



EVALUATION OF THE EFFECT OF QUARRY ON MAIZE PRODUCTION IN MPAPE, FCT ABUJA, NIGERIA

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ABSTRACT: This paper evaluates the effect of Quarry on maize production in Mpape area of FCT, Abuja, Nigeria. Data for the study area gathered from primary and secondary data collected through questionnaire were presented using table and charts, and Interpretation with the aid of statistical package for social science (SPSS) analysis. This finding revealed that 100% of the respondents affirm their knowledge about quarrying in the study area. The results also shows that 95.6% of the respondents agreed that quarrying serves as a means of livelihood in the study area. The results also confirmed that 87% of respondents of the study agreed that before the commencement of quarrying in the study area, land use for majorly for agricultural purposes. The result revealed that 91.1% of the respondents agreed that earnings from quarrying are higher than agriculture. The study shows that 85.5% of the respondent believed that agricultural activity in the area has been reduced as a result of quarrying. Most of the respondents agreed that maize production has been hampered by quarrying through degradation of agricultural lands due to increasing activities in the area. 61.1% of the respondents were in support of this fact. The issue of land degradation in the study area is as a result of pressure on land for rock materials extraction which is done by open pit cast method. The study recommends that stringent law should be spelt out which will mandate that quarrying companies and groups of individual to reclaim the land property after quarrying activity. The reclamation should go beyond sand filling with clay.

Key Words: Evaluation, Effects, Kaolin, Quarry, Environment.

INTRODUCTION

Nigeria is an agrarian society with about 70% of her population engaged in agricultural production (CBN, 2006). Agriculture is the most assured engine of growth and development and a reliable key to industrialization as it makes available the raw materials used in the industries. In Nigeria, agriculture provides food for the teeming population and

contributes about 33% to the Gross Domestic Product (GDP) of the nation (Bureau of African Affairs, 2010). The agricultural sector employs about one-third of the total labour force and provides livelihood for the bulk of the populace (FMARD, 2006). Maize is an important staple food in several tropical African countries, especially in Nigeria where it plays a principal role in the food economy. Maize has the ability to grow on marginal lands, especially where cereals and other crops do not thrive. This comparative advantage over other staples serve to encourage its cultivation especially by resource-poor farmers. According to the Food and Agricultural Organization Statistics (2011), Nigeria is among the world's largest producer of Maize with about 37 million metric tonnes and it ranks second after yam in extent of production among the root and tuber crops of economic value in Nigeria.

The past half century has been a period of unprecedented agricultural change in developing countries in response to large population increases, integration of rural areas into national and international agricultural and other markets, new technologies, and infrastructure development. Major increases in aggregate agricultural production in this period have been associated with different kinds of soil degradation (Scheir, 1999). Increase in world population and other non-agricultural land uses are putting additional pressure on land hence there is progressively less land for food production while demand for food and other agricultural products is increasing, requiring more land which is not available since the earth land area is finite (EL-Swaify, 2002). The implications of this are many: the extreme pressure will affect use and management of agricultural land and consequently affect agricultural yield and output. For instance this has started already in Nigeria where the fallow period has reduced to one or zero year. The marginal lands which should be left under grass or forest are being brought into cultivation and this has led to increased erosion (EL-Swaify, 2002). Also there have been

increased levels of agricultural input (especially fertilizer and agrochemicals), expansion of area of land under cultivation and consequent distortion of natural ecosystem.

The economic effects of extractive industries, such as quarry and oil extraction, are usually thought in terms of a "Dutch disease": a boon of natural resources may change relative prices and crowd out industries with more growth potential like manufacturing (van der Ploeg, 2011; Corden and Neary, 1982). Less prominent in the academic and policy debate, however, are other crowding out mechanisms such as environmental degradation and loss of agricultural output. This dimension has been neglected despite the existing biological evidence linking pollution to reduction in crop yields, and the fact that most extractive operations are located in rural areas where agriculture, more than manufacturing, is the main economic activity. The search for and extraction of mineral resources is one of such activities through which the environment suffers damages. Man has always been conspicuous in his ability to alter the surface of the earth for various purposes. Some of the most extreme alterations occur in the extraction of minerals. According to Roots (1977), the environment is integrated and its components are linked by dynamic processes. We cannot use or affect any part without affecting some other parts.

Udo (1990), observed that the extraction of minerals in Nigeria especially by the open cast process left undesirable effects on the land surface. The most widespread destruction of the rural landscape according to him is caused by indiscriminate quarrying of sand and laterite as well as gravels for road construction and building purposes. Indeed, quarry operations have been envisaged by environmentalist and conservationist alike as causing some of the most devastating and far-reaching consequence to the environment (Ripley et al., 1978). In this regard Day (1985), observes that the

very process of quarry fossil fuel and minerals defaces the land with great scars and pits, destroys ecosystems and brings on many undesirable side effects such as water pollution and the disturbance of hydrologic systems.

The productivity of some lands has declined by 50% due to soil erosion and desertification. Yield reduction in Africa due to past soil erosion may range from 2-40%, with a loss of 8.2% for the continent. Africa is perhaps the continent most severely impacted by land degradation (Henao and Baanante, 2006), with the global average being lower, possibly in the range of 1-8%. With increasing pressures of climate change, water scarcity, population growth and increasing livestock densities, these ranges will be probably conservative by 2050. This study will therefore evaluate the effect of kaolin quarry on maize production in Mpape, FCT Abuja State.

THE STUDY AREA

Mpape District village, which is the research location/area considered for this study, is located in the suburbs of Federal Territory of Abuja. Abuja is the capital of the West African nation of Nigeria. It is located in the centre of Nigeria in the Federal Capital Territory (FCT). Abuja is a planned city and was built mainly in the 1980s. It officially became Nigerian's capital on 12 December 1991, replacing Lagos, the previous capital. As of the 2006 census, the Federal Capital Territory has a population of 778,567. Abuja is located on Gwagwa plain to the north-east of the FCT. Geographically located between latitude 9°0" between 8°50" LG Alongitudes 7°16" and 7°32". The site under study is located at Mpape Hills in Bwari Area Council, Abuja. It is geographically located 09°55"N. Figures 1-3 show the maps of showing the study area.

