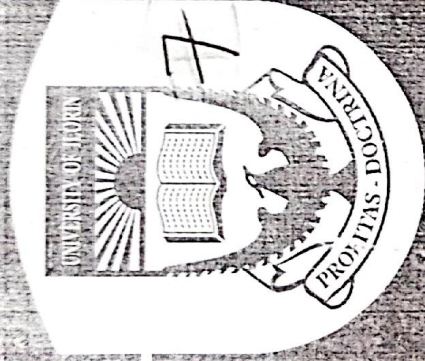


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ECONOMIC IMPORTANCE OF SAND MINING AND ITS SUSTAINABILITY IN SUBURB OF OGBOMOSO NORTH, NIGERIA

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Abstract
The environment has been a source of raw materials like logs, herbs, food, forest, sand atmospheric gases among others for human consumption. Sand mining is a process of extracting, refining and transporting of sand for the final users. This research was carried out to assess the economic importance and sustainability of sand mining in Ogbomosho North Local Government Area, Oyo State. The study area was divided into 6 locations; namely Egbeda, Iluju, Katagora, Onitirin, Temidire and Yaku respectively. A total of 120 questionnaires were administered to farmers, landowners, sand miners and sand traders. 20 questionnaires were administered in each location to know the impact of sand mining on day to day activities of the people. Descriptive statistics such as simple percentage, tables, and graphs were used to summarize people's opinion. Inferential statistics (Analysis of Variance) was used to determine whether or not sand mining does contribute significant impact to socio-economic development of the study area. The result revealed that sand mining contributes significant impact to socio-economic development of the area. Various factors such as urbanization, abundance of sand and high quality of sand are responsible for the increasing demand for sand in the study area. The study concludes that sand mining has a positive effect on the socio-economic life of people and it should be maximally sustained in the area. The study however recommends that Environmental Impact Assessment should always be carried out in order to know sand yield capability of the area.

Keywords: Environment, Sand, Mining, Sustainability, Urbanization, Economic

Introduction

The environment has been a source of raw materials for human consumption. Some of these raw materials include logs, herbs, food and wood charcoal from forest, Oxygen gas and other gases from the atmosphere, gravel and sands from the lithosphere. Man tries to utilize these resources within his environment with the opportunity given to him by the environment. Man interacts with the environment largely because he cannot live without

it but the environment can without man. As a result of these large interactions with and within the environment, man has advanced in science and technology, causing huge injury upon the environment.

Sand being a resource is naturally occurring granular material composed of finely divided rock and mineral particle (Mwangi, 2007). He noted that soil is an important source of raw materials such as clay, sand gravel and minerals. It is non-renewable natural resource with potentially rapid degradation rates and extremely low formation and regeneration process. It is gotten from the disintegration of rocks and corals under the influence of weathering and abrasion. When sand is freshly formed, the particles are usually angular and sharply pointed but they grow gradually smaller and more rounded as they become constantly worn down by the wind or water. Sand is regarded as a resource because man benefit from it, ranging from construction activities to generation of income which brings about expansion and development of a society. Being a resource, it needs to be put into use so as to bring about development in the environment.

Sand mining is considered a very big source of income and revenue, offers employment opportunities to the people of a community as well as providing social amenities to satisfy human wants. Even with these advantages, others still advocate for complete abolishment of the activity to save the deteriorating environment and curb the associated social ills; with benefits being termed as trivial. Eggert (2006) asserts that sustainable mining entails the simultaneous pursuit of sustained or enhanced environmental quality, economic growth and social justice. Laurence (2011) acknowledges that there is limited guidance for mine operators to put sustainability frameworks and theory into action on the ground. Despite that, many researchers dismiss the possibility of compatibility between mining operations and sustainability goals, Laurence (2011) argues that sustainable mining activities would be feasible if the rate of use of minerals does not exceed the capacity to find new sources, acceptable substitutes or recycle.

Sand mining being the removal of sand from their natural configuration often creates environmental stress. Pereira (2012) realized that as global demand for sand is exploding and rising rapidly, the sources of sand and gravel such as riverbeds, beaches, creeks are being mined faster than nature can replenish.

