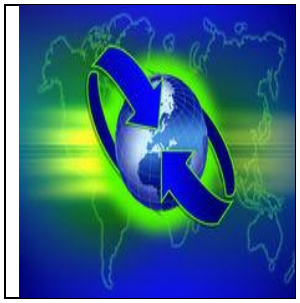

Appraisal of the Implementation of the Environmental Management Plan (EMP) for the Okobo Coal Mining Project in Ankpa, Kogi State, Nigeria

[1]Msheliza, Florence Nicholas, [2]Samaila, Ishaya K, [3]Magaji J.I. & [4]Abugu, Nkechinyere Anthonia

Geography Department, Faculty of Environmental Sciences, Nasarawa State University, Keffi, Nigeria.

Corresponding Author: Abugu Nkechinyere Anthonia; Mobile: Phone No. 08187930402

Email: researcherscreed@gmail.com

Received October, 2019, Accepted January, 2020, published March, 2020

Abstract

Okobo community has continued to yell for help over the deplorable environmental and socio-economic conditions created by Okobo Coal Mining Project, despite that an Environmental Impact Assessment (EIA) with impacts mitigation measures in the Environmental Management Plan (EMP) was conducted. Thus, this study was conducted to appraise the Environmental Management Plan (EMP) of Okobo Coal Mining Project in Ankpa Kogi State, Nigeria, in order to evaluate the performance of the EMP. The objectives were to review the Environmental Management Plan of Okobo Coal Mining Project; assess the implementation of environmental impacts mitigation measures and then evaluate the follow-up of environmental management plan (EMP). Material used in this study is the EIA report of Okobo coal mining project. Methods used for data collection are: review, questionnaire, interview and focus group discussion. Review of the EMP shows that the Okobo coal mining project EMP is adequate. However, data from the survey shows that approximately one hundred and one (101) scores representing less than twenty per cent (19.40%) agreed that the mitigation measures for environmental impacts predicted in the Okobo coal mining project were implemented. Out of the five hundred and twenty-three (523) respondents, 444 representing 84.89% rated the implementation of the environmental mitigation measures low, sixty-three (63) which is only 12.05% rated it moderate and only sixteen respondents which is 3.06% rated it high. The monitoring of the outlined mitigation measures is not in tune with the arrangement in the Environmental Management Plan as the actual follow-up (2 times) is significantly lower than the planned follow-up (18 times). Therefore, it was concluded that the Okobo coal mining project EMP is adequate but the implementation and follow-up were low. It was recommended that the mitigation measures and monitoring plan should be strictly followed.

Keywords: Coal mining, Environmental Impact Assessment, Environmental Management Plan, Implementation monitoring and evaluation and monitoring Follow –up activities

Introduction

Development has for a long time focused on whether the initiative was economically and technically feasible. Thus, development projects increased pressure on the environment due to lack of concern for the environment. However, development and environment are no longer separate concepts due to the continued rise of interest in sustainable development of land and its valuable resources. To bring environment and development together, new legislative and technical tool called Environmental Impact Assessment (EIA) was introduced at international and national levels (Baker and Mclelland, 2003). This legislative and technical tool (EIA) has been applied for mining projects in Nigeria and the Okobo coal mine inclusive. Adoption of environmental impact assessments (EIAs)

in Nigeria is to enable its government to plan development projects such as mining and other land use in an integrated manner, avoiding irreversible environmental damage.

According to Erhun (2015), a stable and profitable mineral project requires consideration of not just the economic viability of mineral deposit, but competent project appraisals is also essential as well as early incorporation of environmental and social impact analysis and the strengthening of the capacity of institutions to engage in such integrated assessment. However, Nwoko (2013) observed that prior to the enactment of the EIA Act 86 of 1992 in Nigeria, project appraisals were limited predominantly to feasibility studies and economic cost-benefit analysis and that most of the appraisals did not take environmental costs, public opinion, social and environmental impacts of development into consideration. Mkpuma *et al*., (2015) opined that mining can become more environmentally sustainable by developing and integrating practices that reduce the environmental impact of mining activities (mitigation measures). This include measures such as reducing water and energy consumption, minimizing land disturbance and waste production, preventing soil, water, and air pollution at mine sites, and conducting successful mine closure and reclamation activities.