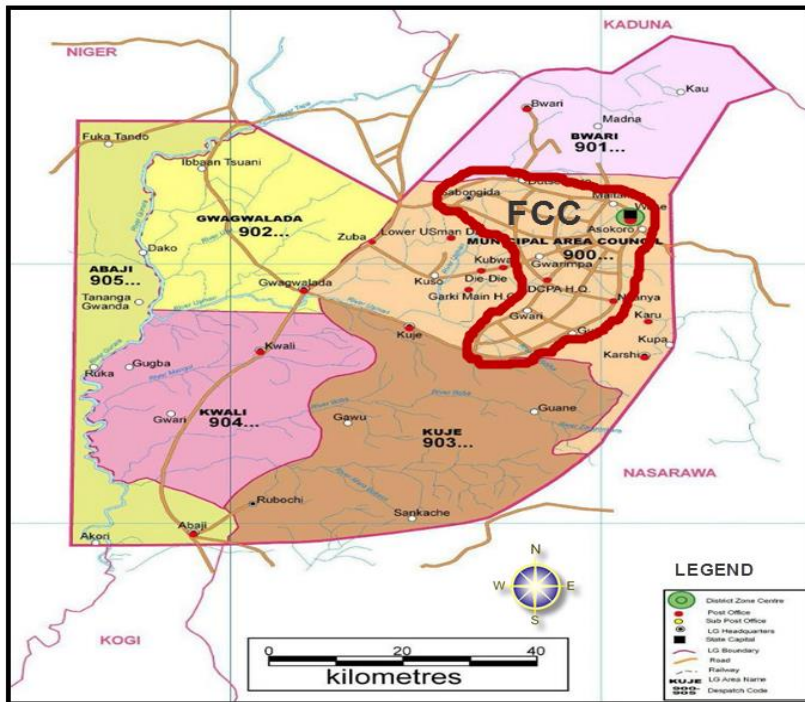


Plate 1: Map of F.C.T

Source: Abuja Geographic Information System (AGIS), 2018.

MATERIALS AND METHODS

Data for this study data were gathered from several sources that could be broadly classified into two: primary and secondary data.

Primary Data

Primary data for this study was obtained through oral interviews and administration of questionnaires.

Secondary Data

Secondary data for this study was sourced from textbooks, published and unpublished journals, materials from the internet, statistical bulletin by National Bureau of Statistics and literatures related to the studies

DATA ANALYSIS TECHNIQUE

The data collected through the questionnaire were presented using table and interpretation with the help of statistical package for social

science (SPSS) analysis.

RESULTS AND DISCUSSION

Table 3.1: Knowledge of Quarrying in the Study Area

Response	Frequency	Percent
Yes	90	100
No	0	0
Response Total	90	100

Source: Field Survey, 2018.

Table 3.1 show responses of the respondents on their knowledge of quarrying in the study area. The result shows that 100 percent of the respondents answered in the affirmative that they know about quarrying in the study area. This indicates that all the respondents know about the activities of quarrying in the study area.

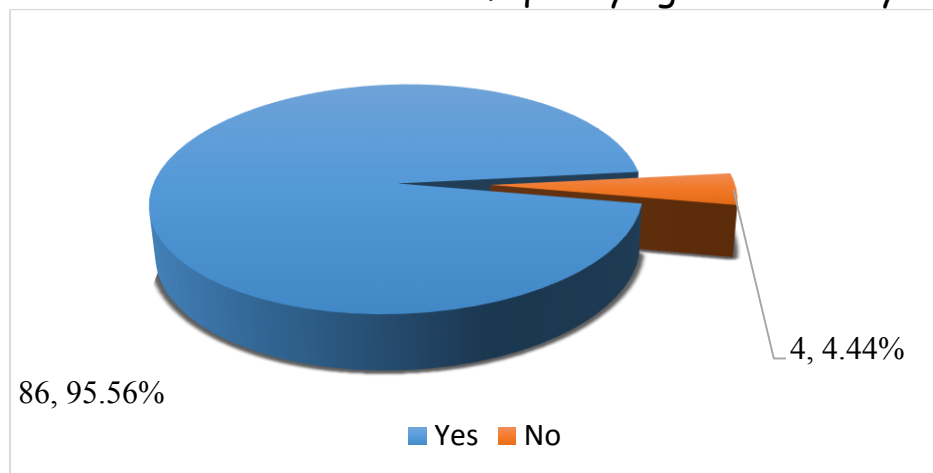


Fig. 3.1: Quarrying as a means of livelihood

Source: Field Survey, 2018.

Figure 3.1 show responses on quarrying as a means of livelihood by the quarry workers in the study area. The result showed that 95.6 percent agreed that quarrying serves as a means of livelihood in the study area while 4.4 percent of the respondents did not respond to

the question. This shows why hundreds of people are engaged in quarrying activities in the area.

Table 3.2: Total Number of Miners

No of workers	Frequency	Percent
1-50	12	13.3
51-100	29	32.2
101-150	16	17.8
151 >	31	34.4
No Response	2	2.2
Total	90	100.0

Source: Field Survey, 2018.

Table 3.2 shows the respondents opinion on the number of workers who are engaged in quarrying activities in the area. The result shows that 13.3 percent of the respondents believe that the number of quarrying workers who are engaged in the place are not more than 50 while 32.2 percent believed the quarrying workers are between the range of 51 and 100. On the other hand, 17.8 percent of the respondents believed the number of quarrying workers in the area is between 101 and 150 while 34.4 percent of the respondents feel that there are up to 151 quarrying workers and above in the area. Only 2.2 percent of the respondents did not give answer to the question.

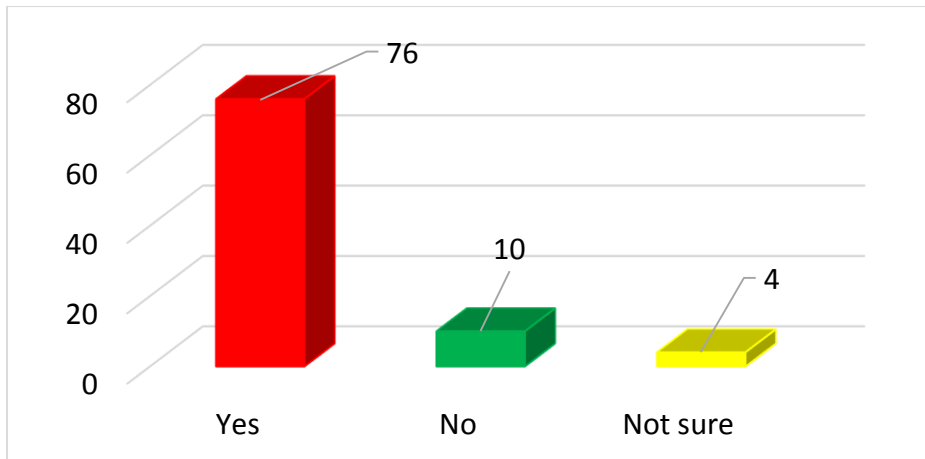


Fig. 3.2: Huge capital requirement for quarrying in area
Source: Field Survey, 2018.

Figure 3.2 shows the respondents' views on capital requirement for quarrying in the study area. The result shows that 84.4 percent of the respondents agreed that the capital requirement for quarrying operation in the area is huge. On the other hand, 11.1 percent of the miners say the capital requirement is small while 4.4 percent of the respondents say that they are not sure of the capital requirement for quarry activity in the area.

