

EFFECTS OF SAND MINING ON PERI-URBAN AGRICULTURE IN IFE EAST AND IFE CENTRAL LOCAL GOVERNMENT AREAS, OSUN STATE, NIGERIA

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ABSTRACT

There is virtually no information on the effects of artisanal sand mining on peri-urban agriculture in Nigeria in general and Osun State in particular. This study assessed the effects of sand mining on peri-urban agriculture in Ife East and Ife Central Local Government Areas of Osun State during 2015-2019. In effect, the study sought to identify and explain the rate and extent of changes in land uses in the study area, evaluate the level of encroachment of sand mining activities into other land use classifications, and examine socio-economic factors that determined parting of land for sand mining by landowners in the study area between 2015 and 2019. Data were generated from both primary and secondary sources. Multi-stage sampling technique was used to collect primary data from 60 landowners, 30 cultivators and 30 residents giving a total of 120 respondents using structured questionnaire. Mean ages of landowners, farmers and residents were 67.9 years, 39.6 years and 47.3 years respectively. Majority (68.3%) of landowners had no formal education, while majority (73.3%) and (90%) of farmers and residents had formal education. Majority (68.3%) of landowners were farmers while majority (66.7%) and (76.7%) of farmers and residents were employees of governments. Majority (93.3%) of landowners were males, 100% of farmers were males. Cultivated land area decreased from 48% to 23.2% (-24.8%), built-up area increased from 37.3% to 41.8% (4.5%) while sand-mined area substantially increased from 14.6% to 35% (20.4%). Parting of land for sand mining increased with increasing age, household size and primary occupation being farming while parting of land for sand mining decreased with higher level of education. It is therefore recommended that all levels of government in the country should embark on close monitoring of land use to prevent frequent occurrence of land and environmental degradation. Additionally, Land Use Act of 1978 should be reviewed by bringing all stakeholders together to deliberate on how to prevent multiple land ownership and conflicts.

Key words: sand mining, agriculture, peri-urban agriculture, Ife East and Ife Central

INTRODUCTION

The natural environment is the store of natural resources of the earth which man harnesses to satisfy some of his needs. Over the years, human activities have affected the natural environment, thus, threatening its sustainability and regenerative capacity (National Academy of Sciences, 2020). Sand mining is one of such human activities, and if it is carried out uncontrolled, can result into negative consequences for the natural environment. Sand mining is the scooping of sand from portions of the earth surface for construction and other developmental purposes (Ohaeri *et al.*, 2021). Studies have shown that the negative environmental effects of unguided and small-scale sand mining in most developing countries far outweigh the socio-economic benefits (Narh, 2016; Baba, 2017; Mohammed, 2017; Ohaeri *et al.*, 2021). Some of the reported negative effects of unguided sand mining include environmental degradation, water pollution, soil structure destruction, soil erosion facilitation with abandoned pits acting as breeding grounds for water-related diseases and death-traps (Jonah *et al.*, 2015; Narh, 2016; Baba, 2017).

Environmental degradation, is one of the leading topical issues today that is receiving global attention because of severe devastations it has caused in several countries of the world. This degradation is often linked to the production and consumption patterns of goods and services in the society, as well as misallocation of land, water and other environmental resources among various uses and users (Ministry of Mines India, 2018). This degradation has resulted into negative environmental externalities or external diseconomy. Environmental quality changes caused by the effect of externalities may increase production costs of producers. Land degradation, a part of environmental degradation, refers to the reduction or loss of the biological or economic productivity of cropland, pastures, forest and woodlands. It is any process that lowers the productivity of land, assuming other factors such as technology, management and weather remain constant (Wainaina *et al.*, 2022). One fundamental environmental challenge hindering crop production in many peri-urban areas in Nigeria is the unguided mining of sand in such areas. Sand mining in agricultural land,

particularly in peri-urban areas is a major source of land degradation in the country. Because it is often carried out without proper guidelines, it is said to be responsible for considerable environmental damage, vegetation clearing, soil erosion and landslides (Wainaina *et al.*, 2022). Next to water, sand is the most consumed natural resource. Global demand for sand and gravel stands between 40 and 50 billion tons annually as a result of increase in urbanization and industrialization (United Nations Environment Programme, 2019). This is with attendant environmental, political and social consequences. Negative effects of sand mining are particularly likely where there are no local regulations, when their enforcement is weak, or absent, or when the underlying ecological, geological and hydrological dynamics of the extraction site are misunderstood or ignored (UNEP, 2019).

In many African countries in general and Nigeria in particular, traditional leaders, community chiefs and private land owners sell community lands within their domains to miners without consideration for other land users (Arowosegbe, 2017). This is as result of increase in demand for sand for construction purposes which places enormous pressure on the environment particularly with negative competing effects on agricultural land in the peri-urban areas. Trade-off in the competing uses of land in the peri-urban areas for agricultural and mining purposes, therefore, requires urgent attention of resource economists, local government administrators and policy makers in order to prevent occurrence of food insecurity in the continent of Africa in general and Nigeria in particular. The trade-off is between physical development of land spaces and natural resource degradation posed by uncontrollable excavation of sand, particularly in peri-urban areas.