Environmental and Social Management Plan (EMP) is one of the tools available to achieve this goal. EMP is a core component of EIA aimed at assessing, identifying and ranking the impacts the proposed mining activity will have on the environment and the lives of the community members where the operations are going to take place. Furthermore, its goal is to identify the suitable measures to manage, avoid or mitigate the impact the mining activities will cause to the environment and mining community concerned. Therefore, it is submitted that EMP can assist in reducing harm and hazards of mining activities if well implemented. The EMP, once accepted by the relevant authorities, becomes an enforceable blueprint for managing impacts on the environment.

In Nigeria, a number of EIA practitioners have pointed out that there is the lack of EIA follow-up on the evidence of the effectiveness of implemented mitigation measures in practice (Gwimbi and Nhamo, 2016). This suggest why Okobo community has continue to yell for help over deplorable environmental and socio-economic conditions created by Eta Zuma mining company in the

community, despite carrying out an EIA with detailed mitigation measures in the EMP (TVC News, March 22, 2017). Ambitious legislation needs to be complemented through effective monitoring and enforcement. Hence, several researches have been carried out on Nigeria EIA Act of 1992 and its performance as a tool for sustainable development and findings has been made (Nwafor, 2006; Agbazue and Ehiemobi, 2016). The origin, objectives and process of EIA in Nigeria is well documented (Federal Ministry of Solid Mineral Development, 2004; Nwafor, 2006; Agbazue and Ehiemobi, 2016). The benefits of EIA has been detailed, Ajoa, (2016) has it that EIA will help select and design projects, programmes or plans with long term viability and therefore improve cost effectiveness. EIA is recognized as a planning tool used to predict the likely environmental impacts of a proposed activity such as a project, plan, program or legislative action so that they can be addressed at an appropriate stage in the design or formulation before further decisions are taken on the activity or action. Sosovele (2011) stated that EIA is meant to inform decision makers and influence designers, increase project benefit and reduce environmental effects associated with the proposed project.

Although EIA has a wide range of benefit, it has been noted that EIA application is confronted with many challenges. For instance, Agbazue and Ehiemobi (2016) stated that "the Act and its practice are fraught with many challenges. EIA is often conducted long after the project proponents have become attached to a design concept. The other challenges include; performance and accountability failure of the responsible authority, proponents desire to simply fulfill "all righteousness", professional incompetence of EIA practitioners, poor screening and scoping, ineffective coordination, poor public participation, and lack of post project monitoring and the implementation of mitigation measures.

Moreover, performance of Environmental Management Plan (EMP) has become a common feature in environmental management debates among scholars, practitioners, Non -Governmental Organizations (NGOs) and the government agencies in Nigeria. The discussions on the challenges of the EIA practice in Nigeria have covered a wide range of issues including an assessment of the

compliance, responsibilities, efficiency and the performance of the EIA process (Agbazue and Ehiemobi, 2016).

However, adequate attention has not be given to the Environmental Management Plan (EMP) in a specific project, rather it is usually suggested that lack of implementation of mitigation measures, makes EIA ineffective (Mallo, 2007; Kolhoff *et al*.,2009; Marshall, 2011; Kabir, 2012; Canter, 2013). This study in a bit to bridge this gap intend to appraise the environmental management plan of coal mining project at Okobo, Kogi State in order to find out why coal mining in Okobo, Kogi State by Zuma 828 Coal Limited has continued to cause detrimental environmental and socio-economic effects despite having an approved EIA report with detailed Environmental Management Plan. The objectives of the study are to review the Environmental Management Plan of Okobo Coal Mining Project; assess the implementation of environmental impacts mitigation measures and then evaluate the follow-up of environmental management plan (EMP).