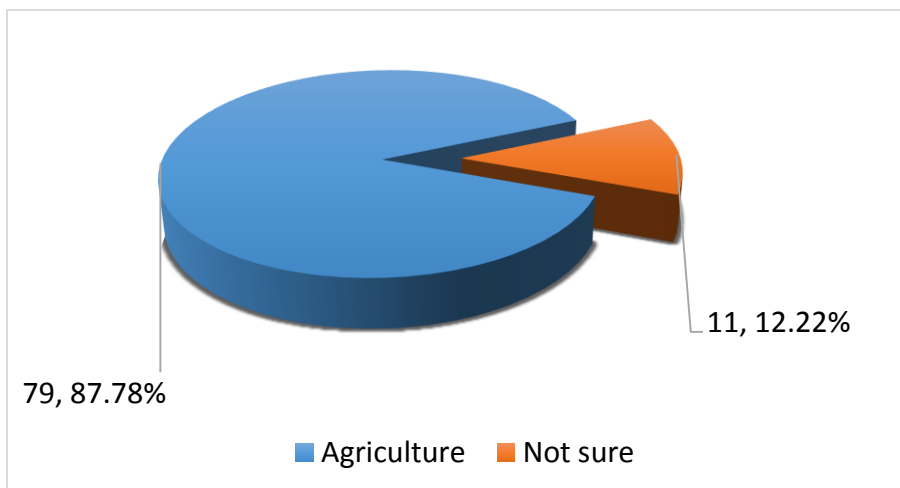


Fig. 3.3: Land use in place before quarry activity
Source: Field Survey, 2018.

Figure 3.3 show responses of the quarry workers on the landuse in the various quarrying sites within the study area prior to quarrying activity. The result showed that 87.8% of respondents say the land use in place before the commencement of quarrying was agricultural land use. However, 12.2 percent of the respondents are not sure of the land use in place before quarrying. These may be some of the people who came from other parts of the country to the community in search of daily bread.

Table 3.3: Monthly Remuneration of Workers (in Naira)

Response	Frequency	Percent
30000-60000	25	27.8
61000-80000	46	51.1
81000-100000	13	14.4
101000>	6	6.7
Total	90	100.0

Source: Field Survey, 2018.

Table 3.3 represents the monthly remuneration of quarry workers in Mpape. The result revealed that 27.8 percent of the quarry workers who responded to the question agreed that their monthly remuneration is not above 60,000 naira while 51.1 percent of the respondents agreed that their monthly remuneration is between 61000 and 80,000 naira. In the same vein, 14.4 percent of the respondents maintained that theirs is between 81,000 and 100,000 naira whereas, 6.7 percent of the respondents agreed that they earn 101,000 naira and above.

Table 3.4: Comparison between Quarrying and Agriculture

Response	Frequency	Percent
Yes	82	91.1
No	3	3.3
Not Sure	5	5.6
Total	90	100.0

Source: Field Survey, 2018.

Table 3.4 presents the responses of the respondents on comparison between quarrying and agriculture in area. The result revealed that 91.1 percent of the respondents agreed that earnings from quarrying are higher than agriculture while 3.3 percent of the miners believed that earning from agriculture is better than quarrying, while 5.6 percent of the respondents were indifferent on the subject. This explains part of the reasons why quarrying has impacted maize production and agricultural land in the area.

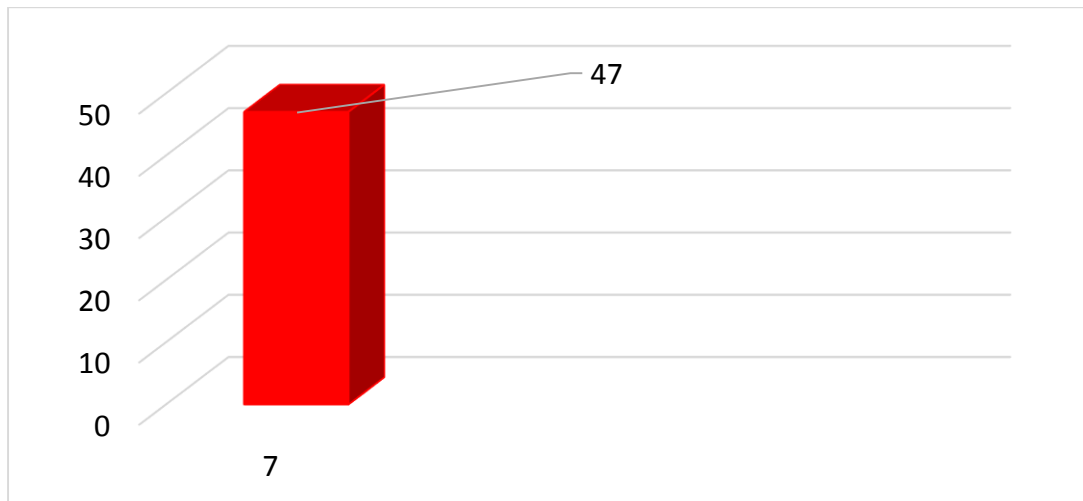


Fig. 3.4: Use of machineries in the sites

Source: Field Survey, 2018.

Figure 3.4 show responses on the use of machineries in the sites. The result shows that 85.6 percent answered in the affirmative that machineries are used in the site while 7.8 percent answered that no machine is used in the sites. On the other hand, 6.7 percent of the

respondents were not sure. It was observed from their response that the companies decide on the use of machineries depending on the depth of the mineral.

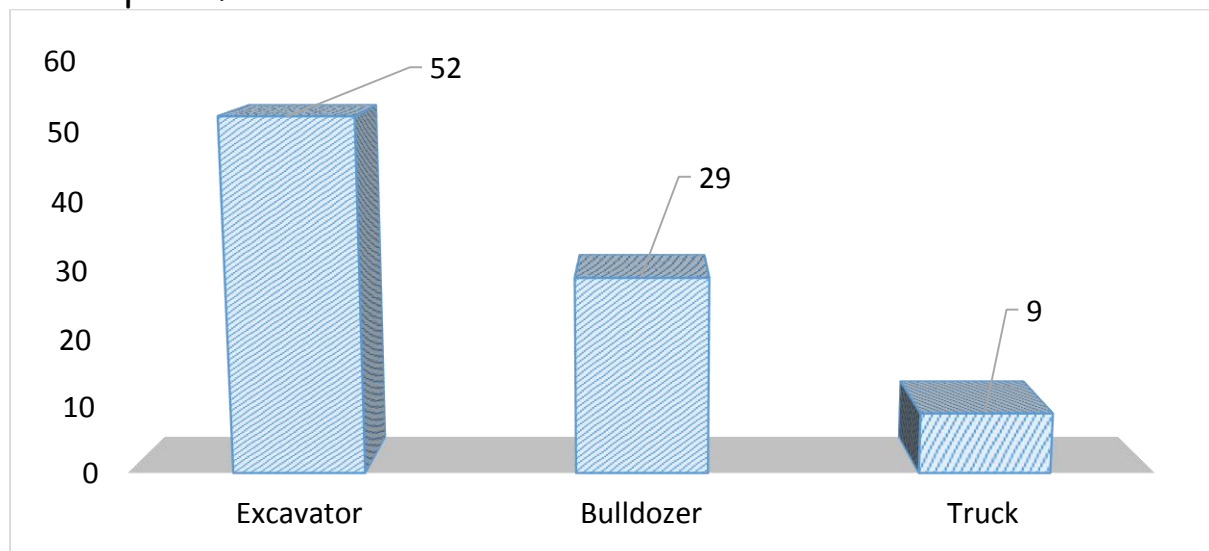


Fig. 3.5 Type of machineries used in the sites

Source: Field Survey, 2018.

