



Understanding the Principles, and Procedural Concepts of Environmental Impact Assessment in Nigeria

Moses Okeahialam Ekeoma¹, Verla² Andrew Wirnkor, Verla³ Evelyn Ngozi, Mbuka-Nwosu Iheoma Ezichi⁴

¹Department of Chemistry, Michael Okpara University of Agriculture, Umudike, P.M.B. 7267, Umuahia, Abia State, NIGERIA

^{3&4}Department of Environmental management, FUTO, Owerri, Nigeria

²GRACE&CC, Department of Chemistry, IMSU, Owerri, Nigeria

ekeomamoses@gmail.com, ngoverlean@gmail.com, verlaandrew@gmail.com

Abstract EIA as a veritable tool for achieving sustainable development is being given renewed attention following man's realization that civilization is gradually eroding mother earth. Humans satisfy their needs from the environment and thus the importance of protecting the environment cannot be overemphasized. In this review the need for EIA is stressed, the basic principles worldwide have been capture with specific attention to the prevailing circumstances in Nigeria. It is understood that while some projects could be go on without EIA, certain projects are mandatory that EIA be well articulated and monitoring implemented. Even though there has been an increased in the interest of conducting and implementing EIA, there is still a lack of data and almost an absence in the enforcement. However the careful implementation of EIA does not eliminate environmental damages and some level of expertise and dedication is required to go the extra mile in preserving and protecting our environment, and to ensure sustainability. Thus given the complexity and delicate balance required to maintain the environment, the three bodies may need to function in synergy to ensure both compliance and accuracy, making these bodies not just of the triplication of function but partners on an issue of grave importance.

Keywords Chemometrics, Development, Mandatory List, Mitigation, Monitoring, Projects, Sustainability

Introduction

Climate change is real. Climate change occurs when changes in global weather patterns results in new weather patterns that last for few decades and could last for millions of years [1,2,3]. When used, term climate change is often implied anthropogenic climate change than to natural cause of climate change. Also called global warming, its effects on man and his environment are reaching alarming proportions. Environmental pollution and degradations have caused global warming, natural disasters, species extinction, and emergence of new diseases, poor agricultural yields leading to hunger and starvation, and even wars [3, 4].

The importance of environment cannot be overemphasized. Man obtains his food, shelter, clothing and other basic needs from the environment [4,5,6,]. Recent trends in research lay much emphasis on the environment with such concepts as biodiversity, sustainability etc. Environmental management is the conservation of environment for human kind sake.

Carrying capacity is the number of individuals that an environment can support without experiencing significant negative impacts to organisms and the environment. For humans sustainability is the potential for long term maintenance of wellbeing which in turn depends on the wellbeing of the natural environment and the responsible use of natural resources. The World Commission on Environment and Development (WCED) strongly recommends the implementation of sustainable development in the Brundtland Report, 1987. According to the Commission Sustainable Development is "on that meets the needs of present generation



without compromising the needs and aspirations of future generations” [7, 8]. Currently humans are living very unsustainably. To return to sustainable living, humans need conscious and concerted effort by all. Some ways of living more sustainably could be conditions such as in Eco villages, Eco municipalities, sustainable cities, sustainable agriculture, sustainable architecture, renewable energy, green building, green chemistry etc. The three Core concepts in sustainable development are: 1- Appropriate technology to assist and sustain people to meet their developmental needs. 2- These six core indicators for appropriate technology represented by international trade and investment need to be achieved: economic policy, climate change and energy, measurement and assessment, natural resource management, and communication technologies in sustainable development. 3- Integral elements for a sustainable development are Research & Development and innovations. An example for is the European environmental research and innovation policy, which aims at defining and implementing a transformative agenda to greening the economy and the society as a whole so as to achieve true sustainable living [10, 11]. Sustainable development therefore means that development in which the needs of current generation is meet without compromise on the needs of future generation. Environmental Governance is the sum total of rules, practices, policies and institutions that shape how human beings interactions with the environment.

Impact refers to the change that occurs in the environment (physical, social, economic, cultural and depending where we measure it) in response to certain activities or operations that are aimed at specific targets and objectives, but also that have a consequence (i.e. "impact") on a the wider context as the environment reacts and integrates in the systems these changes occur at a specific levels. Impact could be intentional or unintentional, desired or undesired, positive or negative., desired or undesired, positive or negative.[13]

Environmental Impact Assessment systems are still evolving in many countries globally [14]. Concepts and practices are not well developed and often show wide-ranging similarity with systems operated in developed countries than in developing countries. Nigeria for instance, there are multiplicity in the EIA legislations. In Nigeria, three independent government agencies operated EIA systems; the Department of Petroleum Resources (DPR) Act (1969), the Federal Ministry of Environment (FMENV) EIA Decree 86 (1992) and the Town and Country Planning Decree 88 (1992) [9]. Unlike in Nigeria, the UK and the US, operate one law which governs EIAs for national and private projects. In this study these differences are overlooked and the basic principles, and procedures of practice are discussed with the aim of exposing in a simplified manner the current state of EIA in Nigeria.

