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Assessing the Role of Legislation in the Development of Nigerian Solid Mineral Sector

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Authors' contributions

This work was carried out in collaboration between all authors. Author ODE designed the study, collected the primary and secondary data for the study, performed the statistical analysis, managed the literature searches and wrote the first draft of the manuscript. Author ZOO wrote the protocol and managed the analyses of the study. Author AOO managed the discussion in the study and also edited the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

This study assesses the role of legislation in the development of the Nigerian solid mineral sector. The aim of the assessment is to determine how well Nigeria mining companies comply with some key provisions of mining and mineral legislation and also to determine the influence of these legislations on the mining industries. For the purpose of this study, the Mining Act of 2007; The Mining Regulations of 2011; The explosives Act of 1964 and Explosives Regulations of 1967 which are the major legislations governing the activities of mining in Nigeria were reviewed, some specific provisions were extracted and compliance to these extracted provisions were assessed. Thirty mining firms were assessed with the aid of a questionnaire in order to determine the level of their compliance to the identified provisions of mining legislations. Data acquired and assessed include compliance of these mineral industries with the provisions of the mining legislations on explosives

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magazines administration; Safety and health requirements; Production reporting and royalty payments. The results indicate that the mining industries assessed comply with most of the requirements on safety and health and also with royalty payments. It is however revealed that most of the provisions of mining legislations on explosives magazine administration are not well complied with.

Keywords: Legislation; magazine; explosive; mining; mineral.

1. INTRODUCTION

Legislation is the process of law making by the body authorized to make laws as well as the law(s) that are made by that body [1]. Nigeria is an oil producing country also well-endowed with solid minerals. Proven solid minerals reserves have been found in over 500 locations across the country. All of the 36 states of Nigeria including the Federal Capital have more than one type of mineral. However, solid minerals exports constitute less than one percent of Nigeria's GDP due to the government's neglect and its concentration on the development of the oil and gas sector which contributes three percent of global production and 95 percent of Nigeria's foreign exchange [1]. [2] opined that for a developing country facing high poverty levels, low revenue base levels, a sluggish economy with weak institutions, and a growing population with high expectations, and at the same time possessing abundant natural resources, the exploitation of these resources will present a relatively quicker and simpler source of additional revenues than the accumulation of domestic tax revenues or the negotiation of loans that in turn can be used to mitigate poverty, build and modernize infrastructure, access finance, promote competitiveness, and generally transform the economy. However, at the same time, these goals could all be compromised by the inappropriate management of those natural resources. There is therefore need for thorough legislation and focus in the Solid mineral Sector so as to increase its input into the national wealth [3].

Policy or regulatory frameworks and laws governing the exploitation and management of natural resources are often spread across different pieces of legislation and other government instruments. In most cases, constitutions vest natural resources in the people but grant the government the authority to manage those resources on their behalf [4]. In some cases, constitutions specify formulae for revenue sharing between national and state or provincial levels of government. While

current efforts to increase transparency and accountability in the management of natural resources emphasize the roles and responsibilities of a broad range of actors, relatively little attention has been paid to the potential contribution of elected legislators. Yet, the three core functions of legislative bodies – representing constituent interests, making or shaping public policy, and overseeing policy implementation by executive branch agencies – are central to any effort in this area.

The effects of mining are generally localised, specific and identifiable unlike other national and global issues like deforestation and climate change. The necessary measures to safeguard the environment, the health and safety of the population and the workforce can be incorporated in legislation and regulation [5]. Appropriate standards should therefore be set and procedures for monitoring compliance established.

The objective of this study is to assess the role of legislation in the development of the Nigerian solid mineral sector.

2. LEGISLATION OF NIGERIA'S SOLID MINERALS SECTOR

2.1 Safety Distance between Explosives

As safety of life and equipment should be primary in every mining site, it is necessary for operators of mining establishments to ensure that the standard space or distance between explosives and detonators are observed in order to prevent generation of heat and possible explosion in the mining site. Table 1 shows the minimum permitted distance between explosives magazines in an explosive magazine (store) as stated in the Nigerian Explosives Act of 1964 and the Explosives Regulations of 1967.