Figure 3.5 represents responses on the type of machinery used in the quarrying sites. The result show that 57.8 percent of the respondents agreed that only excavator is used in the site whereas 32.2 percent of the respondents answered that bulldozer is normally used in the sites.10 percent of the respondents posited that truck is the major machinery employed in quarrying. The machinery employed depends on accessibility to the sites from the road, the depth of the rocks of interest and the size of the site.

Table 3.5: Reduction of agricultural activities as a result of quarry

Response	Frequency	Percent
Yes	77	85.6
No	9	10.0
Don't know	4	4.4
Total	90	100.0

Source: Field Survey, 2018.

Table 3.5 showed that majority of the quarry workers agreed that agricultural activities in the area have been reduced in preference to quarrying. The study shows that 85.6 percent of the respondents believed that agricultural activities in the area has been reduced as a result of quarrying while 10 percent believed that agricultural activity has remain the same. Only 4.4 percent of the respondents did not know about any change in agriculture as a result of quarrying in the study area.

Table 3.6: Ways in which quarrying affects Maize production in the area

Response	Frequency	Percent
Degradation of land	55	61.1
Reduction of farmers	20	22.2
Reduction of land	13	14.4
No Response	2	2.2
Total	90	100.0

Source: Field Survey, 2018.

Table 3.6 presents the respondents view on the various ways in which quarrying has affected maize production in the area. Most of the respondents agreed that maize production has been hampered by quarrying through of degradation of agricultural lands due to increasing quarrying activities in the area. 61.1 percent of the respondents were in support of this. The table farther showed that 22.2 percent of the respondents believed that low maize production in the study area is as a result of reduction in the number of maize farmers most of whom have taken up jobs in quarrying companies while 14.4 percent of the respondents believed that reduction in farm land due to loss of agricultural lands to quarrying is responsible for low maize production in the study area. Only 2.2 percent of the miners did not give answer to the question.

Table 3.7: Effect of quarry on other crops

Response	Frequency	Percent
Yes	82	91.1
No	5	5.6
Don't know	3	3.3
Total	90	100.0

Source: Field Survey, 2018.

Table 3.7 show the effect of quarrying on other crops. 91.1 percent of the respondents believed that quarrying also affects the output of other crops apart from maize production in the study area. On the other hand, 5.6 percent believe that quarrying of rocks does not affect crop production in general while 3.3 percent don't know if quarrying affects crop production in the study area. This result implies that on a general scale, quarrying in Mpape area of FCT has resulted to reduced production of cereal and leguminous crops in the area.

Table 3.8 showed that 85.6 percent of the respondents agreed that quarry has caused land degradation in the area while 10 percent thinks that kaolin quarry has not affected the land in any way. In addition, 2.2 percent weren't sure if quarry has caused land degradation while 2.2 of the miners did not divulge any information on the subject matter.

Table 3.8: Has quarrying caused land degradation in the area

Response	Frequency	Percent
Yes	77	85.6
No	9	10.0
Not Sure	2	2.2
No Response	2	2.2
Total	90	100.0

Source: Field Survey, 2018.

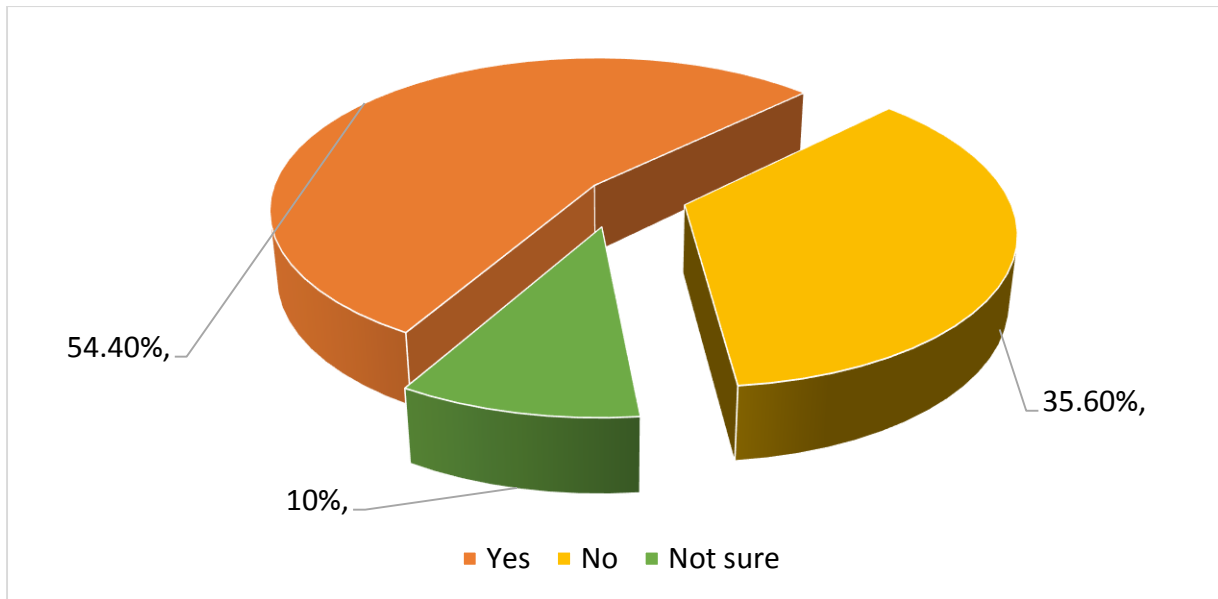


Fig. 3.6: Associated social impacts of kaolin quarry in the area
Source: Field Survey, 2018.

Figure 3.6 revealed the respondents opinion on the social impacts associated with quarrying in the study area. It is worthy of note that 54.4 percent of the respondents believed there are social impacts associated with quarrying while 35.6 percent says there are no social impact of quarrying. More so, 10 percent of the respondents did not know if there is any social impact of quarrying in the study area.

Table 3.9: Social impact of Quarrying

Response	Frequency	Percent
Drug abuse	40	44.4
Diseases	7	7.8
High cost of living	14	15.6
Land use conflict	21	23.3
Prostitution	4	4.4
Not Sure	1	1.1
No Response	3	3.3
Total	90	100.0

Source: Field Survey, 2018.