According to Hilson (2005) small scale mining plays a pivotal socio-economic role in developing countries. In many places, especially the developing world, this sector is associated with poverty alleviations and significant contribution to development of the rural areas. The remoteness of the practice has remained unchanged and the rural mining landscape has continued to prevail. Small scale mining has long been perceived as an informal sector industry, and Hilson (2005) asserts that formalization of this sector has remained a big challenge.

Study area

Study area

Ogbomosho North is located between latitudes 8° 05' N and 8° 11' N and longitudes 4° 12' E and 4° 19' E (figure 1), and the population was projected to be 235,710 people (National Population Commission of Nigeria, 2006). Ogbomosho North is in warm humid zone. The warm humid climate is found close to the equator and extends 15° North and South (Ayinla, 2012). The dominant features are lack of seasonal variation in temperature and it is characterized by high humidity, high rainfall and high temperature with relative low wind

velocity. Geologically, the study area is regionally concealed within the southwestern Nigeria basement complex. The rock units are made up of ancient gneiss-migmatite series and meta-sedimentary series (Afolabi et al., 2013). The soil type found in Ogbomoso North is the lateritic soil; these soils composed almost entirely of Iron and Aluminum oxides; they are usually reddish in colour and are the least soluble product of rock weathering in tropical climates (Idris et al., 2010). The major occupations of the people here are trading, farming (subsistence), handicraft, mining and so on. A few other people engaged in civil service, extracting and transportation.

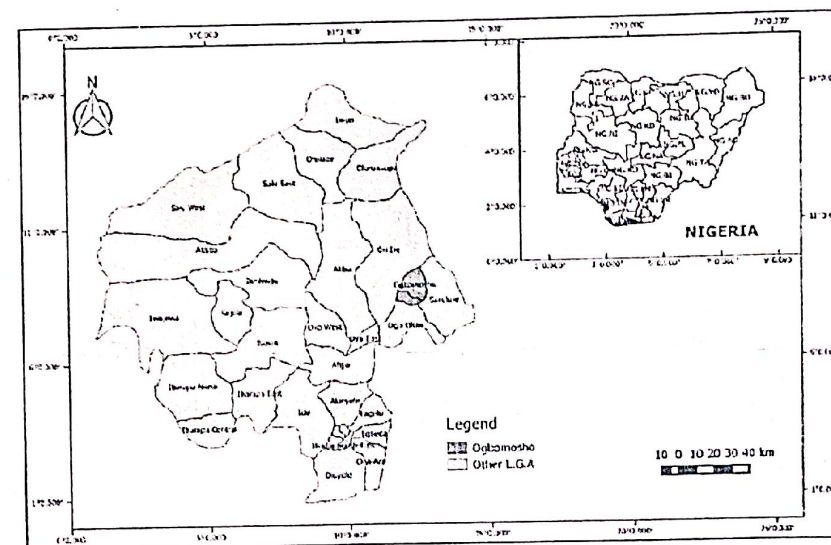


Figure 1: Map of Ogbomosho North Local Government Area.
Source: Oyo State Ministry of Lands (2016).

Materials and Methods

The data required for this study include socio-economic characteristics of respondents, impact of sand mining on socio-economic development and sustainability and effects of sand mining on the environment. These data were collected through questionnaire administration. The nature of the study allowed the use of purposive sampling technique within the mining locations in the study area. Therefore, the sample frame consists of people living near the mining sites as well as miner and traders of sand. The Sample size for the study is 120 people out of the estimated population size of 235,710. This was done by sampling the views of the people residing in mine site. In all, Eight (8) locations were visited based on the presence of sand mines. Most of these mine sites were small in sizes with the use of manual tools to excavate sand from it natural configuration and the maximum number of four (4) labourers were employed to load sand into a tipper. The mines were located in the following areas; Egbeda, Iluju, Katagora (abandoned sand mine), Odoje, Onitirin, Samu,

Temidire, and Yaku. Out of these locations, six mine locations were purposively selected for the study, these includes Egbeda, Iluju, Katagora (abandoned sand mine), Onitirin, Temidire and Yaku.

