | Greater Diffra development project | Done | Generic | none | yes | none | none | none |

Most of the Sudanese practices failed in some major areas in EIA such as: alternative analysis: were not considered in most cases, timing delay: most of the studies started after the implementation of the project there fore the EIA never integrated with the planning stage of the project and that always introduce many financial and technical problems in the long term of EIA and project integration, poor public participations and bad interaction with the decision making process, limited tools applied which in most cases were insufficient for specific projects, EMP in most cases was not complete and not considering the cost-benefit analysis, responsibilities or monitoring schedule. Poor governmental reviewing decreased the monitoring process and sustainability of the EIA mitigations. Advantageously, the EIA practices are becoming more popular in Sudanese development planning and there are lots of arguments about enhancing the legislation and regulations.

5. RECOMMENDATIONS FOR EIA PRACTICE IMPROVEMENTS

Based on the results of this review, a number of recommendations for EIA practice improvement in the Sudan can be made. The following recommendations were formed, to support the enhancement of Sudanese EIA implementation and effectiveness.

Legal Status

- Build up the local Sudanese guidelines for each sector
- Putting the legal format time and schedule plan of EIA (with respect to the project cycle).
- Enhance the governmental monitoring system and strengthen the official reviewing bodies/boards. (Ensure reviewing from the scoping – after implementation)
- Strengthen the environmental authorities and related NGOs
- Up-date the legislative regulations
- Build a data base of the Sudanese environment and up-date the available data.
- Enhance the recording system of the data and previous studies.

Baseline Data

- Applying the modern models of sorting the data such as GIS or Computer data base.

Tools Applied

- Applying the modern models of sorting the data such as GIS or Computer data base to meet the needs of each part or parameter.
- Selecting the suitable tools for each category and take into account the team qualifications, type of projects, TOR, and specific situations.
- Adapting the tools or EIA methods to cope with the local circumstances and special situations and needs.

Public Participations and Decision Making Process

- Enhance the presentation of the final draft and conclusions of the report.
- Discrimination between the feasibility studies and EIA studies.
- Avoid using of the complicated technical and foreign languages in the EIA report.
- Involve the experts and skilled personnel to enhance the public involvement and to ensure the involvement of the local communities.
- Increase the environmental awareness about the environmental threat in both official and local levels, and clear the benefits of applying EIA in development process.
- The leader agencies should be independent and reliable.
- Encourage training and corporation work with other experts' agencies or personnel and supporting the academic institutions and research work in EIA related areas.

6. INCORPORATION OF COST BENEFIT ANALYSIS (CBA) AND ENVIRONMENTAL RISK ANALYSIS (ERA) INTO EIA PRACTICE

The Environmental Impact Assessment (EIA) assists decision-makers in considering the proposed projects for environmental costs and benefits. When the benefits sufficiently exceed the costs, the project can be viewed as environmentally justified. The central issue in CBA is the aggregate gain or loss to society as a whole, and not identification of winners or losers. Therefore, the whole exercise of CBA is to bring about an increase in the economic as well as social welfare of the stakeholders.

Regarding the possible integration of cost-benefit analysis in EIA, there are difficulties in doing so. It is recognized that valuation and the reflection of some monetary values in EIAs is an essential exercise, particularly if the results of the assessment were to have an impact on influencing decision and policy makers. It should, however, be noted that since there are difficulties associated with the quantification of intangibles including cultural and social values, qualitative analysis have to substitute for quantification of costs and benefits until valuation techniques are more reliable.

The management of risks is a central issue in the planning and management of any venture (Simmons, 1998) and should be proactive so as to avoid risks. Risk management has not been historically an organizational issue in many development bodies probably because of lack of capacity for risk assessment. Risk analysis and management are embedded in multi-disciplinary understanding of environmental issues. Being proactive, risk analysis should begin in the pre-proposal phase and continue through the proposal and subsequent phases.

7. CONCLUSIONS AND RECOMMENDATIONS

This paper has demonstrated the following weaknesses of international EIA guidelines:

- The guidelines leave a lot of discretion to the developer in carrying out an EIA except in the case of the US and WB guidelines.
- The level of public participation in the EIA process is not easy to measure, but public participation in the EIA process is required by all guidelines.
- Mostly guidelines are not clear about post implementation issues and lack clear description of how to handle transboundary issues.
- Cost benefit analysis, risk assessment, and sensitivity analysis are not addressed by all guidelines.

The paper has also revealed that EIAs are not carried out efficiently within the Sudan (in many cases) which is attributed to lack of knowledge in EIA practices and methods. It is therefore proposed to have training programs for practitioners of EIA.

Data gathering and sharing initiatives (i.e. in the form of databases) for various projects in the Sudan should be developed. This should aid in the development of efficient process of identifying environmental quality parameters using scientific and empirical approaches.

It is also proposed that the following guidelines should be developed and adopted for the EIA practice in the Sudan:

- Stage 1 – Develop a Project Proposal
- Stage 2 – Screening (leading to sectoral guidelines)
- Stage 3 – Scoping (under the sectoral guidelines of a the project)
- Stage 4 – Prediction and Evaluation
- Stage 5 – Environmental Impact Review
- Stage 6 – Implementation
- Stage 7 – Environmental Monitoring
- Stage 8 - Environmental Audit

8. ACKNOWLEDGEMENTS

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