Table 3.9 show responses on the social impacts of quarrying in the study area. The result shows that 44.4 percent of the respondents agreed that quarrying bring about drug abuse. The quarrying workers take drugs to boost their energy and power since excavation from the ground is done using spade and bare hand. In the same vein, 7.8 percent of the respondents believed the social impact of quarrying is diseases while 15.6 percent agreed that quarrying in the area has brought about high cost of living. 23.3 percent believed that quarrying has resulted to conflict over land ownership. In addition, 4.4 percent of the respondents maintained that quarrying in the area has brought about prostitution while 1.1 percent did not think of any social impact of quarrying. However, 3.3 percent of the respondents did not lend their voice on the question.

Table 3.10: Do miners employ any mitigation measure to reduce environmental effect of quarry

Response	Frequency	Percent
Yes	61	67.8
No	21	23.3
Not Sure	8	8.9
Total	90	100.0

Source: Field Survey, 2018.

Table 3.10 show the response of the respondents on the mitigation measures to reduce the environmental effect of quarry in the area. The result shows that 67.8 percent of the respondents posit that the quarrying workers employ mitigation measures to reduce environmental effect of quarrying in the study area while 23.3 percent says they don't employ any means to reduce the environmental effect of quarrying in the area. In addition, 8.9 percent of the respondents are not sure. It is worthy of note that some of the miners come from different places to work in the quarry site and might not know what happen to the sites after quarry.

Table 3.11: Measures to reduce environmental effect of Quarrying in the area

Response	Frequency	Percent
Reclamation	84	93.3
Not Sure	6	6.7
Total	90	100.0

Source: Field Survey, 2018.

Table 3.11 show the respondents view on measures to reduce the effect of quarrying on the environment. Majority of them posited that land reclamation is done after the quarrying process to reduce the environmental effect of quarry in the area and this was supported by 93.3 percent of the respondents while 6.7 percent of the respondents maintained they are not sure of any measure to reduce the environmental effect of quarrying in the study area.

Table 3.12: Compulsory land reclamation after quarry which is enforced by government

Response	Frequency	Percent
Yes	52	57.8
No	31	34.4
Not Sure	3	3.3
No Response	4	4.4
Total	90	100.0

Source: Field Survey, 2018.

Table 3.12 show results on compulsory land reclamation program which is enforceable by government. The result revealed that 57.8 percent of the respondents agreed that compulsory land reclamation exists which is enforced by government agencies. On the other hand, 34.4 percent of the respondents believe there is no compulsory land reclamation after quarry which is enforced by the state government. Only 3.3 percent are not sure if such measure exists

while 4.4 percent did not respond to the question. Federal Government plays a vital role in ensuring that open pits are sand-filled after the quarrying process in the study area. What need to be understood is the way compulsory land reclamation is handled by government officials.

Table 3.13: Use of land for agricultural activity after reclamation

Response	Frequency	Percent
Yes	5	5.6
No	76	84.4
Not Sure	6	6.7
No Response	3	3.3
Total	90	100.0

Source: Field Survey, 2018.

The table above show responses on the use of land for agricultural purposes after reclamation. Majority of the respondents posited that land cannot be used for farming after reclamation. This is so because the land loses all the nutrients needed for farming during excavation and this was supported by 84.4 percent of the respondents while 5.6 percent feel the land can be used for farming after reclamation. In addition, 6.7 percent of the respondents werenot sure if the land can be used for agricultural activity after reclamation while 3.3 percent did not respond to the question.

Farmers' Data Presentation

The farmers in the study area are mostly adult whose age bracket falls between 36-50 years as 55 percent of the farmers fall within the group. About 15 percent of the farmers fall within the age bracket of 18-35 while 30 percent of the farmers are 50 years and above. This is why most of the workers in the area are mostly adult who are below 50 years. Most of the farmers are women who constitute 58.3 percent of the respondents while male are just 41.7

percent.

On educational qualification of the farmers, the study revealed that 36.7 percent of the farmers stopped at primary education whereas 31.7 percent only stopped at secondary. Only 6.7 percent of the farmers passed through the higher institution. Some farmers did not acquire any form of formal education and they are 18.3 percent while 6.7 percent did not deem the questioning dispensable. The study showed that 65 percent of those who practice agriculture are mostly married people and 15 percent are single while 5.0 percent are divorced. In addition, 10 percent of the farmers are separated by death whereas 5 percent did not respond to the question. A total of 60 questionnaires were randomly distributed to the farmers in the study area.

Table 3.14: Period the farmer joined farming activity (Before or after the coming of the quarrying companies)

Response	Frequency	Percent
Before	41	68.3
After	16	26.7
Not Sure	3	5.0
Total	60	100.0

Source: Field Survey, 2018.

Table 3.14 shows the response of the farmers on the period they joined farming activity. The result reveal that 68.3 percent of the respondents joined farming before the coming of quarry companies in the area while 26.7 percent agreed they joined farming after the emergence of quarry companies in the study area. Only 5 percent of the respondents were not sure of when they join farming in the study area.

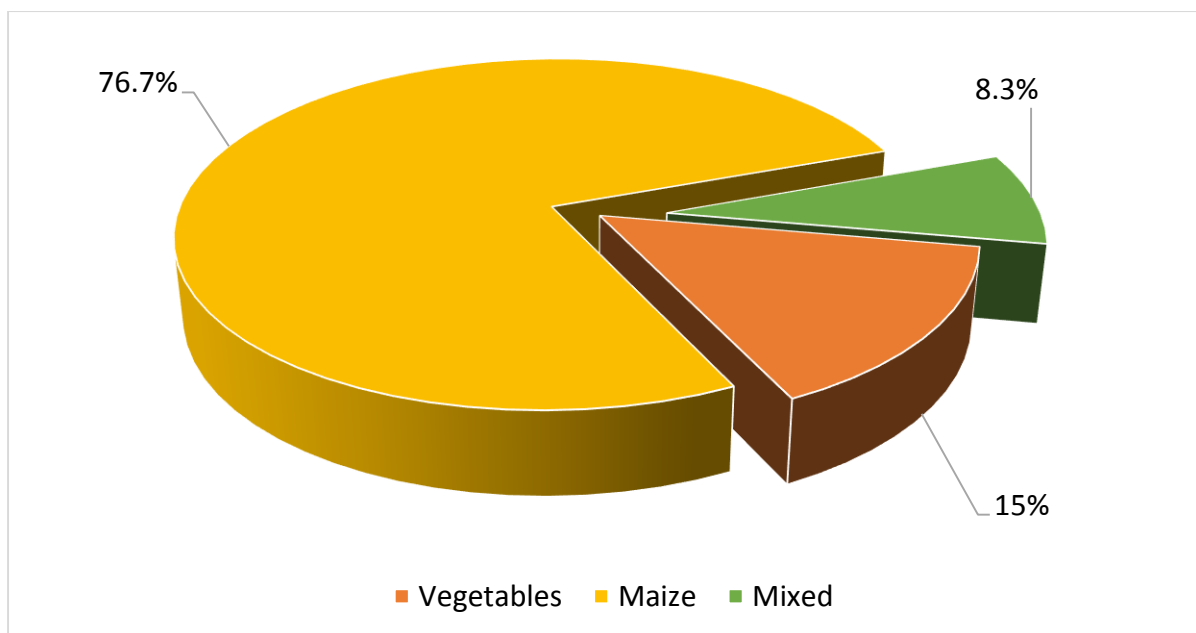


Fig. 3.7: Types of crops grown in the study area
 Source: Field Survey, 2018.