Methodology

This paper is culled from a lecture delivered to Senior staff of ISOPADEC, Imo State, Nigeria. The study reviewed research articles published in Nigeria and elsewhere on the subject matter of EIA. Literature from Methods and Documentary analysis of key information from international organizations and government agencies responsible for environment were obtained and used. The principal methods used to gather the materials used in the paper comprised of Google scholar articles, web of science publications, local journals and bulletins from organizations. A key document was the EIA Act No 6, 2005. The review of these documents was guided by an interest in a simplified and basic components of EIA based on the Stewart and Sinclair (2007) and Andre *et al.*, 2006 [15].

Historical Development of EIA

The idea of EIA emerged internationally after the 1972 Stockholm Conference and is now recognized internationally in the Rio Principles and the 1991 Espoo Convention. Principle 17 of the Rio Convention states that Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority [16].

The first definition in Espoo Convention referred to EIA as a national procedure for the evaluation of the likely impact of the proposed activity on the environment [17]. In 1987, an illegal dumping of toxic wastes in a village of former Bendel State, called Koko village. The Government of Nigerian promulgated the Harmful Wastes Decree aimed at providing the legal framework for control of toxic and harmful waste disposal into the environment within Nigeria. The Federal Environmental Protection Agency (FEPA) was formed in 1988 and this body was charged with the overall responsibility to preserve, protect and oversee developmental projects in the Nigerian environment. The DPR Environmental Guidelines and Standards (EGAS) of 1991 for the petroleum industry is comprehensive with consideration for preserving and protection of the Niger Delta, and thus the Nigerian environment.

The EIA Decree No. 86 of 1992 was an additional document with the same aim as the (FEPA) standards. In particular it is directed to regulate the industrialization process with regard to the environment. According to EIA Decree, industrial plan, developmental activity under the FEPA’s mandatory list can only be executed with



prior consideration of the environmental consequences of such a proposed action. The prior knowledge must be in form of an environmental impact assessment [1].

In Nigeria (EIA) Act of 1992 aimed at making the environment central to all developmental projects. However, the engagement with local cultures in the EIA process was not made statutory. The Environmental Impact Assessment Act (Cap E12 LFN 2004) spell out the operation and maintenance of a public register. This gives the public access to information about the potential hazards to that could impact negatively on environment and safety. Three levels of assessments are possible under the Act in the form of an environment impact statement (EIS), public environmental report (PER) and a Development Report (DR).

Biblical Injunctions about the Environment

i. Gen. 2:15- God created even the smallest pebble as a work of His design. All of Gods works are interconnected both living and known living.

ii. GEN. 2:15 God kept man in the garden to DRESS it and to KEEP it.

iii. PSALM 104:25-30

iv. JOB 12: 7-10

v. ISAIAH 24: 4-6

Basic Principles of EIA

1. EIA establishes a systematic method for incorporating environmental and sustainable considerations into decision-making relating to proposed projects.

2. EIA provides the necessary elements to make an informed decision. Consequently EIA can achieve the following:

1. Modify and improve the design of a project

2. Ensure efficient resource use to achieve sustainable development

3. Enhance social equity

4. Identify the measures for monitoring and managing environmental impacts arising from projects

5. Provide project sustainability for maximum benefits and while minimizing adverse effects[6].

Definitions

EIA is a complex integral safeguarding tool that examines the social, cultural, economic and environmental consequences of a proposed project with a view to enhance its capacity for climate change mitigation, adaptation and wellbeing of the society [17,18]. Horsefall and Spiff defined EIA as a process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposal prior to major decisions being taken and commitments[19, 20]. Some researchers define EIA as “a process by which information about the environmental effects of a project is collected, both by the developer and from other sources, and taken into account by the relevant decision-making body before a decision is given on whether the development should go ahead or not” [21].

For the purpose of this discussion, EIA is defined as a process in which a proposed project is systematically examined socially, culturally, economically and environmentally for the likely effects in order to maximize the desired ones and minimize or eradicate the adverse ones.

Major Objectives of EIA

I. Determine the current status of the Environment and impacts of the existing facilities and operations in the project area.

II. Determine baseline conditions of the environment as well as the socio-economic and health conditions of the host communities.

III. Evaluate the residual impacts of the existing facilities on the receiving environment.

IV. Determine and evaluate the potential impacts of the proposed project activities on the environment, using the current environmental conditions as the baseline.

V. Identify and evaluate the potential socio-economic effects of the project on the communities including impacts on cultural properties, social infrastructures, natural resources and impact on lifestyles/values as well as analysis of the opportunity cost to chemical spills during project activities;

VI. Identify health hazards that may result from the different phases of the project during execution (including operation & decommissioning) and evaluate local population exposure to these hazards;

VII. Develop cost effective mitigation measures and appropriate Environmental Management Plan (EMP) for all identified impacts.