Descriptive and inferential statistics were used for data analysis. The descriptive statistics used includes simple percentage, tables and graphs while inferential statistics used was Analysis of Variance to test if sand mining does contribute significant impact to socio-economic development and sustainability of the study area.

Results and Discussions

The administered questionnaires were retrieved on the spot to maintain high retrieval rate. Out of the 120 questionnaires administered, 112 questionnaires were successfully retrieved and were used to carry out relevant analysis for this study.

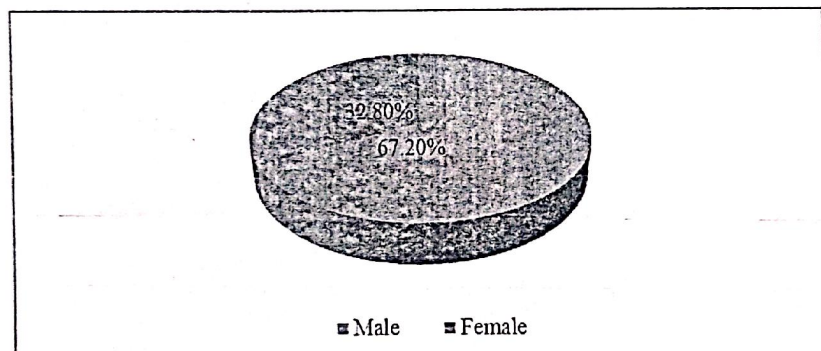


Figure 3: Sex Distribution of Respondents.

Source: Authors' computation (2016).

Majority of the respondents are males with 67.2 per cent and females with 32.8 per cent. This indicates majority of the respondents found in the interviewed area are male (Figure 3).

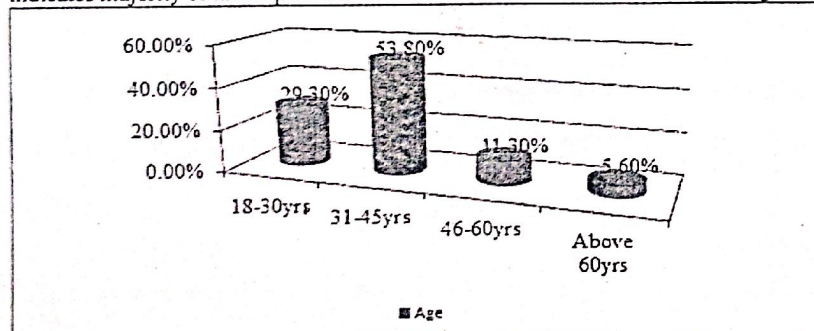


Figure 4: Age Distribution of Respondents.

Source: Authors' computation (2016).

Majority of the respondents, 53.8 per cent fall within the age group of 31-45yrs, 29.3 per cent falls within the age group of 18-30yrs, 11.3 per cent falls within the age group of 46-60yrs while 5.6 per cent are above 60yrs (Figure 4). This implies that the respondent were majorly in the working population category to promote the economic situation of the study area. In fact, the ratio of dependents people was 1:4 making Ogbomoso North Local Government Area economical productive.

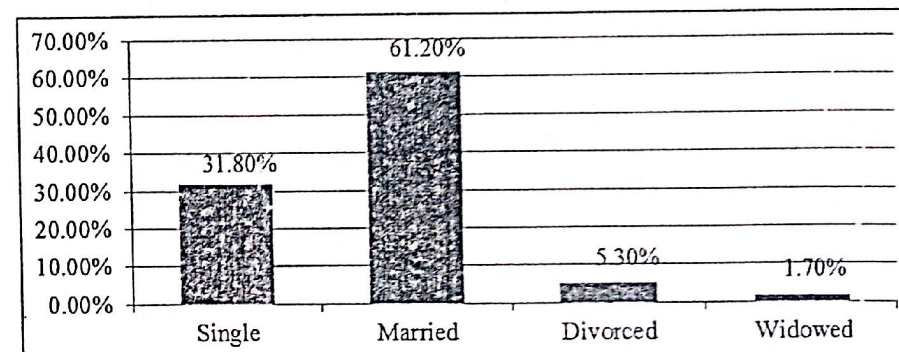


Figure 5: Marital Status of Respondents.