Figure 3.7 represents response on the type of crop grown by the respondents. The study shows that 15 percent of the farmers grow vegetables whereas 76.7 percent of the farmers cultivated maize in the study area. The table further revealed that 8.3 percent cultivate mix corp. This shows that majority of the farmers grow a combination of crops and/or vegetables in the study area.

Table 3.15: Knowledge about Quarrying in the Area

Response	Frequency	Percent
Yes	58	96.7
No	2	3.3
Total	60	100.0

Source: Field Survey, 2018.

Table 3.15 shows farmer's knowledge about quarrying in the study area. The study revealed that 96.7 percent of the farmers are well aware of quarrying in the area whereas 3.3 percent of the respondents claim they don't know about quarrying in the area.

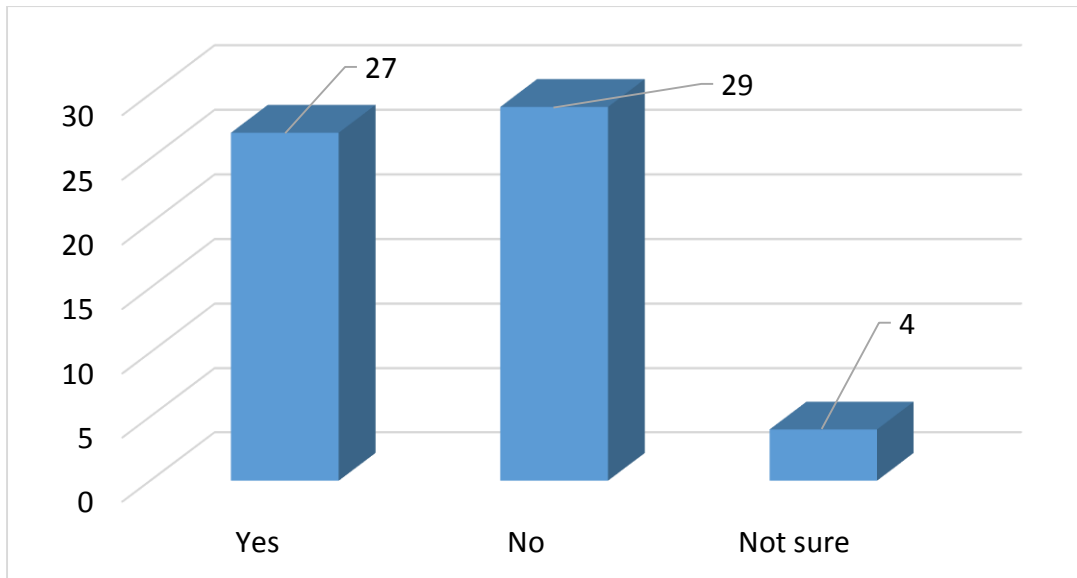


Fig. 3.8: Agriculture as a Means of Livelihood
Source: Field Survey, 2018.

Figure 3.8 show the respondents' reliance on agriculture as a means of livelihood. The result shows that 45 percent of the farmers agreed that farming serves as their means of livelihood while 48.3 percent answered on the contrary. They maintained that farming has to be supported by other jobs for sustenance of livelihood. Only 6.7 percent of the respondents did not respond to the question.

Table 3.16: Total number of farmers in the Area

Response	Frequency	Percent
1-50	8	13.3
51-100	20	33.3
101-150	15	25.0
151 >	14	23.3
No Response	3	5.0
Total	60	100.0

Source: Field Survey, 2018.

Table 3.16 show responses by the farmers on the number of farmers in the area. The result shows that 13.3 percent of the

respondents believe that the number of farmers in the area should range between 1 and 50, while 33.3 percent believe the farmers are up to 100. Furthermore, 25 percent of the respondents believe the numbers of farmers are in excess of 100 but not more than 150 whereas 5 percent of the farmers didn't respond to the question.

Table 3.17: Effect of Quarrying on maize production in the Study Area

Response	Frequency	Percent
Yes	52	86.7
No	4	6.7
Mo Response	4	6.7
Total	60	100.0

Source: Field Survey, 2018.

Table 3.17 show responses by the farmers on the possible effect of quarrying on fanning in the study area. The result showed that 86.6 percent of the respondents believed that quarrying has significant effect on maize production in the study area while 6.7 percent don t believe in any possible effect of quarrying on maize production in the study area. In addition, 6.7 percent of the respondents did not make their intention known.

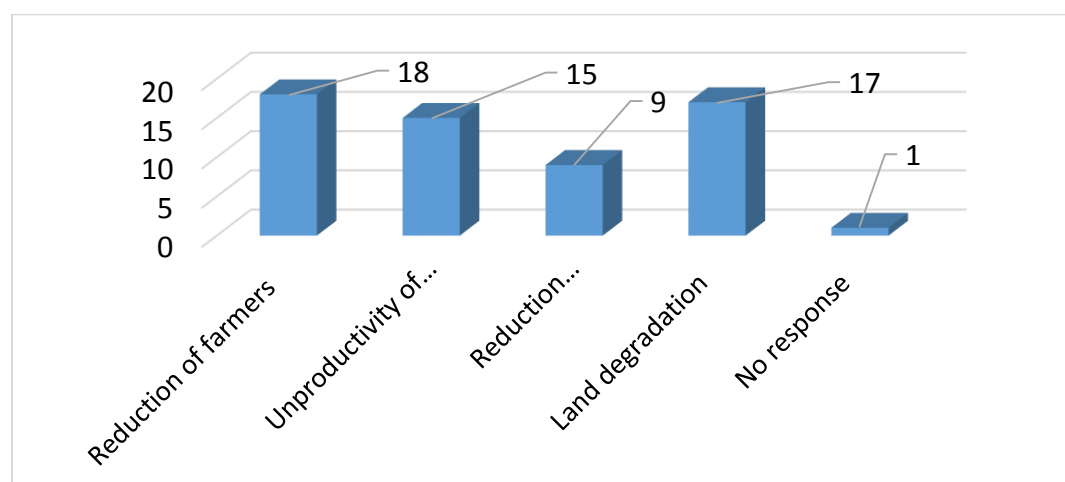


Fig. 3.9: Ways in which Quarrying has affected maize production
Source: Field Survey, 2018.