Therefore Environment impact assessment seeks to:



- i. Ensure that the developmental options under consideration are environmentally, socially and economically sound and sustainable.
- ii. Ensure that any possibly adverse environmental consequences are recognized early in the project cycle and are taken into account in the project design.
- iii. Identify ways to improve projects environmentally and minimize or compensate adverse impacts.

Framework of EIA

- Identification of how significant are the impacts
- Generation of information and data base
- Evaluation of impacts
- Identification and evaluation of mitigation measures and alternatives
- Developing of a monitoring plan
- Preparation of an EIA report

The EIA Act No. 86 of 1992 makes the EIA mandatory for development projects likely to have adverse impacts on the environment prior to implementation. Prior to the enactment of the EIA Act in Nigeria, project appraisals were limited predominantly to feasibility studies and economic-cost-benefit analysis. Most of these appraisals did not take environmental costs, public opinion, and social and environmental impacts of development projects into consideration [22, 23, 24].

Characterization of Impacts

Impacts are characterized as

- i. Type and nature
- ii. Magnitude
- iii. Extent
- iv. Timing
- v. Duration
- vi. Uncertainty
- vii. Reversibility
- viii. Significance

Procedural Steps in EIA

Currently there are no effective and efficient procedural guidelines for EIA in Nigeria. There is also no administrative mechanisms containing the entire activities in the EIA Act of 1992 [Tayo, 2008] [25] and 2004 EIA act. The EIA practice in Nigeria (in its present form is a show for corruption and infraction of the EIA Act. Also, the public access to information through the public registry is yet to be honoured in compliance since the commencement of the EIA Act in 1992. The wide divergence from the EIA Act and actual practice since 1992 has resulted to the escalating environmental and public health consequences in Nigeria.

Who Prepares EIA

EIA is prepared by experts drawn from various fields. These experts are contracted by either i) Government agency or ministry ii) project proponent. Either parties are legally permitted to hire consultants to do the work or handle some specific jobs according to their expertise. This is so because EIA is a multidiscipline exercise and only experts can bring out the best in their own areas of specializations. Below is a typical example of EIA preparers list showing their various disciplines [26,27].

Justification of Project

- Need for project and project background
- Value of project in terms of Social, cultural, economic sustainability
- Project alternatives
- Envisaged sustainability
- Economic sustainability
- Technical sustainability
- Environmental sustainability

Steps in Carrying out EIA

- One. Identification
- Two. Screening
- Three. Scoping



- Four. Terms of references
- Five. Draft EIA
- Six. Public Participation
- Seven. Final EIA
- Eight. Decision
- Nine. Administration and judicial review
- Ten. Project implementation
- Eleven. Project monitoring
- Twelve. Feed back

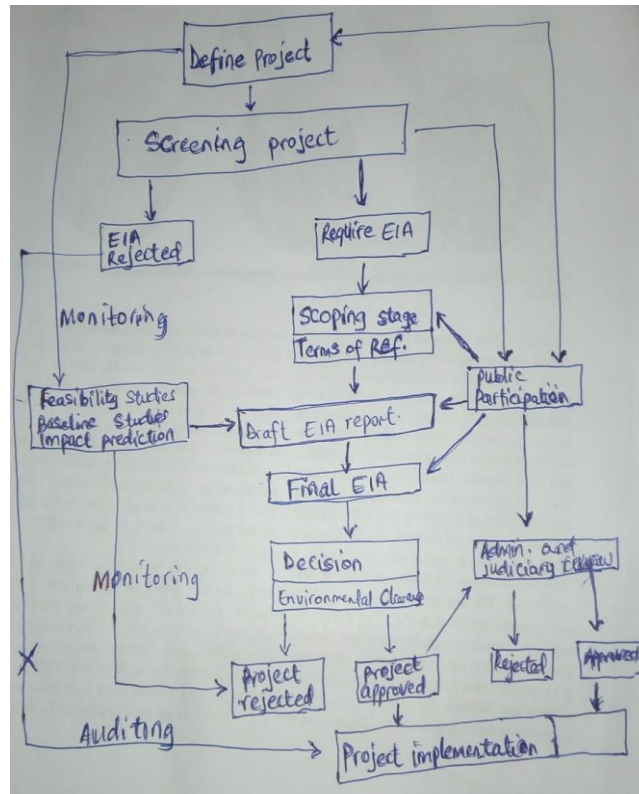


Figure 1: A simplified Flowchart of EIA process elements and interconnectivity of activities

An EIA process can be reduced for easy understanding by non-experts who most often may not be required to understand the jargon. For simplicity, in this presentation most EIAs can be seen to consist of four key parts. Firstly, the preliminary assessment: This involves the identification and collection of relevant information, in a process generally called screening. During this step the decision is made on whether an EIA is required for the project or not. If an EIA is required, then the second part starts. The second part is called scoping in which relevant information to be identified and assessed with respect to key impacts of the proposed development are obtained. The results from scoping process are produced in EIAR report. The third part is achieved when the EIAR is summarized and forwarded to the relevant decision-makers as an ‘environmental impact statement’ (EIS). The final part comprises the review of the EIS and its adequacy as a basis for the competent/approving authority to make the decision on ‘development conditions’ or give clearance or approval for the implementation of the project [28].