Peri-urban agriculture is a common practice in Africa. It encompasses horticulture, crop production, animal husbandry, aquaculture, and forestry that take place within or on the periphery of the city (Bonye *et al.*, 2021). It has become a source of livelihoods, incomes, fresh and nourishing produce, poverty reduction for many and contributes to one fifth to two thirds of total household food supplies as a result of declining incomes of urban households and high rates of urbanization (Bellwood-Howard *et al.*, 2015). Peri-urban agriculture relies on readily availability of land, water, and labour within the city areas. It can be diverse in scope and scale and it plays an important role in land use intensification around the peripheries of cities. Globally, about 200 million urban and peri-urban dwellers participate in this agriculture. In Africa, there are many constraints that deter cultivators from deriving maximum benefits from the practice of peri-urban agriculture. These constraints include but not limited to misconception, lack of access to land, increase in urbanization, insecure land tenure, intense competition from other land users, and poor attitude of government towards the practice (Alhassan *et al.*, 2021; Bonye *et al.*, 2021).

Although several studies have been conducted with a view to showing the impacts of sand mining on the environment in some parts of Nigeria, there is paucity of information about the emerging problems of sand mining in agricultural land spaces in the country. Therefore, the need to provide solution to land degradation caused by the activities of artisanal sand miners in urban and peri-urban agricultural land spaces is the attraction for this study. Existing literature on urban and peri-urban agriculture centers commonly on issues of urban expansion impacts, drivers of sustainable intensification, urban and peri-urban agriculture as a pathway to food security, dynamics and sustainability of the concept with or without any mention of inhibiting factors like sand mining (Chihambakwe *et al.*, 2018; Kurgat *et al.*, 2018; Bonye *et al.*, 2021; Mangah *et al.*, 2021). The extensive damage to agricultural land spaces by uncontrolled sand mining threatens to food security of the ever-increasing urban population, hence this study. This study was conducted on this premise. Assessment of the effects of sand mining on peri-urban agriculture in Ife East and Ife Central Local Government Areas (LGAs) would provide useful bedrock information for other researchers with a view to alleviating the negative impacts of unguided sand mining in the country. The broad objective of the study was to assess the effect of sand mining on peri-urban agriculture in Ife East and Ife Central LGAs. Specifically, the study described the socio-economic characteristics of the respondents, identified the land use classifications of the study area in 2015 and 2019, evaluated changes in land use classifications within the study period (2015-2019), determined socioeconomic factors influencing parting of privately owned lands for sand mining by landowners.

METHODOLOGY

Study Area

The study covered Ife East and Central LGAs. The two LGAs are located within Ile-Ife Township in Osun State, southwest geopolitical zone of Nigeria and contain a population of 355,818. The population of Ife East LGA was 188,027 that of and Ife Central LGA was 167,254 as at population census of 2006 (NPC, 2006). Ile-Ife is located by latitude 7°28' N and longitude 4°34' E. The area is surrounded by rural settlements where agriculture is the major occupation of the people. The town falls under the tropical savannah climate and witnesses two major seasons, dry and rainy seasons. The average humidity level of the LGAs is 59% with an average temperature of 28 °C. Ile-Ife itself is highly commercialized. The headquarters of Ife East LGA is located in Oke-Ogbo while the Ife Central LGA's headquarters is at Ajobandele. Ife East covers a total area of 172 sq. km while Ife Central covers a total area of 111 km (<http://www.manpower.com.ng>). These two LGAs are hotspots for sand mining activities and peri-urban agriculture is a common agricultural practice.

Sampling Procedure

Multi-stage sampling technique was adopted for the survey. At the first stage, Oke-Ogbo and Opa communities were purposively selected from Ife East and Ife Central LGAs, respectively because of the prevalence of artisanal sand mining activities. At stage two, Agogo and Ile-Funfun were purposively selected from Oke-Ogbo and Opa communities, respectively as smaller communities which fall in peri-urban areas of Ife East and Ife Central LGAs where artisanal sand mining activities and peri-urban agriculture are common practices. At the final stage, 30 landowners, 15 farmers and 15 residents were selected from each location, using snowball sampling technique. Thus, a total of 120 respondents (60 landowners, 30 cultivators and 30 residents) were interviewed through personal interview method using pre-tested questionnaire between September and November, 2019. Agogo and Ile-Funfun contain one enumeration area each and their respective population sizes as at 2006 were 425 and 428 (NPC, 2006).

Land use classification figures were obtained from the records of the town planning authorities in the two LGAs and also through physical measurements of the area with the assistance of land surveyors in the LGAs. We were advised to limit the study to a five-year period in order to get reliable data and to minimize cost. In view of this, the study period was limited to 2015-2019.