2.2 Explosives Administration

The Nigerian Explosives Act of 1964 and Explosives Regulation of 1967 stipulates that only an authorised responsible person must be in

charge of the administration of the explosives magazine. This provision as stated in section 9 (1) of the said legislation is shown below:

“The owner or any person entitled to the possession, control or use of explosives shall appoint, with the written authorisation of an inspector, a responsible person who shall at all times be in immediate charge of the explosives”

extract of the Nigerian Mining Regulation of 2011 section 99 (2) shown below:

“Upon receipt of a notice from the Mines Inspectorate Department that a mineral title holder has failed to meet required royalty reporting and payment requirements, the Mining Cadastre office shall proceed to revoke such title in line with regulation 96”

Table 1. Permitted safety distance between explosives

S/N	Capacity of magazines (Pounds)	Distance between magazines (Yards)
1	Over 250 to 3,000	50
2	Over 3,000 to 10,000	60
3	Over 10,000 to 50,000	75
4	Over 50,000 to 100,000	100
5	Over 100,000 to 200,000	150

Source: The Nigeria explosives regulations of 1967, reg. 26(5)

2.3 Community Development Agreement

The Nigerian Minerals and Mining Act of 2007, states unequivocally, that all mining establishments must develop a Community Development Agreement with its host community even before commencing development work in the mine begins. The extract from the Mining Act of 2007 section 116 (1) on this provision is shown below:

“Subject to the Provision of this section, the Holder of a Mining lease, Small Scale Mining Lease or Quarry Lease shall prior to the commencement of any development activity within the lease area, conclude with the host community where the operations are to be conducted an agreement referred to as Community Development Agreement or other such agreement that will ensure the transfer of social or economic benefits to the community.”

2.4 Royalty Reporting and Payment

The Nigerian Mineral and Mining Regulations of 2011 asserts that every mine operator is required to pay royalty to the government monthly which is a percentage of proceeds (in tonnage) of the mineral extracted from the lease area, failure to do this is punishable by law as stated in the

2.5 Description of the Study Area

Edo state is located in the Southern part of Nigeria. The state has 18 local government areas. The coordinates are 6°30'N 6°00'E/ 6.500°N 6.000°E with land mass area 17,802 km². Edo state is an inland state in western Nigeria. It is bounded in the north and east by Kogi state, in the south by Delta state and in the west by Ondo state. Edo state is endowed with both solid minerals and oil. The state is one of the present nine oil producing states in the country though the oil deposit in the state is basically located in the coastal areas while the solid minerals are located basically at the northern end of the state and down the southern part of the state. Large deposits of Granite is found in Ohosu (towards the state's western boundary with Ondo State) and deposits of limestone, dolomite and granite are located in Okpilla, Ikpeshi and Iyuku respectively all in the northern part of the state. Other solid mineral deposits in the state include calcite, kaolin among others.

2.6 Sampling Technique

Judgment sampling procedure was used in selecting the samples and simple random sampling technique was used to recruit participants into the study. The personal contact with the sample group provided a lot of advantage. It ensured high rate of return, gave in-depth data for the purpose of the study and also enable the researcher interpret some items to the respondents which further minimized the chances of misconception and ambiguity. Furthermore, the discussion with people both within and outside the sample group provides more light on the authenticity of the responses that were given by the respondents.

2.7 Data Collection and Analyses

The primary data used for this study were obtained through questionnaire administration in thirty selected mining industries in Edo state,

Nigeria and the secondary data were obtained from the explosive act of Nigeria 1967, Nigeria Mining Act of 2007, The Nigeria Mining Regulation of 2011 and other articles and book publications. Edo was selected for this study because it hosts a large amount of reputable mining industries. Thirty (30) Quarries were visited within the study area and questionnaires were distributed and retrieved. Areas covered by the content of the questionnaire include compliance to mine health and safety, explosives magazines administration, environmental protection, and royalty payment assessment. The data obtained were analysed with the aid of SPSS software and the results obtained were tabulated.