Content of EIA Report

Information contained in the report should be arranged and resented to the responsible licensing authorities in the following format:

- Executive summary
- Policy, legal and administrative framework
- Description of the proposed project
- Description of the environment



- Significant environmental impacts
- Analysis of alternatives
- Mitigating management plan
- Monitoring plan
- Interagency and public/NGO's involvement
- Non- technical summary of the report for political and public use
- List of references

Appendices:

- List of environmental impact assessment preparers and reviewers, including their specializations and their highest qualifications.
- Records of interagency and public/NGO's communications - Data on unpublished document references

Table 1: On the strengths and shortcomings of EIA process in Nigeria (source: Chris O. Nwoko (20013) [29])

S/N	Questions raised	Frequency (%)
1	Poor administrative set up within the responsible authority	57
2	Weak coordination along the line departments (EIA proponents, consultants, local financial institutions)	60
3	Few EIA production per annum	67
4	Inadequate screening and scoping	65
5	Limited scope of EIA review	54
6	Poor quality of EIA report	50
7	Weak public participation	79
8	Inadequate implementation of mitigation measures and monitoring	75
9	Is EIA objectives to reduce environmental impact of projects?	100
10	Effective legal system and legislation	67
11	Extensive politicization of the EIA process	78
12	Is 21 days allowed for public comments adequate	78
13	Is baseline data available?	53
14	Need to maintain professional ethics	87

Minimum content of EIA

The director in charge of project need not be an expert in EIA. However there is a check list that will quickly put him in control to ensure the proper work is achieved. We have simplified the entire process into two checklists namely Screening Checklists and the Policy Approvers and Decision-makers checklist.

Table 2: Checklist for screening, approval and policy makers.

Screening Checklists	Approvers and Decision-makers checklist.
<p>1.Environmental Features Areas containing rare or endangered species National parks, nature reserves, Etc. Habitats providing important resources for vulnerable groups. Moist or dry tropical and sub-tropical forest</p> <p>2.Development Features Important policy changes likely to affect the environment. Major changes in land tenure or use Substantial changes in water use. Large infrastructure project</p> <p>3.Potential adverse and beneficial effects Livelihoods Culture Land management Water quality and quantity Local air quality Global impacts Conservation</p> <p>4.Impact characterization</p>	<p>5 Project setting Have underlying causes of environmental damage been considered? Would these underlying causes be better addressed by other means.</p> <p>6. Impact identification Is there any effect on environmentally sensitive or important areas? Have the environmental and social risks been evaluated? Have indirect effects been addressed?</p> <p>7. Mitigation measures What mitigation measures are proposed? What measures will be taken to enhance environmental benefits? What consultation was there with concerned stakeholders?</p> <p>8.Procedures</p>



Is the impact beneficial, benign or harmful? What is the scale and intensity of impact? Are effects irreversible? Are the effects due to construction and/or operations? Are the effects likely to be politically or socially controversial? Will there be different effects on different members of society? What are the timescales of impact?

Have appropriate guidelines been followed?

Have the beneficial and adverse environmental effects been integrated into the economic analysis?

Have the appropriate authorities been consulted?

9. Implementation

Do local institutions need strengthening in order to effect the environmental measures? Who will monitor the environmental impact?

Have environmental measures been costed, and funds allocated?

Data of EIA can be so elaborate and detailed that the interpretation is often a problem even for well-trained scientists. This is because many experts are involved in generating the data. Therefore, policy makers are overwhelmed with data that looks superfluous. Therefore, the need for chemometric methods that reduce data to single digits that have simple interpretation is a very important aspect of EIA [verla et al., 2019] [30].

Environmental Factors of EIA

Generally, all EIA will describe effects on human population and health, biodiversity with reference to species, land, soil, air and climate, material assets, cultural heritage and the landscape and the interaction between these factors.

There will also be a brief description of the environment (baseline information). General area description and most important features (Present infrastructure and services) water- electricity- sewage – solid wastes – hospitals.

Fragile or sensitive ecosystems (critical or high valued ecosystems) that are present

Description of archeological & historical areas)

Description of protected areas

Description of recreational & tourist areas

Preliminary Analysis of Impacts

1. Air Quality (potential effects on air quality: (Construction phase - Operation phase – Site - Neighboring area.
2. Clarify whether projects or sites that are considered sensitive exist nearby the project sites (associates, schools, residential areas...etc
3. Water Quality: Will the activity cause a significant change on the water availability, use, hydrology, drainage, temperature or quality?
4. Are there existing hazard probabilities- explain the type, quantity and impact?
5. Will the activity affect surface water use?: Fisheries .- Tourism & secretion - Other activities
6. Soil Quality: Would the activity provoke a significant change on land use, landscape, fertility, vegetation cover, biodiversity or quality, identify the impact of changes of soil quality on different activities and any other potential or significant impacts resulting from this activity (EU 2014). [31]
7. What are the specific and short term impacts on climate?
8. What are risks and disasters and accidents that could arise from the project?