Source: Authors' computation (2016).

Majority of the respondents with 61.2 per cent were married, 31.8 per cent were single and 5.3 per cent were divorced while 1.7 per cent were widows (Figure 5). This means that majority of the people in the study area were highly responsible, family men and women are fully engaged in productive works which contributes to socio-economic development of Ogbomoso North.

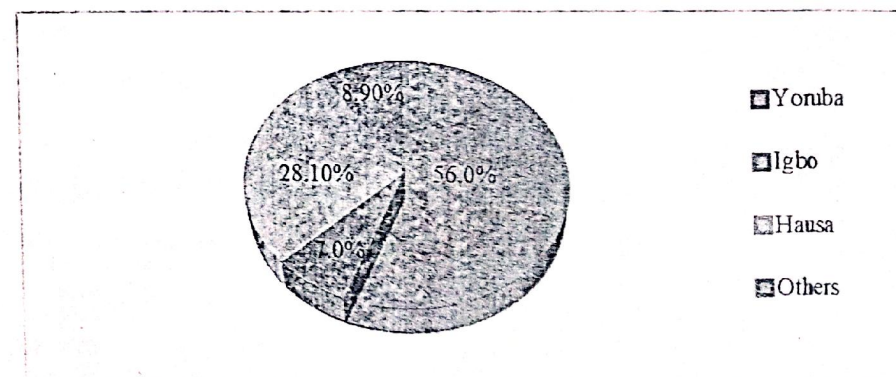


Figure 6: Ethnic Distribution of Respondents.

Source: Authors' computation (2016).

Majority of the respondents with 56.0 per cent were Yoruba, 28.1 per cent were Hausa, and 7.0 per cent were Igbo's while 8.9 per cent were other tribes as shown in figure 6. The study was taken in southwestern part of Nigeria (Ogbomoso North), where the dominant tribe is the Yoruba speaking people.

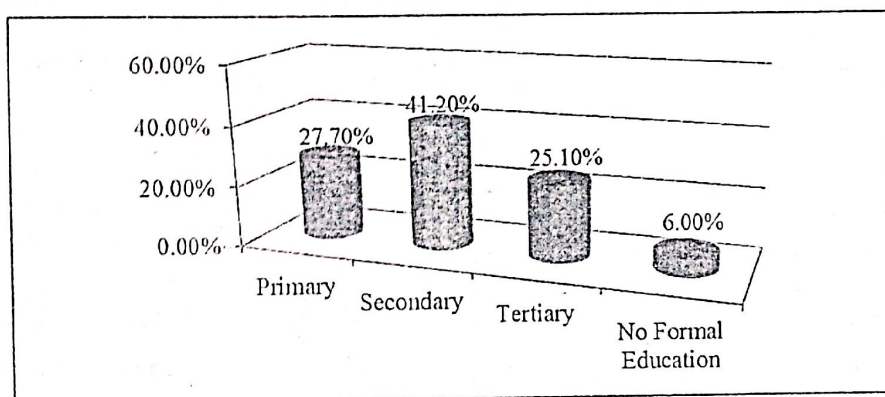


Figure 7: Educational Background of Respondents.
Source: Authors' computation (2016).

27.7 per cent of the respondents have primary school educational background, 41.2 per cent have secondary school background, and 25.1 per cent have tertiary educational background while 6.0 per cent have no formal education background (figure 7). This implies that majority of the respondents had basic education in a ratio of 3:4, which is needed to grow the economy of the study area.

