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Effects of Limestone Mining on Arable Lands in Ashaka Area, Nigeria

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ABSTRACT

Mining has been linked to various environmental challenges such as land degradation, landslide, soil erosion and flooding. Land degradation is believed to be one of the major ways in which mining of minerals affects agricultural production in areas where such activities takes place. This study analysed the effects of limestone mining on arable lands in Ashaka Area, Funakaye Local Government, Gombe State where limestone is been mined by Ashaka Cement Plc (Lafarge). Data was generated using questionnaire, oral interviews and personal observations. Similarly, handheld GPS garmin76 was employed to establish the coordinates of the study area. A total of 94 respondents out of 100 sample size completed the survey questionnaire. Descriptive statistics was employed in the analysis and presentation of data. The study revealed that more than 90% of the respondent's farmlands were seized by the mining activities. Other problems include: land degradation and pollution. According to the respondents quarry activities which continue to flourish in the study area have left behind some ponds and pits. They added that substantial farm lands have been lost due to mining activities. The Sudan vegetation was also denuded which left the quarried area vulnerable to erosion. In order to maximize the benefit of limestone mining and minimize the environmental effects there is need for an elaborate plan for sustainable quarry reclamation and conservation best practices using community participatory methods.

Keywords: Limestone, Mining, Ashaka, Arable Land

INTRODUCTION

Mining generally refers to the extraction or removal of ore from the ground. According to Acheampong (2004) and Hayatu (2019), mining it is the removal of minerals from the earth crust in the service of man. Mining is the selective recovery of minerals and other recently formed organic materials from the crust of the earth. From the above definitions, it can be deduced that mining is human activity that deals with the excavation and extractions valuable materials from the earth crust other than agricultural products. Such materials mined by humankind are broadly grouped as fuels, metals, and non-metabolic minerals. Metallic ores/minerals are those ores of the ferrous metals like iron, manganese, molybdenum, and tungsten, the base metals like copper, lead, zinc, and tin, the precious metals like gold, silver, the platinum group metals, and the radioactive minerals like uranium, thorium, and radium. The Non-metallic minerals also known as industrial minerals are the nonfuel mineral ores hat are not associated with the production of metals. These include among others phosphate, potash, halite, troha, sand, gravel, limestone, sulphur. Fossil fuels also known as mineral fuels are the organic mineral substances that can be utilized as fuels, such as coal, petroleum, natural gas coal bed methane, gilsonite, and tar sands among others (Adekoya, 2003 Hayatu 2019).

Manufacturing of cement has generally led to serious localized land degradation due to exploitation of limestone all over the world.

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Land degradation is very rampant all over the world, were this limestone has been exploited for the purpose of making cement and other building construction (Ajakiaye, 1985). Land degradation is recognized as a key issue in the world today, as much planet earth is affected, or at risk. Since the Second World War, cement and concrete has come to be used more often as a construction material and has resulted in extensive quarrying of chalk or limestone.

However, in spite of the remarkable contribution of these cement factory towards the economic development of Funakaye local government and the state at large, the adverse effects of quarry activities on arable crop production which is the main source of livelihood in the area has remained a cause for concern. The study therefore Examine the effects of mining activities on arable lands in Ashaka area of Funakaye L.G.A, Gombe State, Nigeria. Specifically, the study sought to establish the extend of the mined lands, examine the effects of limestone mining on arable lands, find out the various strategies towards reclaiming the mined land, categorize and identify the various problems associated with limestone mining on arable lands.

The Funakaye areas and environment, located within the savannah grass-land vegetation in fertile alluvial valley has now evolved new characteristics in the mined areas with spoils, Hollows and deposits on previously rich soil. It is a known fact that every industrial activity may have both negative and positive impacts on the environment. Ashaka cement works is therefore not an exception. Limestone extraction necessarily involves the removal of top soil and the subsequent creation of deep pits thus, rendering productive farmlands. Agriculture which is the major economic activity of the local populace has been seriously affected due the mining activities, the top soil which contain the essential required nutrients for the growth of plant have been tempered with, and available farmlands has also been degraded thus affecting their output, this degradation also resulted in depletion of renewable and non-renewable resource, and pollutions of air, water and soil to a large extend. It is against this background that this study intends to analyze the effects of these mining activities on the arable lands.