Determination of Adverse Impacts

The first step in determining adverse effects is identify all significant changes which the project will cause. These changes would include, but not limited to, changes on employment opportunities, wastewater effluents, air emission, solid waste, land use, infrastructure, exposure to diseases, risk of industrial hazards, noise, traffic and socio-cultural behavior.

Then an assessment of the impacts from changes brought up by the project on the baseline environmental conditions.

There should be an analysis distinguishing between positive and negative impacts, direct and indirect impacts, intended and non-intended impacts as well as immediate and long term impacts done in a manner that can guide project operations.

Mitigation of Adverse Impacts



For a proposed project, a recommendation of feasible cost effective measures to prevent or reduce significant adverse impacts to acceptable levels is required.

An inclusion of measures for emergency response to accidental events, should be set as appropriate

There is a need to estimate the impacts and costs of these measures and of the training requirements as well. Finally, there should be a consideration of compensation to affected parties for impacts which could not be mitigated [32].

Developing an Environmental Monitoring Plan

A detailed plan to monitor the implementation of mitigating the adverse impacts of the project during construction and operation should be prepared including the following aspects:

- 1- Hydrology, ground water, drainage and effluents
- 2- System performance
- 3- Public health
- 4- Flora and fauna
- 5- Air, noise
- 6- Social cultural economic
- 7- Climate factors etc

Together with estimates of capital and operating costs

Guiding Principles of an EIA

- i. Participation
- ii. Transparency
- iii. Certainty
- iv. Accountability
- v. Cost effectiveness
- vi. Credibility
- vii. Flexibility
- viii. Practicability

Categories of EIA Projects

In many countries legislations allow projects to be classified into three categories: white projects include establishments and project with minor adverse environmental impacts.

Grey projects includes establishments to be screened for major adverse environmental impacts. The establishment is categorized by activities, quantity of production and project size. The applicant must carry out a more elaborate environmental screening.

Black projects includes establishments or projects which due to their potential and sustainable environmental impacts require a full EIA study. The establishments are screened by activities, quantity of production and project size [33].

Mandatory EIA Study List

Project conditions for requiring a full EIA

1. Agriculture

- (a) land development covering an area of 500 hectares or more to bring forest land
- (b) Agricultural programmes necessitating the resettlement of 100 families; (c) development of agricultural estates covering an area of 500 hectares

2. Airport

- (a) Construction of airports (having an airstrip of 2,500 metres or longer
- (b) Airstrip development in state and national parks.

3. Drainage and irrigation

- (a) Construction of dams and manmade lakes and artificial enlargement of lakes with surface areas of 200 hectares or more;
- (b) Drainage of wetland, wildlife habitat or of virgin forest covering an area of 100 hectares or more;
- (c) Irrigation schemes covering an area of 5,000 hectares or more.

4. Land reclamation

Coastal reclamation involving an area of 50 hectares or more.

5. Fisheries

- (a) Construction of fishing harbours;
- (b) harbour expansions involving an increase of 50 percent or more in fish landing capacity per annum



(c) Land based aquaculture projects accompanied by clearing of mangrove swamp forests covering an area of 50 hectares or more

6. Forestry

- (a) Conservation of hill forest land to other land use covering an area of 50 hectares or more;
- (b) logging or conversion of forest land to other land use within the catchment area of reservoirs used for municipal water supply, irrigation or hydropower generation or in areas adjacent to state and national parks and national marine parks;
- (c) Logging covering an area of 500 hectares or more;
- (d) Conservation of mangrove swamps for industrial, housing or agricultural use covering an area of 50 hectares or more;
- (e) Clearing of mangrove swamps on islands adjacent to national marine parks.

7. Housing Housing development covering an area of 50 hectares or more.

8. Industry

- (a) Chemical production capacity of products is greater than 100 tons/day
- (b) Petrochemicals of all sizes
- (c) Non-ferrous Primary smelting.
Aluminum-all sizes Copper-all sizes, Other producing 50 tons/day and above of product
- (d) Non-metallic Cement for clinker throughput of 30 tons/hour and above.
Lime 100 tons/day and above burnt line rotary kiln or 50 tons/day and above vertical kiln
- (e) Iron and Steel. Require iron ore as raw material for production greater than 100 tons/days; or Using scrap iron as raw material for production greater than 200 tons/day
- (f) Shipyards with dead weight tonnage greater than 5000 tons.
- (g) Pulp and paper industry. Production capacity greater than 50 tons/day.

9. Infrastructure

- (a) construction of hospitals without falling into beach fronts used for recreational purposes;
- (b) Industrial estate development for medium and heavy industries covering an area of 50 hectares
- (c) Construction of expressways;
- (d) Construction of national highways;
- (e) construction of new townships.