Figure 3.9 represent the respondents' views on ways that quarrying has affected maize production in the study area. The result shows that 30 percent of the farmers believed that quarry has affected maize production by way of reducing the number of farmers who cross carpeted to quarrying business. On the other hand, 25 percent feel that unproductivity of farmlands induced by quarrying activity affects maize production in the study area while 10 percent believed it is as a result of reduction in agricultural land. In terms of land degradation, 28.3 percent answered in the affirmative whereas 1.7 percent didn't respond to the question.

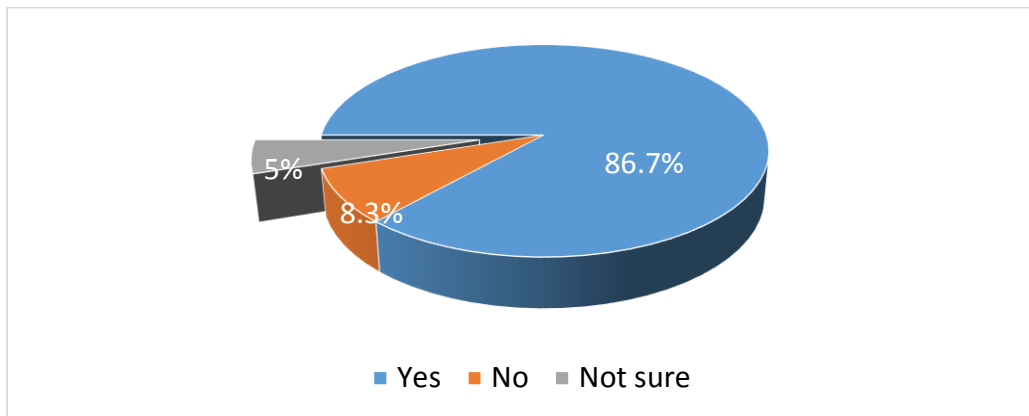


Fig. 3.10: Farmers giving out their Lands for Quarrying Activities in the Area
Source: Field Survey, 2018.

Figure 3.10 shows responses on farmers giving away their lands to quarrying companies. Majority of the farmers agreed that most farmers give out their land with rocks of interest to quarrying companies in the study area and this was supported by 86.7 percent of the respondents. Only 8.3 percent of the respondents answered on the contrary while 5 percent are not sure.

Table 3.18: Reason why farmers prefer giving out their Land for Quarrying

Response	Frequency	Percent
Unproductivity of Land	23	38.3
Money Involved	36	60.0
Not Sure	1	1.7
Total	60	100.0

Source: Field Survey, 2018.

Table 3.18 shows the result on the reasons why farmers prefer to give out their land to Quarrying companies or workers. The result revealed that 38.3 percent of the respondents believe unproductivity of farmland compel farmers to give out their lands. 60 percent of the respondents agreed that the money the quarrying workers or companies give for their land is higher than what they get from maize or other crops farming while 1.7 percent is not sure why farmers give their land for quarrying purpose in the study area.

Table 3.19: Mode of transferring farmlands to Quarrying workers

Response	Frequency	Percent
Sell	18	30.0
Lease	37	61.7
Not Sure	5	8.3
Total	60	100.0

Source: Field Survey, 2018.

The result in table 3.19 show that 30 percent of the respondents feel that the farmers sell their land out rightly to the quarrying workers while 61.7 percent believe the farmers only lease their land. Only 5.8 percent of the respondents are not sure of the mode of transferring farmland land to quarrying workers in the area.

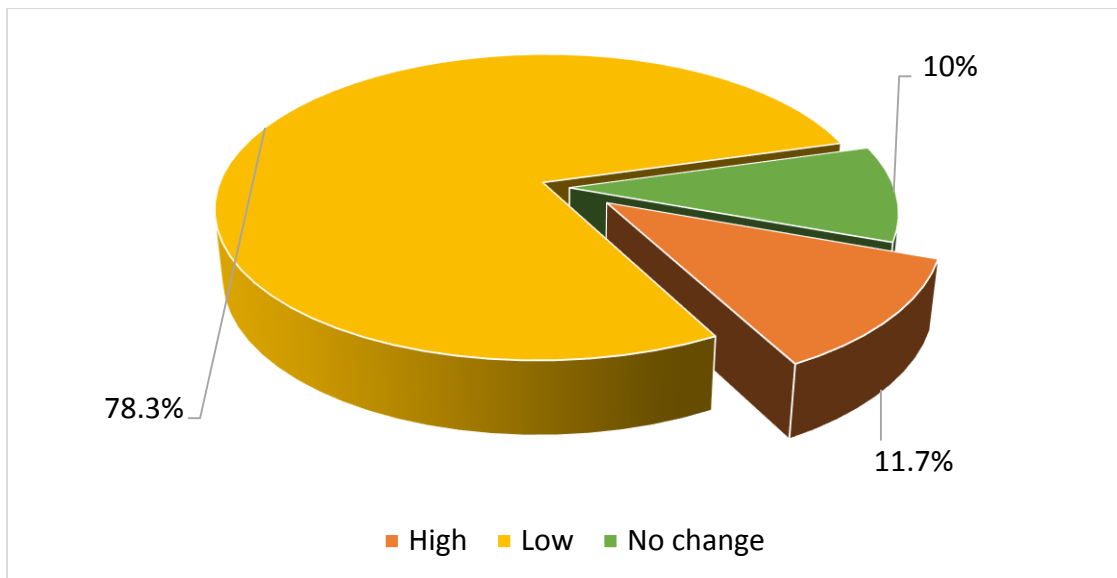


Fig.3 11: Yield experience of farmers who are close to quarrying sites
Source: Field Survey, 2018.

Figure 3.11 represent responses on yield experience of farmers who are close to quarrying sites in the study area. The result shows that 11.7 percent of the respondents agreed that the yield of farmlands close to quarrying sites has been high. On the other hand, 78.3 percent of the respondents maintained that the yield of farmland close to quarrying sites has been low while 10 percent of the respondents believed there is no change in the yield.

Table 3.20: Reason for low maize yield

Response	Frequency	Percent
Pollution	40	66.7
Deforestation	10	16.7
Pest and Disease	7	11.7
No Finance	3	5.0
Total	60	100.0

Source: Field Survey, 2018.

Table 3.20 represent reasons the farmers gave for low yield in the study area. The result showed that 66.7 percent of the respondents

maintained that land pollution caused by the quarrying is responsible for low yield especially in areas very close to the quarrying sites. In the same vein, 16.7 percent of the respondents believed that deforestation is the major reason why farmers experience low yield in the area. In addition, 11.7 percent also agreed that pest and disease hampers maize production in the area while 5 percent believed it to be caused by lack of finance.

Table 3.21: Estimated yield of maize per annum before commencement of quarrying in the study Area (in metric tons/hectares)

Yield	Frequency	Percent
1.0-5.0 tons	8	13.3
5.0-10.0 tons	17	28.3
10- 15 tons	28	46.7
15>tons	7	11.7
Total	60	100.0

Source: Field Survey, 2018.