The Study Area

The study area is located approximately within Latitude 10°50' N to 11^0 00` N and Longitude $11^0$25' E to 11° 35' which is some 112km North of Gombe (Figure 1). This makes the area within the northern part of the present Gombe State and close to its border with Yobe State (Figure 1). The population of the area is about 236,087(National population Commission, 2006). The Ashaka area is part of the Upper Benue Trough. The origin of the basin was related to rifting that occurred in the early Creetaceous (or Albian) times; following the breakup of subsidence or rifting gave rise to the now popular Chad basin. The basin was affected by series of marine transgression and regression which led to the deposition of Cretaceous sedimentary rocks in the area (Garba, 2018).

The relief in the plain is gentle. There seem to be no strict relationship between topography and lithology. In some places the sandstone stands out, in others shale is found on higher parts (Ashaka Environmental Audit Report, 2004). Temperature is generally high throughout the year. It could be as high as 35-40°C in the month of March and April, Minimum temperature is recorded during the rainy season and during the Harmattan period. Yearly extremes in temperature range are 15°C (Harmattan) to about 40°C during the month of March and April (Bala, 2015).

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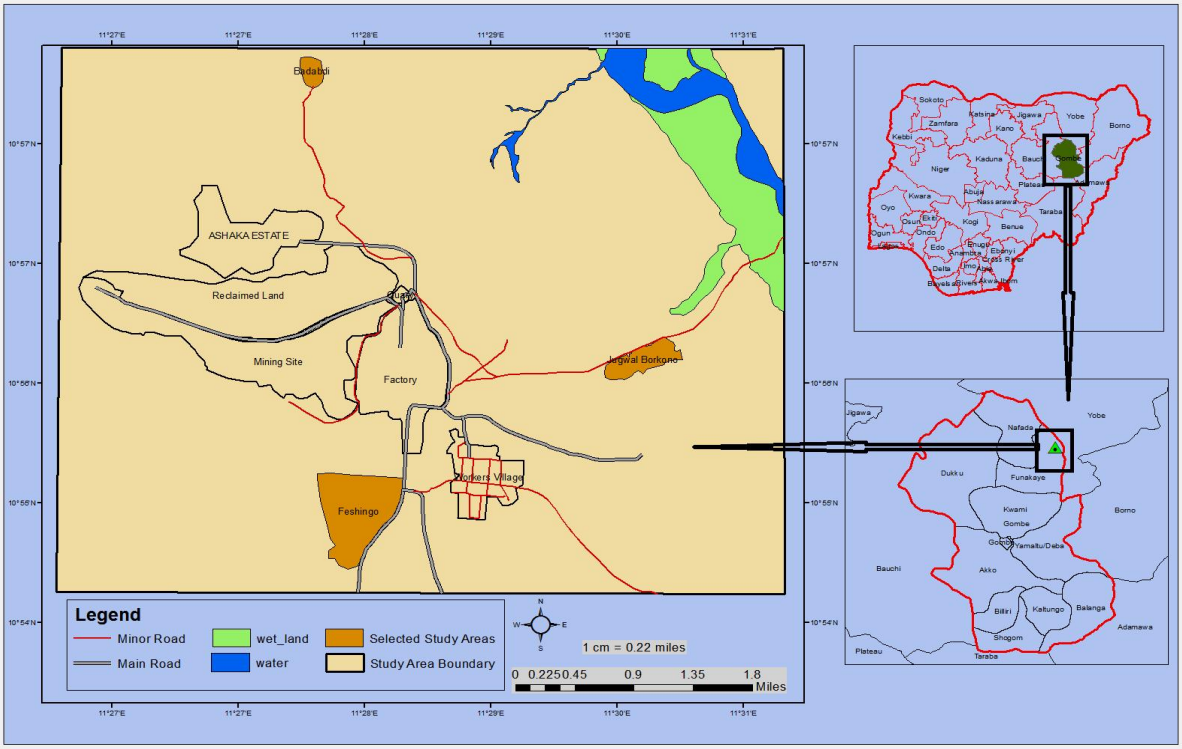

Figure 1: Map of the Study Area

Source: Modified from Administrative map of Funakaye Local Government Area 2014.

MATERIALS AND METHODS

In carrying out this research, two data sources were explored in the process of data collections which include primary and secondary data. The primary data was obtained via the use of questionnaires, oral interviews and personal observations. The secondary data on the other hands was obtained through textbooks, the internet, journals and other electronic and printed materials

RESULTS AND DISCUSSION

Environmental Problems Caused By Limestone Mining

The interview conducted and responses from the respondents revealed that 97% Figure 2 reported that they are aware of the environmental problems caused by limestone mining while the remaining 3% said they are not aware. This shows the rate at which the mining is affecting the environment and general arable lands.