10. Ports

- (a) construction of ports;
- (b) port expansion involving an increase of 50 percent or more in handling capacity per annum

11. Mining

- (a) mining of materials in new areas where the mining lease covers a total area in excess of 250 hectares;
- (b) ore processing, including concentrating for aluminum, copper, gold or tantalum;
- (c) Sand dredging involving an area of 50 hectares or more.

12. Petroleum

- (a) oil- and gas fields development;
- (b) construction of offshore pipelines in excess of 50 kilometers
- (c) construction of oil and gas separation, processing, handling, and storage facilities;
- (d) construction of oil refineries;
- (e) construction of product depots for the storage of petrol, gas or diesel (excluding service stations) which are located within 3 kilometers of any commercial, industrial or residential areas and which have a combined storage capacity of 60,000 barrels or more.

13. Power generation and transmission

- (a) construction of steam generated power stations burning fossil fuels having a capacity 10 megawatts;
- (b) dams and hydroelectric power schemes with either or both of the following-
 - (i) dams over 15 meters high and ancillary structures covering a total area in excess of 40 hectares;
 - (ii) Reservoirs with a surface area in excess of 400 hectares;
- (c) construction of combined-cycle power stations;
- (d) construction of nuclear-fuelled power stations.

14. Quarries

Proposed quarrying of aggregate, limestone, silica, quartzite, sandstone, marble and decorative building stone within 3 kilometers of any existing residential, commercial or industrial areas, or any area for which a license, permit or approval has been granted for residential, commercial or industrial development.

15. Railways



- (a) construction of new routes;
- (b) Construction of branch lines.

16. Transportation

Construction of mass rapid transport projects.

17. Resort and recreational development

- (a) construction of coastal resort facilities or hotels with more than 80 rooms;
- (b) hill station resort or hotel development covering an area of 50 hectares or
- (c) development of tourist or recreational facilities in national parks;
- (d) development of tourist or recreational facilities on islands in surrounding waters which may be declared as national marine parks.

18. Waste treatment and disposal

- (a) toxic and hazardous waste-
 - (i) Construction of incineration plant;
 - (ii) Construction of recovery plant (off-site);
 - (iii) Construction of waste water treatment plant (off-site);
 - (iv) Construction of secure landfill facility;
 - (v) Construction of storage facility (off-site);
- (b) Municipal solid waste-
 - (i) Construction of incineration plant;
 - (ii) Construction of composting plant;
 - (iii) Construction of recovery/recycling plant;
 - (iv) Construction of municipal solid waste landfill facility;
- (c) municipal sewage-
 - (i) construction of waste water treatment plant;
 - (ii) construction of marine outfall.

19. Water Supply

- (a) construction of dams, impounding reservoirs with a surface area of 200 hectares or more;
- (b) groundwater development for industrial, agricultural or urban water supply of greater than 4,500 cubic metres per day [34].

Public Participation

Public participation is recognized in Nigeria as an integral part of a good EIA process. However, the practice remains a story for another day. In the interim what it should be has been outlined here: Public participation should be: 1. Context Adaptive This means that the EIA should exhibit an understanding and appreciation of the social and cultural values and institution of the communities in which the project is sited. 2. Informative and proactive: This can be achieved by recognizing the rights of the public to be informed in time and early about the proposal in a meaningful way since the projects will eventually affect their lives. 3. Adaptive and communicative: This recognizes the heterogeneous nature of the public in terms of demographics, knowledge, power, values and interests. 4 Inclusive and equitable: This aspect ensures that the interests of those not represented are respected as regards the distribution of impacts, compensation and benefits. 5 Educative and Cooperative: A good public participation should contribute to mutual respect of all impact assessment stakeholders at same time promote cooperation, convergence and consensus building in a way that eliminates conflicts and encourage general acceptance of the proposals that promotes and supports sustainable development. 6. Imputable: As the EIA process goes on, a good public participation should be improving the proposal by taking into account results of the public participation process and including into the report and obtaining feedback about the results of the public participation process, especially on how public participation inputs are contributing to informed decision making [35 Mathope and Toteng, 2018]

What Needs to be Done

1. Register consultants' names and terms of reference
2. Name consultants and their expertise in the EIA report
3. Publish the terms of reference in the EIA report
4. Make EIA reports available to the public
5. Publish lists of screening and final decisions along with conditions for approval.

Discussion



There are numerous issues arising from even the best practice of EIA. For instance having fulfilled the preservation and protection of the environment, the sociocultural and economic balance will still not be achieved neither will there sustainability. In the light of this the Asian Development Bank (1993) provided a listing and description of some major environmental problems associated with construction of rural roads.

These are:

- Encroachment into precious ecological resources, including forests and swamps.
- Encroachment into historical areas and cultural monuments.
- Impairment of fisheries, aquatic ecology and other beneficial water uses, due to changes in surface hydrology.
- Erosion and silt runoff from exposed areas, which may also cause impairment of downstream water quality and damage to land values.
- Dust nuisances caused by both the road usage and during construction.

In Nigeria, erosion has been thought to be most devastating consequences the projects such as roads. It could in the interest of everyone if these extra suggestions form part of EIA.