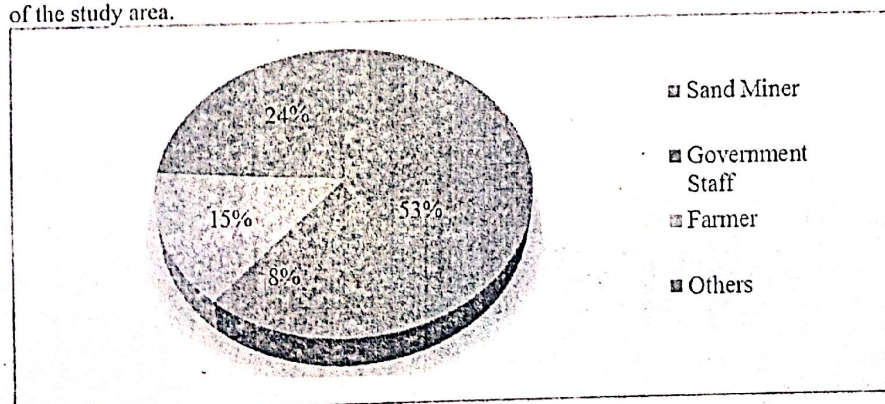


Figure 8: Occupational Profile of Respondents
Source: Authors' computation (2016).

Figure 8 shows that 53.0 per cent of the respondents are sand miners, 15.0 per cent are farmers, 8.0 per cent are government staff while 24.0 per cent of the respondents cut across other professions like traders, teachers, carpenters and so on. This implies that from the selected population within the study area, most of them are entrepreneurs (artisans), creating a source of income for themselves to sustain livelihood.

Factors Responsible for Increased Sand Mining

This section presents the factors responsible for increased sand mining in Ogbomoso North Local Government Area, Oyo State, Nigeria.

Table 1: Distribution of land ownership

Land Ownership	Percentage (%)
Government	39
Individual	38
Others	23

Source: Authors' computation (2016).

It was observed from Table 1 that 39.0 per cent of the lands where sands are mined belong to government, while 38.0 per cent and 23.0 per cent of the land belongs to individual and other people respectively. Other person in this context includes family land ownership, cooperative ownership among others. Respondents also claimed that it is easy to purchase sand from individual who own a piece of land than the government and other land owners, hence individual land owners might have attracted sand mining activities in the study area thereby adding to its economic growth.

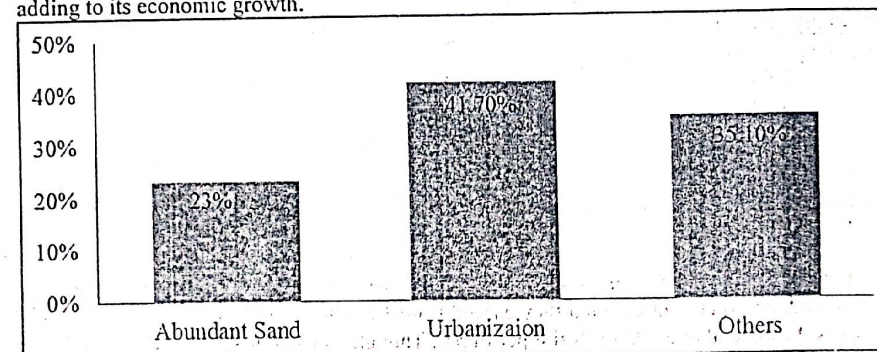


Figure 9: Reasons for increased sand-mining in Ogbomoso North.
Source: Authors' computation (2016).

It was revealed in figure 9 that 41.7 per cent of the respondents claimed urbanization increases rate of sand mining in the study area, while 23.0 per cent claimed it was because of abundant sand in Ogbomoso North Local Government. 35.1 per cent of the respondents claimed it was other factors like quality of sand present in the study area that enhanced sand mining activities. This implies that the population growth rate of the study area is increasing

Economic Importance of Sand Mining and it's Sustainability in Suburb of Ogbomoso

at a faster pace as well as the basic need of various infrastructures such as shelter and roads would be needed to satisfy the increasing population demands; therefore sand and other resources would be needed to create satisfaction.

In order to assess the contribution of sand mining to socio-economic development of Ogbomoso North, response of the respondents who are sand miners (53%) were analysed.

Table 2: Tippers load of sand sold per month

Tippers of sand sold per month	Percentage (%)
1-20	17.50
21-40	32.50
41-60	41.20
Above 60	8.80

Source: Authors' computation (2016).