2.7.1 Safety and health

This section of the assessment examines the mineral industries' compliance with safety and health laws as provided in the various mining and mineral legislations. Areas of assessment in this section include availability of safety of health officer in the firm, availability of Personal Protective Equipment (PPE) observance policy for all field workers, and review of how the mining firms respond to accidents on the site.

2.7.1.1 Availability of safety and health (SH) officer

This assessment determines the quarries that have competent Safety and Health Officer and the quarries that does not.

2.7.1.2 Provisions available for injured workers on site

This assessment determines the provisions available for workers who get seriously injured on site during operations in these assessed quarries.

2.7.1.3 Who purchases personal protective equipment (PPE) for workers

The aim of this assessment is to determine how many of the assessed Quarries have a PPE observance policy for their workers on site and how effectively the provisions of the law on the subject is complied with.

2.7.1.4 Accident reporting

According to the Nigerian Minerals and Mineral Act of 2007, those who are to be notified principally when an accident occurs in the quarry are the office of the Mines Inspectorate within the

zone and/or the nearest police station. This section aims to assess mineral industries' compliance to this legislation.

2.7.2 Explosives magazine administration

This section of the questionnaire examines mineral industries' compliance with the requirements for administration of explosives magazines as provided in the various mining and mineral legislations. Areas of assessment in this section include availability of explosives responsible person and information about the personnel in charge of giving out explosives from the magazine(s).

2.7.2.1 Availability of a licensed explosives responsible person

The aim of this section is to determine whether the quarry has the services of a competent explosive responsible person (Mining Engineer or a Geoscientist) as stipulated in the Mining Act of 2007.

2.7.2.2 Qualification of explosives responsible person

This section aims to determine whether or not a competent personnel is employed as an explosives responsible person, for those companies who have one.

2.7.2.3 Release of explosives from the magazine

This section aims to determine the level of compliance to the provision of the mineral and mining regulation of 2011 which stipulates that only a licensed explosives responsible person must be in charge of opening and closing the explosives magazine any time it is required. In this section, respondents were asked "who is in charge of giving out explosives from the magazine".

2.7.3 Environmental protection

This section of the questionnaire examines the mineral industries' compliance with required standard practice for environmental protection in their daily operations as stipulated in the various Nigerian mining and mineral legislations. Areas of assessment in this section include the average distance between the firm's explosives magazines, availability of community development agreement between the company and its host community and availability of

compensation in cases of damage to properties caused by company's mineral extraction.

2.7.3.1 The average distance between company's magazines

This assessment aims to discover whether the standard required distance between two or more explosives magazine is being followed based on the provisions of the Mining Act of 2007.

2.7.3.2 Company's attitude in a case where properties are destroyed by company's quarrying operations

This assessment aims to discover the approach of each company to destruction of properties outside the quarry lease area caused by their quarrying operations especially blasting. Here, respondents were permitted to select more than one option.

2.7.3.3 Community development agreement {CDA}

This assessment aims to determine whether or not the compulsory community development agreement which must be duly signed by the host community and the company before commencement of quarrying operation as provided by Section 116 of the Nigerian Mineral and Mining Act of 2007 was prepared.

2.7.4 Production reporting/royalty assessment

This section of the questionnaire examines the Mineral Industries' compliance with requirements for production reporting and royalty payments as provided in the various Nigerian mining and mineral legislations. Areas of assessment in this section include percentage of local indigenes of the host community in the company's staff strength, the amount of royalty paid by the company and how often the royalty is being paid.

2.7.4.1 Monthly mineral production

This assessment aims to determine the average production capacity of each of the companies and therefore determine the accruing royalty payment to the various companies.

2.7.4.2 Monthly royalty payment

According to the Mining and Mineral Regulation (2011), there's a deemed selling price of 800 Naira Per ton for all granite aggregates won, and so the Government charges 40 Naira per ton of all the company's monthly tonnage as its monthly royalty payment. This assessment aims

to determine the level of compliance of Mineral industries to monthly royalty payments.