The World Bank, 1991, suggested that mitigation measures for the control of erosion could be include in the designs prior to construction (e.g. inappropriate drainage channels and culverts can exacerbate erosion just as quick establishment of vegetation on exposed slopes can reduce erosion. McCormick, 1990 argues that implementation methods may contribute encourage environmental damage. For instance the ue of heavy equipment mar cause unintended damages whereas labour-based operations may prevent environmental damages. [36,37,38 Hearn, 1999].

These indirect negative impacts of developmental projects are easier to predict, since they are usually of a long-term nature. On the other hand changes in land use can bring about serious damages that are felt immediately and cascading into other negative impacts such as cultural and economic problems. In Brazil, changes in land use such as roads have encouraged the development of settled farming communities, at the expense of the indigenous peoples' livelihoods, and at the expense of the natural ecology. In the same way, roads constructed to give logging companies greater access to the African rain forests may have had a similar damaging impact and questions[39.40.41]

Conclusion

Even though the remarkable increase in EIA in Nigeria there is still remarkably insufficient EIA for screening and full EIA studies conducted in Nigeria. The implementation process and its outcomes are yet to be felt in Nigeria, EIA experts and consultants believe that the main objective of EIA is to enhance sustainable development and to reduce environmental impact from projects, and to help in decision making. To date the success has been rooted in public participation and the legal regulation of EIA. However, some problems such as subjectivity during scoping process, insufficient consideration of alternatives, politicization of EIA process, and low competence level of involved authorities need to be addressed urgently. EIA practitioners need to have a thorough knowledge on EIA procedures and legal requirements, but forecasting the effects and evaluation of the results should be reserved for the recognized experts. A rapid increase in the number of specialists who undertake preparation of EIA documentation, especially documentation for screening procedure, requires effective investigation and regulation, perhaps in a form of a licensing system which would also provide for the professional competence building scheme, would enable setting up a network of experts capable of contributing to EIA studies, and would assist regulators in those cases when participation of such experts in EIA study is required.

Recommendations

1. EIA should clearly be provided for from the onset of the budget of every project certified as requiring EIA.
2. Experts should be contracted to carry out EIA as part of the project according to their specializations.
- 3 Independent EIA review bodies should be involved at different levels of decision- making. Third party evaluation is already done at FMEnv and DPR levels.
4. Directors involved in projects should seek for periodic reports on EIA
5. The development of EMP must be incorporated in the monitoring and evaluation scheme.
6. The EIA planning must be robust and the proposed mitigation must be soundly conceived and properly effected.
7. Specific impacts to certain projects should be given special attention. For instance the Asian Development Bank (1993) added a listing of impacts that are peculiar to road construction.

References

- [1]. DFID (1999). Environmental Guide. London: Department for International Development (DFID).