As shown in Table 2 that 41.2 per cent of the respondents claimed they sell nothing less than 41-60 tippers of sand in a month, 32.5 per cent claimed they sell not less than 21-40 tippers of sand, 17.5 per cent sells within the range of 1-20 while 8.8 per cent of the respondents sell above 60 tippers.

Table 3: Price range earned on a tipper of sand.

Price range earned on a tipper	Percentage (%)
5,000-10,000	58
10,000-20,000	25
Above 20,000	17

Source: Authors' computation (2016).

From Table 3, 58.0 per cent of the miners claimed they earned within 5,000-10,000 Naira per tipper of sand, 25.0 per cent claimed they earned from 10,000-20,000 Naira per tipper, while 17.0 per cent earned above 20,000 Naira per tipper. Though they claimed that the variation in price is determined by the type of sand and the distance from the sand mines to the place where it is needed. This implies that sand miners are doing great in the business because of high patronage from the consumers in the study area which generate huge income to raise their standard of living and afford them a better live.

Table 4: Tax paid to government on sand per month

Tax	Percentage (%)
Below 10,000	69.40
10,000-20,000	30.60

Source: Authors' computation (2016).

69.4 per cent of the miners claimed they paid below 10,000 Naira as tax for a month, while 30.6 per cent claimed they paid from 10000-20000 as tax (Table 4). This implies that the local government benefit from the wealth of the study area by generating revenue from the tax paid. The taxes paid to the local government are used to build basic social amenities and infrastructure to sustain livelihood. It was observed that the miners are earning huge money per tipper of sand sold in a month when estimated. This implies that they are in good position to influence the economy of Ogbomoso North; as tipper owners will recruit labor to help with loading and off loading of sands. This has really influenced the economic status of miners with good standard of living, job opportunities and good investment of money earned on other economic activities.

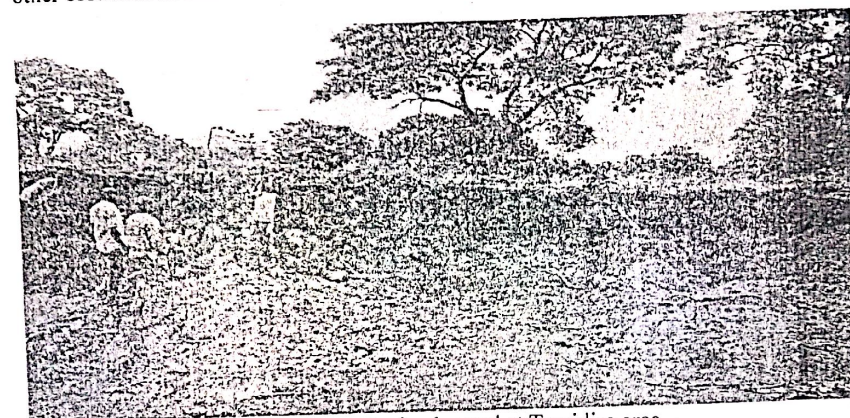


Plate 1: Laborers at work at the sand mine located at Temidire area.

Source: Authors fieldwork (2016).

Impact of Sand Mining on the Environments

The opinions of all the respondents were examined to deduce the impact of sand mining on the environment and the obtained results are as follows:

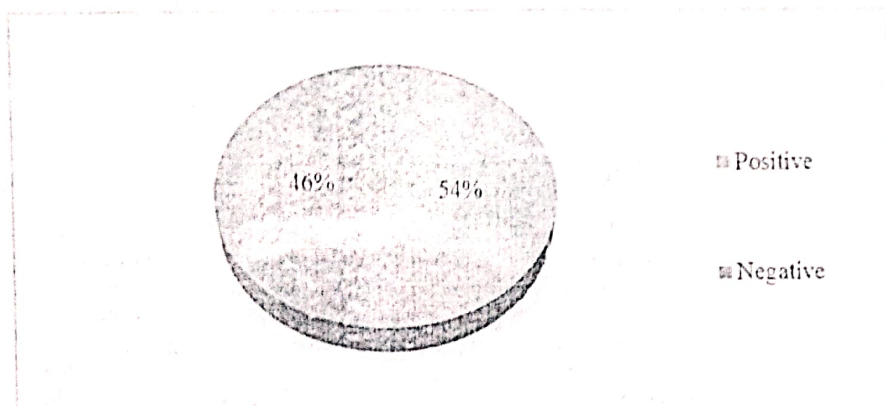


Figure 10: Impact of sand mining on the Environment.