Formula for deemed royalty = N40 * monthly tonnage

Any company that makes a royalty payment which does not match the deemed royalty is registered as offender of law.

2.7.4.3 Returns to the mines inspectorate

According to the provision of the Nigerian Minerals and Mining Act of 2007, returns are supposed to be sent to the Mines inspectorate on a monthly basis. This assessment aims to determine compliance of mineral industries with this provision. The assessment shows how frequently the company sends its royalty payment to the office of the mines inspector.

3. RESULTS AND DISCUSSION

3.1 Safety and Health

3.1.1 Availability of safety and health officer

Table 2 shows the Quarries that have a competent Safety and Health (SH) Officer on site, and those that doesn't have out of the thirty companies assessed.

Table 2. Availability of safety and health officer

Quarries with SH officer	Quarries without SH officer
15	15

Source: Author's Field Data, 2014

From the Table 2, it is observed that the amount of quarries having competent Safety and Health Officer exactly equals the amount of quarries that doesn't have indicating that the amount of companies having Safety and Health Officers does not constitute a majority. Mining operations are highly hazardous, this is the reason mining industries are encouraged to engage the services of a competent safety and health officer. It is therefore imperative for the Mines Inspectorate to do more in encouraging companies to engage Health and Safety Officers.

3.1.2 Provisions available for injured workers on site

Table 3 shows the various provisions available for workers that get injured on site in all the thirty assessed companies.

Table 3. Provisions available for injured workers on site

First aid treatment	Available sick bay	Monetary compensation	Others	No provision
20	6	10	3	5

Source: Author's field data, 2014

It is observed from the Table 3 that most companies only have First Aid provisions, whereas there may be times when a worker may suffer injuries that may be too serious for first aid treatment to effectively manage. Companies should therefore be implored to build sick bays close to their site or alternatively have a clinic close to the site that workers will be taken to in a case of emergency. It is also observed there are companies that still don't have any provisions for their injured workers; This should be addressed by the Mines Inspectorate.

3.1.3 Who purchases personal protective equipment (PPE) for workers

The entire thirty quarries assessed have a PPE observance policy in place. However, the result of who purchases the PPEs for workers is shown in the Table 4.

Table 4. Assessment on who purchases PPEs

Workers themselves	Company	Others
9	21	0

Source: Author's field data, 2014

It is observed from the table that there are still large amount companies where workers buy PPEs themselves. In a case where the company have a policy whereby workers buy PPEs themselves, compelling the workers to have one may be difficult for the organisation since they may claim not to have funds but in case where the company itself buys it, workers may not have difficulty since all they have to do is wear them. It

Table 5. Assessment on whom company reports to in a case of an accident involving loss of life or serious injury

Community head	Community youth leader	The nearest police station	Office of the mines inspectorate
16	3	14	7

Source: Author's field data, 2014

Table 6. Availability of licensed explosives responsible person

Quarries with licensed explosives responsible person	Quarries without licensed explosives responsible person
23	7

Source: Author's field data, 2014

can then be easy for the company to prepare adequate punishments for a worker who fails to wear his/her own. Companies should therefore be compelled by the mines inspectorate to purchase PPEs for their workers so as to enhance more usage of PPEs in mining industries.

3.1.4 Accident reporting

The result of the assessment is shown in Table 5. Here, respondents can select more than one option, since accidents may be reported in several places in each case.

The result of this assessment as shown in the table indicates that most of quarry operators still believe that the primary person to report to in a case of serious accident is the village head of the host community. As much as it is necessary to inform the village head, it is even more important to inform the office of the mines inspectorate and/or the nearest police station prior to informing the host community village head. This provision is backed by the Nigerian Minerals and Mining Act of 2007 Section 84(1). It is therefore necessary for the office of the mines inspectorate to further enlighten quarry operators on this provision.

3.2 Explosives Magazine Administration

3.2.1 Availability of licensed explosives responsible person

The result of this assessment is shown in Table 6.