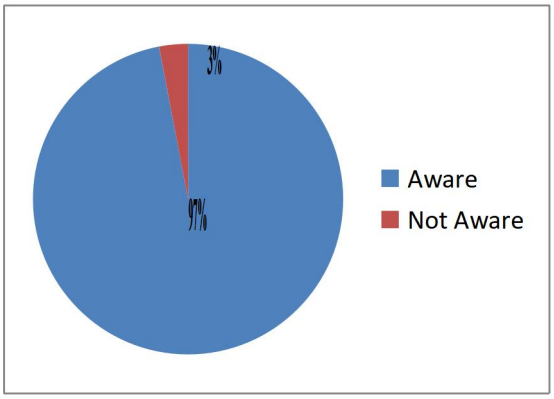

Figure 2: Respondents opinion on environmental problems due to limestone mining.

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Table 1 reveals that 21% of the respondents had reported 1-3 hectares of farm land were taken up by the mining activity. Similarly 38% of the respondent had 4-5 hectares of farmland were seized by the mining activity while the remaining 41% which account the high percentage among the group revealed that above 5 hectares of land were taken over by the limestone mining.

Table 1: Land in Hectares

Land in hectares	Frequency	Percentage %
1-3	20	21
4-5	35	38
Above 5	39	41
Total	94	100

Table 2 result of the analysis reveals that land degradation is the major problem as indicated by 79% of the respondents. This is accompanied by noise and air pollution constituting 10% and 11% respectively.

Table 2: Respondents Opinion on the Problems of Limestone mining

Problems	Frequency	Percentage %
Land degradation	74	79
Noise pollution	10	10
Air pollution	10	11
Total	**94**	**100**

Source: Field work, (2014)

Table 3 reveals that 32% of the respondent reported that the company is reclaiming the mined lands while the remaining 68% of the respondents said no effort was made in reclaiming the mined land.

Table 3: Efforts made toward reclaiming the mined lands.

Opinion	Frequency	Percentage %
Yes	30	32
No	64	68
Total	94	100

Field work, (2014)

Table 4 reveals that 85% of the respondent believes that the reclaimed mined land does not support agriculture while 15% believe that the reclaimed mined land support Agriculture. With reference to above table it is believed that the reclamation was not properly done because of high percentage of the respondent. Furthermore it was also learnt that the mind lands were only remained to fill up the mined lands but not purposely for agriculture.

Table 4: Respondents Opinion mind lands support agriculture

Opinion	Frequency	Percentage %
Yes	14	15
No	80	85
Total	**94**	**100**

Source: Field work, (2014)

Table 5 revealed that 89% respondents reported that their farm lands were taken over by the mining activity while 5% of the respondent their farm lands were not taken by the activity.

Table 5: Respondents farm lands taken by mining activities

Opinion	Frequency	Percentage %
Yes	89	95
No	5	5
Total	**94**	**100**

Source: Field work, (2014)

Table 6 reveals that the compensation was paid to the locals before their farmlands were taken for the mining activities this was acknowledge by 100% of the respondent.

Table 6: Respondent Response to Compensation

Opinion	Frequency	Percentage %
Yes	94	100
No	0	0
Total	94	100

Source: Field work, (2014).

Result of the analysis presented in table 7 has shown that the respondents are not satisfied with the relocation to a new site, despite the provision of basic amenities such as schools, mosque and modern building.

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Table 7: Respondents Opinion on Resettlement Scheme

Status	Frequency	Percentage %
Satisfy with new settlement	0	0
Not satisfy with new settlement	94	100
Total	**94**	**100**

Source: Field work, (2014).

The respondents reported various problems associated with the new location to include:

- Loss cultural values.
- Loss of fertile farmlands
- Loss of fertile farmlands
- Cultural attachment
- Social distance

Similarly the respondents reported problems associated with limestone mining as presented in Table 8

Table 8: Problems associated with limestone mining

Types of problem	Frequency	Percentage %
Loss of farm lands	45	48
Rapid spread of erosion	19	20
Discharge of pollution	25	27
Destruction of landscape	5	5
Total	94	100

Source: Field work, (2014)

Based on the findings presented in table 8, the results shows that majority of the respondents constituting 47% admitted loss of farm lands is the major problem associated with limestone mining. This is accompanied by discharge of pollution as the second problem associated with the activity as reported by 27% of the respondents, Then followed by spread of erosion which is 20%. Even though the least problem associated with the mining activity as reported was destruction of landscape it has disfigured the configuration of the Ashaka land area making it different for farming activities.