Source: Authors' computation (2016).

From figure 10, 54.0 per cent of the respondents claimed sand mining has positive impact on the environment through employment, tax generation, material for building and construction of shelter, roads etc, while as much as 46.0 per cent of the respondents claimed that sand mining affect the environment negatively via deforestation, land degradation, erosion, road failure as a result of heavy trucks or lorries compacting the soil leading to the closure of pore spaces and finally pot holes filled with water.

Table 5: Positive impact of sand mining in Ogbomoso North

Positive impacts	Percentage (%)
Employment	52
Tax	19.60
Raw materials	28.40

Source: Authors' computation (2016).

Table 5 shows that the residence of the study area attested to the fact that sand mining has raised the socio-economic development of the area through employment with 52.0 per cent, provision of raw materials to satisfy various needs with 28.4 per cent and source of revenue for government through tax with 19.6 per cent.

Table 6: Negative impact of sand mining in Ogbomoso North

Negative impact of sand mining	Percentage (%)
Deforestation	35
Land degradation	43
Soil erosion	18
Others	4

Source: Authors computation (2016).

It was observed in Table 6 that 35.0 per cent responded that the main impact of sand mining in Ogbomoso North is deforestation while 43.0 per cent responded that sand mining causes land degradation. 18.0 per cent attested to the fact that sand mining causes soil erosion while 4.0 per cent claimed that sand mining has other negative impact which includes damages of road due to the soil being compacted and spread of diseases such as malaria.

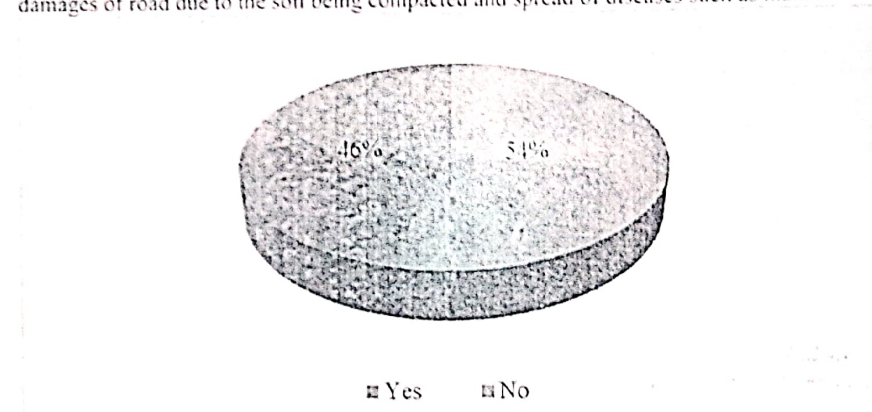


Figure 11: Respondent perception on mitigation measures to negative impact.

Source: Authors' computation (2016).

A large proportion of 54.0 per cent of the respondents agreed that they wanted mitigation measures to be taken for limiting the negative impacts of sand mining on the environment (Figure 11). This implies that although a lot of advantages are gotten from sand mining, yet, it affects the environment by making it deteriorated and degraded.

Table 7: Respondent perception on monitoring of sand mining

	Percentage (%)	
	Yes	No
Proper monitoring of rules	31.50	68.50
Adequate rule enforcement	30.60	69.40

Source: Authors' computation (2016).

It was observed that poor monitoring of rules and inadequate rule enforcement was part of what result into the negative impact of sand mining since 68.5 per cent and 69.4 per cent of the respondents said no, when they were asked whether mining activities were adequately monitored and if mining rules are adequately enforced (Table 7 and Plate 2).