Material and Methods

Material used in this study is the EIA report of Okobo coal mining project. Methods used for data collection are: review, questionnaire, interview and focus group discussion. This study reviewed the EMP of Okobo coal mine project and identified the predicted environmental impacts, mitigation measures, monitoring plan and project stakeholders. After which questionnaire, interview and focus group discussion was conducted with stakeholders. A purposive sampling technique was used to select four (4) communities (Okobo, Enjema, Okobo Ate, and Okobo Okpiko) for questionnaire administration. Although the mining project has six (6) host communities (Okobo, Enjema, Okobo Ate, Okobo Okpiko, Ejiga and Ofugolo) all in Ankpa Local Government Area of Kogi State. Four (4) communities were purposely selected based on their high vulnerability to the project than others. For representativeness, sampling considered the household spatiality. Thus, systematic sampling technique was used to select households to be sampled. As a result, three household intervals were used in household selection. Secondly panel sampling technique was used to select twenty (20) stakeholders for focused group discussion. Total samples of five hundred and twenty three

households were selected from the four (4) selected communities for the administration of questionnaire. The distributions of questionnaire across these four communities were based on their population size obtained in the EIA (2011) report and projected to 2018 (Table1). Sample sizes were determined by Yamane (1973) a standard statistical formula**:**

$$S = \frac{N}{3+N(ME^2)}$$

Where S = sample size N = population ME = margin of error allowed (0.05).

Table 1: Sample Size for Questionnaire Administration

Selected Communities	EIA Pop. in 2011	Projected Population to 2018	Sample Size
Okobo	800	996	81
Enjema,	5000	6225	199
Okobo Ate	900	1089	191
Okobo Okpiko	600	747	52
Total	7300	9057	523

Field observations were also undertaken to independently assess the various project affected communities and evidence of impacts mitigation. Focus Group Discussions (FGDs) were conducted to supplement the findings from the quantitative result. Consultations were held at various levels with stakeholders Zuma 828 Coal Mine Company, Federal Ministry of Environment (FMEnv), Kogi State Ministry of Environment, Kogi State environmental management Board, Ankpa Local Government Council, Ministry of Mine Steel Development and representatives of host communities. Data collected were analysed using frequency distribution, ANOVA and t-test.

Results and Discussion

Review of Okobo Coal Mining Project EMP

Okobo Coal Mining Project EIA report has an EMP that contains all the major requirements in an EMP of coal mining project. Federal Ministry of Solid Materials Development, (2004) explained that environmental management plan (EMP) consists of the predicted impacts, set of mitigation, management, monitoring and institutional measures to be taken during the implementation and

operation of a project, to eliminate adverse environmental impacts or reduce them to acceptable levels. Environmental management plan (EMP) also provides the roles of different parties involved in the project implementation and includes measures for waste management and disposal, noise abatement, maintenance, emergency response planning as well as monitoring and informing public on the environmental and safety impacts of the project. All these were covered in the Okobo Coal Mining Project EMP. It specifies the mitigation measures, monitoring requirements, duration and frequency of the monitoring, and the action parties to manage the biophysical, social and health environment at the various phases of the project.

The Implementation of Environmental Mitigation Measures of Okobo Coal Mine Project

Using the environmental management mitigation measures of Okobo Coal Mining Project as a checklist, result showed that environmental impacts mitigation measures were poorly implemented. Table 2: presented the respondent's recognition of all the mitigation measures enlisted to mitigate the various environmental impacts predicted in the Okobo coal mining project. It showed that on average, approximately one hundred and one (101) scores representing less than twenty per cent (19.40%) agreed that the mitigation measures for environmental impacts predicted in the Okobo coal mining project were implemented. Therefore, on average, there is a poor implementation of the environmental mitigation measures. However, the standard deviation and coefficient of variation being ±78.24 and 98% respectively shows high disparity in mitigation measures' implementation. Therefore, some measures were implemented more than others. For instance, five hundred and twenty (520) respondents (99.42%) agreed that company ensure that operators of construction equipment wear appropriate Personal Protection Equipment (PPE) e.g. nose masks during dusty operations whereas, no respondent (0%) agreed that measures such as "the company shall carry out health awareness campaigns within the workforce to improve hygiene and encourage good housekeeping; ensure that water is sprayed to reduced dust in air during construction in the dry season and ensure that any non-paved area is re-vegetated".