- [2]. OECD (1994). Impact environmental assessment of roads. Paris: Organisation for Economic Co-operation and Development.
- [3]. TRL (1997). Principles of low cost road engineering in mountainous regions. TRL Overseas Road Note 16. Crowthorne: Transport Research Laboratory.
- [4]. Tsunokawa K and C Hoban (1997). Roads and the environment - a handbook. World Bank Technical Paper No. 376. Washington, D.C: World Bank
- [5]. World Bank (1991). Environmental assessment sourcebook. Volume II, Sectoral Guidelines. World Bank Technical Paper No. 40. Washington, D.C: World Bank.
- [6]. Verla Andrew Wirnkor, Verla Evelyn Ngozi, Enyoh Christian Ebere (2019). Understanding the Concept, procedure and practice of Environmental Impact Assessment in Nigeria, Paper presentation at A 3-Day Induction & Leadership Orientation Workshop for ISOPADEC Executive Board Members, held from Monday, 22nd to Wednesday 24th, July 2019 at Oguta Hotel, Owerri Imo State, Nigeria, Organized by Women Leadership Institute's.
- [7]. Olusegun A Ogunba (2003) Environmental Impact Assessment Review EIA systems in Nigeria: evolution, current practice and shortcomings <https://doi.org/10.1016/j.eiar.2003.10.019>
- [8]. P. Fouracre, TRL Limited (2001): Environmental Impact Assessment and Management, Rural Transport Knowledge Base, Rural Travel and Transport Program 2001.
- [9]. Ogunba OA. (2004). EIA systems in Nigeria: evolution, current practise and shortcomings. Environ Impact Asses Rev; 24:643–60.
- [10]. Chris O. Nwoko (20013): Evaluation of Environmental Impact Assessment System in Nigeria, Greener Journal of Environmental Management and Public Safety, 2 (1): 022-031.
- [11]. Environmental Impact Assessment (1995). Procedural Guidelines: The Federal Ministry Of Environment.
- [12]. Isichei AO (2000). Environmental impact assessment and environmental evaluation reports. Paper presented at the Workshop of the Nigerian Corrosion Association, Warri (27th March).
- [13]. Jay S, Jones C, Slinn P, Wood C (2007). Environmental impact assessment: retrospect and prospect. Environ Impact Asses; 27(4):287–300.
- [14]. Kruopiene J, Židonienė S, Dvarionienė J (2009). Current practice and shortcomings of EIA in Lithuania. Environ Impact Asses Rev. 29: 305–309.
- [15]. Obaidullah N, Rizwan H (2008). Evaluation of environmental impact assessment system in Pakistan. Environ Impact Asses Rev. 28: 562–571.
- [16]. Okorodudu-Fabura M T (1988). Law of environmental protection materials and text. Ibadan, Nigeria: Caltop Publications.
- [17]. Pinho P, Maia R, Monterroso A (2006). The quality of Portuguese Environmental Impact Studies: the case of small hydropower projects. Environ Impact Asses Rev; 27(3):189–205.
- [18]. Pölonen I (2006). Quality control and the substantive influence of environmental impact assessment in Finland. Environ Impact Asses Rev; 26:481–91.
- [19]. Sakalauskiene G, Hansen FT, Raulinaitis M (2004). Assessment of hydro power plants effect on river water quality. Environ Res Eng Manage; 3(29):14–20.
- [20]. Simpson J (2001). Developing a review package to assess the quality of EA reports of local authority structure and local plans in the UK. Environ Impact Asses Rev; 21:83–95.
- [21]. Suleiman AO (2007). Environmental Impact Assessment in Nigeria: Akwa Ibom State EIA Train the Trainer Workshop.
- [22]. Tayo, A. Y. (2008). The Environmental impact assessment practice in Nigeria: The Journey so far. www.inigeria.com. date retrieved 10 Oct. 2012.
- [23]. UNCED, (1992). United nation conference on environment and Development. Rio de Janeiro, 3-14 June 1992.on Bisphenol-A Polycarbonate sheets". *Scientific report 6, article number: 24308*.
- [24]. Appiah-Opoku Environmental impact assessment in developing countries: the case of Ghana Environmental Impact Assessment Review (2001)
- [25]. R.N.L Andrews et al. Substantive guidance for environmental impact assessment (1977)
- [26]. Evaluation of environmental information for planning projects: a good practice guide (1994)
- [27]. Directorate of Petroleum Resources (DPR) Nigeria: environmental guidelines and standards for the petroleum industry in Nigeria (EGAS) (1991).
- [28]. Integrating environmental considerations in the agricultural policy process: Evidence from Nigeria 2018, Environmental Development Evaluating EIA systems' effectiveness: A state of the art 2018, Environmental Impact Assessment Review



- [29]. Environmental Impact Assessments in developing countries: We need to talk about politics 2017, Extractive Industries and Society
- [30]. A systematic quality assessment of Environmental Impact Statements in the oil and gas industry 2016, Science of the Total Environment
- [31]. Achieving sustainable environmental governance in Nigeria: A review for policy consideration Urban Governance, Volume 2, Issue 1, 2022, pp. 212-220
- [32]. The attractive concept of simplicity in environmental impact assessment: Perceptions of outcomes in southeastern Brazil Environmental Impact Assessment Review, Volume 67, 2017, pp. 101-108.
- [33]. Public participation in China's EIA process and the regulation of environmental disputes Environmental Impact Assessment Review, Volume 81, 2020, Article 106359.
- [34]. Streamlining or sidestepping? Political pressure to revise environmental licensing and EIA in Brazil Environmental Impact Assessment Review, Volume 65, 2017, pp. 86-90
- [35]. 25 years of the UK EIA System: Strengths, weaknesses, opportunities and threats Environmental Impact Assessment Review, Volume 61, 2016, pp. 19-26
- [36]. Ojile M. O. 1998, Answers to Technical Qualifying Questions for the EIA Studies. Raph Mulders 1997 The State of Environmental Impact Assessment in the Developing Countries. The Hague. Delta State Environmental Protection Agency (DELSEPA) Edict No. 5 1997. Rivers State Environmental Protection Agency (RSEPA) Edict No. 2 1994. Department of Petroleum Resources (DPR), Environmental Guidelines and Standards for the Petroleum.
- [37]. Industry in Nigeria (1991). Federal Environmental Protection Agency (FEPA) Decree 59, 1992. National Policy on the Environment (1989). Environmental Impact Assessment Decree 86, 1992.
- [38]. FEPA Environmental Impact Assessment procedural Guidelines (1995). United Nations Environment Program, Environmental law Nerry.
- [39]. Echefu and E Akpofure Environmental impact assessment in Nigeria: regulatory background and procedural framework. UNEP EIA Training Resource Manual Case studies from developing countries PP: 63-74.
- [40]. Goitseone Mathope and Elisha N Toteng (2018). Public Participation in Environmental Impact Assessment: Review of 2005 to 2010 Legislative and Policy Framework and its Compatibility to International Best Practice. Botswana Notes and Records, 47: 79-91.: <https://www.researchgate.net/publication/323809472>.
- [41]. The Environmental Impact Assessment Practice In Nigeria: The Journey So Far, Tayo Akeem Yusuf December 16, 2008].