The Table 6 shows the number of companies who have a licensed explosive responsible person against those who don't have. It can be observed that seven Quarries out of the total thirty assessed quarries are still without explosives responsible persons. The Nigerian Minerals and Mining Act of 2007 compel all mineral industries to have a licensed explosives responsible person who will be in charge of total administration of the explosives magazine. This is necessary due to the sensitivity of the explosives magazine. Further work therefore needs to be done on this by the Mines Inspectorate to ensure compliance to this provision.

3.2.2 Qualification of explosives responsible person

Table 7 shows the result of this assessment.

Table 7. Qualification of company's explosives responsible Person

Mining engineer	Geoscientist	Others
20	8	2

Source: Author's field data, 2014

The Table 7 indicates that most of the explosives responsible persons in the mining firms assessed are mining engineers and geoscientists. This is a good development as it indicates that the explosive materials are in the hands of mining professionals and as such are in safe hands. However, more monitoring needs to be done to further ensure that mining professionals are actively involved in handling explosive materials on site.

3.2.3 Release of explosives from magazine

The result of this assessment is shown in Table 8. Here, respondents can select more than one option, since more than one person may be authorised to give out explosives.

Table 8. Release of explosives from the magazine

Site mining engineer	Company manager	Company secretary	Blasterman	Chief security officer	Others
17	8	0	13	0	4

Source: Author's field data, 2014

Table 9. Average distance between company's magazines

< 50 Yards	50 Yards	60 Yards	75 Yards	100 Yards	>100 Yards
5	0	3	2	5	15

Source: Author's field data, 2014

From the Table 8, it can be observed that blaster men and company managers still constitute a large proportion of those who remove explosives from the magazine. This ought not to be, according to provisions of the Nigerian mining law. The explosives responsible person owns the singular authority to sign in and sign out explosives materials in and out of the explosives magazine. Mining industries therefore needs to be further sensitised about this provision and also compelled to comply.

3.3 Environmental Protection

3.3.1 The average distance between company's magazines

The result of this assessment is shown in Table 9.

The Table 9 reveals that there are significant spaces between the magazines which is quite good for safety of the magazines as well as workers. Explosive detonators are supposed to be kept quite far from explosives itself to avoid ignition and the table shows that these requirements are being followed to a large extend by quarry operators within the study area.

3.3.2 Company's attitude in a situation where properties are destroyed by company's quarrying operations

Table 10 shows the result of this assessment.

The Table 10 shows that most of the companies compensate the victims after the damage must have been done. In addition to compensation, companies should be implored to restore properties being damaged. Also, further work need to be done to ensure that companies minimise the operation leading to the damage.

Table 10. Company's response in a case where properties are destroyed by company's quarrying operations

Neglect	Minimisation of effects	Compensation of victims	Restoration of damaged properties	Others
0	10	19	10	0

Source: Author's field data, 2014

3.3.3 Community development agreement

Table 11 shows the amount of companies having CDA and the companies who don't have.

Table 11. Companies Having Community Development Agreement (CDA)

Companies having CDA	Companies without CDA
30	0

Source: Author's field data, 2014

From the Table 11 it can be observed that all the thirty {30} companies assessed have a duly signed Community Development Agreement. This is a good development as it is completely in line with section 116 of the Nigerian Minerals and Mining Act of 2007. However, companies need to be adequately monitored to ensure that the agreement made by both the company and the host community in the CDA is fulfilled.

3.4 Production Reporting/ Royalty Payment Assessment

3.4.1 Monthly mineral production

Table 12 shows the result of this assessment.