Table 2: Implementations of Mitigation Measures for the Various Environmental Impacts

Which of the following mitigation measures were implemented?	
Impact/Mitigation Measures	**Freq.**
Increase in noise nuisance	
No night driving policy shall be enforced by all the contractors	98
Contractors shall plan activities such that World Bank noise limit shall not be exceeded around the community(ies)	63
Key communities shall be consulted prior to periods of expected peak noise levels.	32
Application of engineering controls by installing exhaust mufflers and silencers in equipment	65
Ensure functional telecommunication network, electricity, water facilities	89
Increase waste generation	
The mining waste management policy for this project shall be enforced	69
The company shall carry out health awareness campaigns within the workforce to improve hygiene and encourage good house keeping	0
Soil degradation and soil/ Groundwater Contamination	
Provide containment for chemical and liquid discharges	56
Enforce waste management policy	48
Ensure controlled fuelling, maintenance and servicing machinery at worksite	168
Reduction in Air Quality	
Ensure that all mobile and stationery internal combustion engines are properly maintained	238
Ensure that water is sprayed to reduced dust in air during construction in the dry season	0
Ensure that operators of construction equipment wear appropriate PPE e.g nose masks during dusty operations	520
Increase runoff/ Decreased quality of run-off water	
Ensure that any non-paved area is re-vegetated	0
Ensure that the impervious area is minimized	98
Runoff water shall be captured at the point of impact.	79
Total Score	**1623**
Total Possible Scores	**8368**
Percent	**19.40**
Mean Score	**101.44**
Standard Deviation	**78.24**
Coefficient of Variation	**98**

Focus group discussion with host communities representatives indicate that company paid more attention to measures that mitigate impacts that directly affect the company not that of the communities. Ejema community, members explained that the company is only interested in making money and were less concern on the impacts of their activities on their environment and livelihoods. The leaders of Okobo community stated that "it was only in 2017, when regulatory agencies visited the community following the community's agitation in 2016 that they were able to come to an agreement with the company. In the same vein, interview with the head of Mines Environmental

Compliance Department of the Ministry of Mines and steel Development confirmed that the four communities (Enjima, Okobo, Okobo Ate, and Okobo Okpika) have signed Community Development Agreements (CDAs). Each of the CDAs have incorporated a development benefits along the lines outlined in the legislation and as defined and agreed with community input and include education scholarships, provision of employment, upgrading/building of school rooms, meeting halls and clinic, provision of communal bore holes and funding for development initiatives. CDA committees have been established in each community with various strands of each community represented including women and youth. The community CDA committees comprised of between 9 to13 members and have been signatory to the agreements.

Rating of the Implementation of the Environmental Mitigation Measures

Respondents were asked to rate the implementation in three scale (low, moderate and high) based on their impressions (Table 3).

Table3: Respondents Rating of Implementation of the Environmental Mitigation Measures

Location	**No of Respondents**	**Option**		
		Low	**Moderate**	**High**
Okobo	81	72	6	3
Enjema	199	171	21	7
Okobo Ate	191	155	32	4
Okobo Okpiko	52	46	4	2
Total	523	444	63	16
Mean		111	16	4
%		84.89	12.05	3.06

Table 3 presents the rating of the implementation of the environmental mitigation measures by respondents; it showed that out of five hundred and twenty-three (523) respondents, four hundred and forty-four representing 84.89% rated the implementation of the environmental mitigation measures low, sixty-three (63) which is only 12.05% rated it moderate and only sixteen respondents which is 3.06% rated it high. This result suggests that most people rated it low.

Thus, the implementation of the mitigation measures for the environmental impacts of Okobo coal mining project is low base on the impression of respondents. Moreover, Analysis of Variance

(ANOVA) was used to test for statistical significant difference in the rating of the implementation of mitigation measures for the environmental impacts of Okobo coal mining project to ascertain statistically that the implementation is low, moderate or high (Table 4)

Table 4: Analysis of Variance (ANOVA) for the rating of the Implementation of Mitigation Measures for the Environmental Impacts

Source of Variation	Sum of Squares	Degree of freedom	Mean SS	F-Ratio
Between group	146.6	3	48.87	4.87
Within group	221.6	15	184.67	

Calculated F= 4.87> F-table at 0.05 $F_{3, 15}$ =2.11;

Inference

Since the calculated F value of 4.87 is greater the table F value of 2.11, Ho "there is no significant difference among the rating (low, moderate and high) of the implementation of mitigation measures for environmental impacts of Okobo coal mining at 95% confidence level is rejected. Therefore, "there is a significant difference among the rating (low, moderate and high) of the implementation of mitigation measures for environmental impacts of Okobo coal mining at 95% confidence level. Thus, the rating was significantly low than moderate and high since low had the highest mean. So, the implementations of environmental mitigation measures were low.