Table 3.21 represent response of the farmers on maize yield per annum in metric tons before the advent of quarrying in the study area. The result showed that 13.3 percent of the respondents maintained that maize yield before the commencement of quarrying in the area was not more than 5 tons per hectare on annual basis. On the other hand, 28.3 percent of the respondents believed that maize yield in the area before the commencement quarrying activities was between 5 to 10 metric tons per hectare while 46.7 percent of the respondents gave an estimate of between 10 and 15 metric tons per hectare yield a year. Only 11.7 percent of the respondents believed that maize yield before the emergence of quarrying in the area was 15 tons and above.

Table 3.22: Estimated yield of maize per annum after the emergence of quarrying in the area (in metric tons /hectares)

Response	Frequency	Percent
1.0-5.0 tons	46	76.7
5.0-10.0 tons	7	11.7
10-15 tons	5	8.3
No Response	2	3.3
Total	60	100.0

Source: Field Survey, 2018.

Table 3.22 show responses of the farmers on the estimated yield of maize after the emergence of quarrying in the study area. The result revealed that 76.7 percent of the respondents believed that maize yield following the advent of quarrying activities in the area have not exceeded 5 metric tons per hectare on annual basis. On the other hand, 11.7 percent of the respondents believed that the estimated yield in maize is between 5 and 10 metric tons per hectare while 8.3 percent maintained the estimated yield in maize is between 10 and 15 metric tons per hectare on a yearly basis. Finally, 3.3 percent of the respondents did not respond to the question.

Table 3.23: Adoption of landuse management before the emergence of quarrying in the area

Response	Frequency	Percent
Yes	23	38.3
No	26	43.3
Not Sure	9	15.0
No	2	3.3
Total	60	100.0

Source: Field Survey, 2018.

Table 3.23 shows the response of the farmers on landuse management before the emergence of quarrying in the study

area. The result shows that 38.3 percent of the respondents say there has been landuse management in the area before the emergence of quarrying in the area while 43.3 percent posited there has not been any landuse management in the area. 15 percent of the respondents' are not sure if there was any while 3.3 percent didn't give any information.

Table 3.24: Method of Landuse Management Employed

Response	Frequency	Percent
Rotation Farming	16	26.7
Use of Compost Manure	8	13.3
1 Year Fallow	36	60.0
Total	60	100.0

Source: Field Survey, 2018.

Table 3.24 presents the responses of farmers on the method of landuse management adopted in the study area. Some farmers see rotation farming as their best landuse management method and 26.7 percent of the respondents fall in that category. The study showed that 13.3 percent of the respondents use compost manure for land management while 60 percent of the respondents employ one year fallow period. This explains the decrease in maize production in the area as there isn't much land for the large 60% to practice the one year fallow system.

Table 3.25: Reclamation of land by Miners

Response	Frequency	Percent
Yes	45	75.0
No	10	16.7
Total	60	100.0

Source: Field Survey, 2018.

Table 3.25 show responses on reclamation of land by quarry workers

after quarrying activities. Majority (75%) of the respondents agreed that the quarry workers reclaim the quarry sites after mineral extraction while 16.7percent maintained that quarry sites are left open after quarrying. On the other hand, 8.3 percent didn't know about reclamation in the area. Plate 4.3 shows reclaimed quarry site in the study area.

Table 3.26: Measure taken by quarry workers to reclaim the land after quarrying

Response	Frequency	Percent
Re-afforestation	2	3.3
Sand filling	52	86.7
Use of Refuse	1	1.7
No Response	5	8,3
Total	60	100.0

Source: Field Survey, 2018.

Table 3.26 represent the response of the farmers on the measure of reclamation taken by quarry workers in the study area. The result revealed that 3.3 percent of the respondents believed re-afforestation is used by the quarry workers to reclaim the sites while 86.7 percent agreed that sand filling isonly used to reclaim quarry sties. Only 1. 7 percent believed that quarry sites are used for refuse dump. Some farmers refused to divulge information on the question.

Table 3.27: Ability of the farmers to farm on the land after reclamation

Response	Frequency	Percent
Yes	2	3.3
No	54	90.0
Not Sure	4	6.7
Total	60	100.0

Source: Field Survey, 2018.

Table 3.27 showed that 90 percent of the respondents believed farmers cannot plant on the land after reclamation is done in the study area. Only 3.3 percent feels that the land can be used after reclamation while 6.7 percent of the respondents were not sure. The result shows the inadequacy of reclamation exercise carried out by the quarry workers after quarrying activities in the study area.

Table 3.28: Effect of the type of land reclamation in ameliorating degraded land in the area

Response	Frequency	Percent
Yes	37	61.7
No	12	20.0
Not Sure	8	13.3
No Response	3	5.0
Total	60	100.0

Source: Field Survey, 2018.

The result table 3.28 show responses from the farmers on the effect of land reclamation in ameliorating land degradation in the area. 61.7 percent of the respondents believed that the type of land reclamation done in the study area helps in ameliorating land degradation whereas 20 percent of the respondents feel land reclamation does not ameliorate land degradation in the study area. Furthermore, 13.3 percent posited that they are not sure if land reclamation ameliorates while 5 percent of the respondents did not respond to the question.

CONCLUSION

The issue of land degradation is in place in the study area as a result of pressure on land for rock materials extraction which is done by open pit cast method. The pressure will continue as long as such rocks of interest are still found in the area and inability of government agencies to enforce quarrying laws as to the eligibility of

miners in the area. As a result, land resource begins to react negatively to the subjected use in the form of erosion, sedimentation problem, flooding etc. which inadvertently affect maize production in the study area. The study revealed that quarrying has led to degradation of agricultural land in the study area. The quarrying exposes the land and mixes the soil with harmful particles which causes the soil to become infertile. Although reclamation is done after quarry, this study has shown that it is not adequate to get the land back to the standard required for maize production to thrive in the area.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations are put forward for policy consideration:

Farming in the area should be encouraged beyond measure. Since some of the farmers outlined reasons for leaving farming or giving their land to quarrying workers as non-productivity of land, low quality crop, no finance etc., government should encourage the rural people by providing required implements and crops. The assistance should go beyond paper talks. The practicability is what matters most to encourage maize farming in the area.

Government should take stringent measures in enforcing quarrying/mining laws in the study area in order to punish companies or individuals who violate such laws. This will help in curbing the incessant non registered companies or individuals who quarry in the area.

Stringent laws should be spelt out which will mandate the quarrying companies, groups of individuals to reclaim the land properly after quarrying activity. The reclamation should go beyond sand filling with clay. The reclamation should be done in stages with the introduction of soil (loamy soil) that tolerate crops like maize in the

last stage.

Environmental awareness should be created in the locals where quarrying takes place. This may assume public enlightenment campaigns, lectures in churches or village squares, distribution of pamphlets, posters, workshops and media houses. This will help the inhabitants of the area to know the dangers of giving out their agricultural lands for quarrying activities.

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