Table 12. Monthly mineral productions

< 2000 metric tons	2000-10000 Metric Tons	10001-50000 Metric Tons	50001-250000 Metric Tons	Above 250000 Metric Tons
9	14	6	1	0

Source: Author's field data, 2014

Table 13. Monthly royalty payments

< N8000	N8000-N40,000	N40001-N200000	N200001-N1000000	>N1000000	Nil
3	8	10	8	1	0

Source: Author's field data, 2014

Table 14. Returns to the mines inspectorate

Weekly	Monthly	Quarterly	Anytime	Yearly	Never
0	29	0	1	0	0

Source: Author's field data, 2014

The Table 12 shows the various monthly mineral productions of quarries within the study area as provided by respondents. The table shows that fourteen {14} out of the total thirty {30} quarries assessed produce an average of 2001-10000 tons monthly, about nine {9} quarries produce less than 2000 tons monthly, six {6} quarries produce an average of 10001-50000 tons monthly and only one {1} company produces above 50000 tons monthly. This indicates that a vast majority of the companies produce an average of 2001-10000 tons monthly.

3.4.2 Monthly royalty payment

Table 13 shows company's royalty payments.

The monthly royalty payments as provided by respondents are shown in Table 13. The table shows that most companies pay an amount within the range of N40,000 to N200,000 monthly. It also shows that there are few companies that pays royalty greater than N1,000,000.

3.4.3 Returns to mines inspectorate

The result of the assessment is shown in Table 14. The table shows the result of how frequently the company sends its royalty payment to the office of the mines inspector.

The Table 14 shows that twenty nine {29} out of the thirty {30} assessed companies submit their royalty payments monthly and only one company pays anytime. Companies are required to pay royalty monthly by law.

4. CONCLUSION

This research work was carried out to determine the level of compliance to the existing mining and mineral laws. There are four basic laws/regulations that govern the activities of mineral extractive industries in Nigeria. They include the Nigeria mining and mineral Acts of 2007, the Nigeria mining and mineral regulations of 2011, the explosives Act of 1964 and explosives regulations of 2007. This study assessed the level of compliance to some key provisions of these laws and regulations taking Edo State Nigeria as case study.

The assessment carried out to determine the level of compliance to safety and health legislations indicate that 15 out of the 30 assessed quarries have safety and health officers. It was revealed that 5 out of the 30 quarries do not have any provision for injured workers while most of the industries have first aid provisions for injured workers. This assessment further revealed that in 21 out of the 30 companies assessed, the companies itself buy Personal Protective Equipment (PPEs) for their site workers while in the remaining 9 companies, workers buy PPEs themselves-this will not encourage the use of PPEs by the workers in these companies. The assessment on accident reporting indicate that in 16 out of the 30 companies, accidents on site are reported to the village/community head. Inasmuch as it is important to report accidents of indigenes to their community head, the law stipulates that priority should be placed on reporting accidents on site to the office of the mines inspectorate division of the ministry of mines and steel development and/or the nearest police station.

The assessment carried out on explosives magazine administration indicate that 23 out of the companies have duly registered explosives responsible person while the remaining 7 companies do not have; contravening Regulation 9(1) of the Nigerian Mining and Mineral Regulation of 2011.

The assessment carried out on the average distance between explosive magazines of companies indicate that in 15 out of the 30

companies, the distance between the magazines is above 100 yards, while in 5 of the companies the distance is less than 50 yards. Since a survey of the capacity of the magazines of all the 30 companies shows that none has a capacity of less than 15000 kg, the law requires that the distance between explosive magazines (such as store for ammonium nitrate and that of high explosives) should be well above 50 yards to avoid generation of heat which may result in possible explosion. Then we can infer that only 5 out of 30 companies offended the law on safety distance between explosives magazine.

The assessment of the frequency of royalty payment shows that 29 of the 30 companies assessed return their royalty monthly to the mines inspectorate. This is absolutely in conformity with the requirement of the mining and mineral legislation on royalty payment.

5. RECOMMENDATIONS

As a result of the findings arising from this study, the following recommendations are hereby made to ensure thorough compliance to mining and mineral laws and regulations.

- i. Mineral Industries should be compelled to ensure that there is safety distance between its explosives magazines
- ii. The use of Personal Protective Equipment should be made mandatory in mineral extractive industries in Nigeria.
- iii. Mining industries should be compelled to engage the services of competent personnel for the handling of their explosives stores.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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