Follow up of Monitoring Plan

There is a monitoring plan in the Okobo coal mining EIA report like any other EIA report, the monitoring plan is meant to ensure that mitigation measure are followed-up. However, assessment of the follow up of monitoring plan shows that the monitoring plan are not followed up to ensures implementation of mitigation measures (Table 5). Table 5 present the planned frequency of formal reporting, expected no of reports for seven years (2012-18) and actual reporting. The frequency of formal reporting was extracted from the Okobo Coal Mining Project EIA report, after which expected

number of reporting was calculated, while the actual reporting was gotten from stakeholders consultations. It showed that the average expected and actual formal reporting for environmental and social management follow-up were 18.38 and 2.00 times respectively.

Table 5: Actual and Expected Follow Up of Monitoring Plan

Parameter to Monitor	**Planned Frequency of formal reporting**	**Expected No of Reports (2012-18)**	**Actual Reporting**
Night driving permit and statistics	6-monthly	14	2
Noise levels at selected sites as per baseline	Annually	7	2
Physical assessment of waste records	Quarterly	28	2
Waste collection records and chain of custody transfer	Quarterly	28	2
Fuelling maintenance and servicing protocol record	Quarterly	28	2
Records of respiratory diseases	6-monthly	14	2
DO, BOD, pH in water,	6-monthly	14	2
Record of re-vegetation	6-monthly	14	2
Mean		18.38	1.50

This implies that the averaged expected management report is 2 times instead of 18.38 times. Therefore, the number of follow-up report is less than the planned follow-up. Moreover, student t test was used to ascertain if the difference between actual and planned monitoring is statistically significant (Table 6).

Decision:

Since the calculated t- value of 6.18 is greater than the table value of 1.99. The null hypothesis (Ho) of "there is no significant difference between the planned follow-up and the actual follow-up of Environmental Management Plan of Okobo coal mining project is rejected at 95% confidence level. Therefore, there is a significant difference between the planned follow-up and the observed follow-up of Environmental and Social Management Plan of Okobo coal mining project EIA report. Thus,

the actual follow-up is significantly lower than the planned follow-up. Consequently, monitoring of the outlined mitigation measures is not in tune with the arrangement in the Environmental Management Plan. This gave room to poor implementation of remediation measures.

Table 6: t- test for actual (observed) and planned Follow-up of Okobo Coal Mining ESMP

Parameter to Monitor	**Expected No of Reports (2012-18)**	**Actual Reporting**
Night driving permit and statistics	14	2
Noise levels at selected sites as per baseline	7	2
Physical assessment of waste records	28	2
Waste collection records and chain of custody transfer	28	2
Fuelling maintenance and servicing protocol record	28	2
Records of respiratory diseases	14	2
DO, BOD, pH in water,	14	0
Record of re-vegetation	14	2
®	18.38	1.75
Standard Deviation (SD)	7.77	0.66
t-test	6.18	

Conclusion

The implementation of the environmental management plan of Okobo coal mining project is not satisfactory as residents were not impressed with the company's activities. Data from the survey showed that the environmental impacts mitigation measures were poorly implemented and that there is a significant difference between the planned follow-up and the observed follow-up of Environmental Management Plan of Okobo coal mining project". Thus, the poor implementation of the Environmental Management Plan (EMP) of Okobo coal mining project accounts for the significant manifestation of negative environmental and socioeconomic impacts that the communities are yelling for help.

Recommendations

This study made recommendations based on findings as follows:

1. The company should henceforth implement the mitigation measures like "ensure that water is sprayed to reduced dust in air during construction in the dry season" to reduce effects on air quality and re-vegetate deforested areas where mining is over to reduce erosion and run-off water contamination.
2. The environmental regulatory agencies should follow–up the monitoring plan properly
3. The stakeholders should carry audit on the coal mining project and local communities should fully be involved.
4. EIA is legal document and should be signed by layers for the proponent and host communities this will minimize negligence and 'Nigeria factors'.