Plate 1 Reclamation efforts made at the quarry

Plate 2 Resettlement housing at Ashaka area

DISCUSSION

The analysis of data collected for this study reveals that about 99% of the respondents have lost their farmlands due to limestone mining in the area, that the socio-economic well-being of the area is been affected, therefore limestone mining has an overarching effects to the socio-economic development of Ashaka area.

The study also revealed that not only farmland were affected by the mining activities, several problems militating against the socio-economic development were highlighted by

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the respondents prominent among them includes: lack of portable drinking water, accelerated erosion, loss of farm lands and the amount of income derived from arable crop production has drastically reduced and finally unconducive environment of the new settlement. The result of this finding is in support with the findings of Adekoya, (2003), Aigbedion, (2005) and Eta et al, (2019) who discovered that yield of crops planted on farms within close radius to dust of quarries tend to decline. They attributed to dust that settle on crop leaves and flowers, hindering the process of photosynthesis leading to decline in crop yield.

Furthermore the study reveals that the compensation was paid to the farmers before their farmlands were taken for the mining activities this was acknowledge by 100% of the respondent. This finding dis agrees with that of Hayatu, (2019) who reported that from the available data, it is evident that compensation paid is not only inadequate but also lacks fairness in its distribution among farmers. The result of this study also shows that 85% of the respondent believes that there are efforts to reclaimed mined land by the cement factory however it does not support agriculture while 15% believe that the reclaimed mined land support Agriculture.

CONCLUSION

This study was aimed at examining the effects of mining activities on arable lands in Ashaka area of Funakaye L.G.A, Gombe State, Nigeria. Results obtained shows that mining activities affect arable lands in different ways. It reduces crop yield, decreases income derived from arable crop farming, depletes land available for arable farming

Recommendation

There are three objectives of reclamation: to eliminate threat to public safety, including threat to people, property, livestock, or wild life. To protect water and land from erosion, sedimentation or contamination and return the mined land to beneficial use, to the pre mining condition or the other condition determines to be beneficial. The forgoing discussions provide a strong case for the need for environmental conservation. Therefore In view of all problems enumerated in the project the following recommendation are been suggested.

(1) All agreements on land issues between Ashaka cement and the communities, whether involving acquisition, sale, lease etc should incorporate the offspring of the local land owners as well as other stake holders such as traditional institutions, local and state government representatives etc this is to avoid future conflict from present generation to next.

(2) Ensure active participation of communities in all phases of quarry reclamation.

(3) there is need to embark on soil conservation measures, building proper channels for storm water, this becomes imperative due to the observed gradual and massive soil erosion around the plant, particularly, the area between the crusher, junior staff club, country club and juggol village.

(4)The present effort aim at restoring the quarry by filing and leveling of ponds., lakes and pits with overburden spoil heaps should stop they are asset to the environment. They enriched quarry environment by providing easy access to water.

(5) There is need for an elaborate quarry rehabilitation plan which should involve all stakeholders especially the support zone communities in developing and implementing the rehabilitation plan.

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(6) There should be an Inventory an integrated approach for the improvement of ponds/quarry pits for optimum productivity.

(7) Agriculture is a measure contribution to rural economic by providing part and full time occupation to farmers fishermen, and other agricultural laborers Therefore it is strongly recommended that Ashaka cement Plc in collaboration with Gombe State agriculture & development Program should establish agricultural and fisheries extension program in the support zone communities so as to educate and build their capacities on modern agricultural technology such as, fish farming, fish stoking and marketing, dry season farming and organic.

(8) The mining company and government should take urgent steps to arrest the problem affecting the main socioeconomic groups in the area particularly youths in. terms of lack of employments so that they can reduce the rate of rural-urban migration.

(9) The mining company should embark on environmental conservation and restoration plans in partnership with the savannah conservation with the active participation of the communities to make the whole area look like the management estate

(10) The mining company should provide social amenities such as electricity, roads, markets, hospital etc to attract investments and the youths to stay within their locality.

(11) Conduct of environmental studies by government should be made.

(12) Addressing environmental concerns following the study of the, the government works with the mining company to identify steps to prevent, eliminate or mitigate harmful impacts to environment that are expected to occur.

(13) Posting a reclamation bond to ensure that the disturbed lands will be reclaimed.

(14) There is also the need to increase the level of awareness of environmental hazards due to the quarry activity among the local communities and the importance of maintaining environmental quality should be emphasized particularly the threats that are encouraged by quarrying activity such as deforestation, erosion and ultimately desertification.

(15) Sustain and fast track efforts aimed at dust emission reduction.

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