Reference

Agbazue, V.E and Ehiemobi, M.C (2016) the Challenges of the Environmental Impact Assessment Practice in Nigeria. Centre for Environmental Management and Control (CEMAC) University of Nigeria, Enugu Campus.

Ajoa E. A (2016) Environmental Impact Assessment Course Guide AGR 307. National Open University of Nigeria. Retrieved 24-6- 2017 at www.nou.edu.ng.

Bailey. J. (2017).Environmental Impact Assessment and Management: an under explored Relationship. Environmental Manager; 21(3): 317 – 27.

Baker, D.C. & Mclelland, J.N. (2003) Evaluating the effectiveness of British Columbia's environmental assessment process for first nations' participation in mining development. *Environmental Impact Assessment Review,* 23**:** 581-603.

Bina O (2018) Context and Systems: Thinking more broadly about effectiveness in Strategic Environmental Assessment in China. *Environmental management*, 42: 717-733.

Borowy, I. (2013). *Defining sustainable development for our common future: A history of the World Commission on Environment and Development (Brundtland Commission)*. Routledge.

Bruhn and Eklund, (2002) Trends in the small-scale mining of precious minerals in Ghana: a

perspective on its environmental impact. *Journal of Cleaner Production 11:*131–140.

Canter. L., (2013). The Role of Environmental Monitoring in Responsible Project Management. The Environmental Professional. 15(1): 76 – 87.

Erhun, M.O. (2015) The Contribution of the Minerals and Mining Industry to Poverty Alleviation and Sustainable Development in Nigeria – A Legal Perspective. Journal of Energy Technologies and Policy. 5(8)……, www.iiste.org.

Federal Ministry of Solid Materials Development, (2004) Breaking New Ground: Mining, Minerals and Sustainable Development. International Institute for Environment and Development.

Gellers, J. C. (2016). Crowdsourcing global governance: sustainable development goals, civil society, and the pursuit of democratic legitimacy. *International Environmental Agreements: Politics, Law and Economics*, *16*(3), 415-432.

Gwimbi P and Nhamo, H U. (2016) Environment Impact Assessment of Coal Mining. *Research India Publications, 4(3):*..... Online at http://www.ripublication.com/ ijeem.htm.

Kabir S.M. (2012) A critical evaluation of the environmental impact assessment system in Bangladesh using a holistic approach. PhD thesis. School of Environmental and Life Sciences: University of Newcastle, Australia.

Kolhoff AJ, Runhaar H.A and Driessen PPJ (2009) The contribution of capacities and context to EIA system performance and effectiveness in developing countries: Towards a better understanding. *Impact Assessment and Project Appraisal*, 27(4), 271-282.

Mallo S.J.(2011) *the menace of acid mine drainage: an impending challenge in the mining of Lafia-Obi Coal, Nigeria.* Continental J. Engineering Sciences 6 (3): 46 - 54 available at http://www.wiloludjournal.com.

Mkpuma T, Ove M.N and Okpe R (2015) Rationality and effectiveness; does EIA/SEA treat them as synonyms? *Impact Assessment and Project Appraisal*, 27(2), 121-131.

Nwafor, J.C. (2006). *An Assessment of river fish populations in response to Rainfall Distribution and Agricultural patterns of river state and fish communities Planning*. Ann Arabor, MI publishing, Michigan.Journal of African Studies.Retrieved Nov 18 2014.

Nwoko Chris O. (2013). *Evaluation of Environmental Impact Assessment System in Nigeria.* Greener Journal of Environmental Management and Public Safety, 2 (1): 022-031, Retrieved 24-6- 2017 at www.gjournals.org.

Ololade O.O (2012). *Evaluation of the sustainability and environmental impacts of mining in the*

Rustenburg Region. Unpublished PhD thesis. Faculty of Science: University of Johannesburg.

Sosolvele H. (2002). *The Administration of the EIA process in Tanzania: Lessons for practice*. Afr. J. Environ. Assessment Manage. 4 (2): 1-1.

TVC News (March 22, 2017). No fewer than 313 mining companies have been sanctioned by the federal government over non-fulfillment of environmental obligations.