Data Collection

The target population of this study consists of three categories of respondents, *viz*; landowners in the study area who had parted some portion of their lands for sand mining within the last five-year period 2015-2019; those who practice peri-urban farming in the area (only croppers are considered) and residents of the area. Both primary and secondary data were employed in the study. Primary data were obtained from selected households through well-structured questionnaire. The secondary data were obtained both from the records of the town planning offices of the Ife Central and Ife East LGAs and through physical measurements of the area with the help of land surveyors from the LGAs.

Data Analysis

Discriptive statistics such as percentages, frequencies and means were used to describe the socio-economic characteristics of the respondents, identify the land use classifications of the study locations in 2015 and 2019 respectively, evaluate the level of encroachment of sand mining activities into land use classifications between 2015 and 2019. Logit regression model was used to determine socio-economic factors influencing parting of privately owned lands for sand mining by landowners.

Model Specification

The logit model for determining the factors influencing parting of privately owned lands was specified thus:

$$\ln\left(\frac{p}{1-p}\right) = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + \mu;$$

where \ln is base of natural logarithm, p is probability that a respondent parts land, a is constant of the equation, b_1 - b_7 are coefficients of the predictor variables, X_1 is age of the landowner (years), X_2 is educational level (years), X_3 is marital status (married is 1), X_4 is household size (number), X_5 is non-farm income (₦), X_6 is gender (male is 1), X_7 is primary occupation (farming is 1), and μ is error term.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of the Respondents

Socio-economic characteristics of any society assist in understanding the type and nature of their livelihoods and social life for ease of decision making. The socio demographic characteristics of the three categories of respondents are presented in Table 1.

Majority (68.3%) of the landowners belonged to the age group 61-70 years, most(56.7%) of the farmers belonged to age group 31-40 years while majority (73.3%) of the residents were within ages 41-60 years. These results are consistent with the findings of Bellwood-Howard *et al.* (2015) who reported that majority of landowners in the peri-urban agricultural land spaces in Tamalearea of Ghana and Ouagadougou, Burkina Faso were old men who inherited land through family lineage. Also,

Table 1: Socio-economic characteristics of the respondents

Variable	Landowner	Farmer	Resident
Age (years)			
31-40	3 (5%)	17 (56.7%)	5 (16.7%)
41-50	6 (10%)	6 (20%)	10 (33.3%)
51-60	10 (16.7%)	4 (13.3%)	12 (40%)
60-70	41 (68.3%)	3 (10%)	3 (10%)
Total	60	30	30
Mean age	67.7	39.6	47.3
Gender			
Male	56 (93.3%)	30 (100%)	15 (50%)
Female	4 (6.7%)	0 (0%)	15 (50%)
Marital status			
Married	34 (56.7%)	26 (86.7%)	23 (76.7%)
Single	26 (43.3%)	4 (13.3%)	7 (23.3%)
Social status			
Chief	38 (63.3%)	-	-
Ordinary individual	22 (36.7%)	-	-
Education level (years)			
No formal education	41 (68.3%)	8 (26.7%)	3 (10%)
Primary	11 (18.3%)	3 (10%)	7 (23.3%)
Secondary	7 (11.7%)	9 (30%)	8 (26.7%)
Tertiary	1 (1.7%)	10 (33.3%)	12 (40%)
Primary occupation			
Trading	12 (20%)	4 (13.3%)	3 (10%)
Farming	41 (68.3%)	6 (20%)	4 (13.3%)
Employee	7 (11.7%)	20 (66.7%)	23 (76.7%)
Household size (number)			
1-5	8 (13.3%)	20 (66.7%)	21 (70%)
6-10	43 (71.7%)	6 (20%)	7 (23.3%)
11 and above	9 (15%)	4 (13.3%)	2 (6.7%)
Average family size	7	4	4

Field Survey Data, 2019

Manga *et al.* (2021) noted that most vegetable producers in peri-urban spaces in Yaounde city belonged to the age group 40-49. As an integral part of agriculture, peri-urban farming is labour-intensive. It requires certain field operations such as land preparation, maintenance, harvesting and packaging. These activities can only be handled by energetic and physically active men and women. This is evident by the result of this study in which most (56.7%) of the peri-urban farmers were found to be in their economic active years.

The mean ages of the landowners, farmers and residents in the study locations were 67.9 years, 39.6 years and 47.3 years, respectively. The mean age of landowners found here is contrary to the finding of Daudu *et al.* (2021) who reported that the mean age of male headed household landowners in southwestern Nigeria was 54.67 years. The mean age of the farmers found in this study is consistent with the finding of Kurgat *et al.* (2018) who noted that peri-urban farming activities are arduous tasks which can only be handled by abled-body young men and women. The findings of this study suggest that the landowners were relatively old while the farmers were in their active years. The demographic age distribution of the landowners in the study area could be taken as the reason for parting land for sand mining since it is a quick source of financial benefit compared to parting of land for peri-urban farming.

Majority of the landowners (93.3%) and farmers (100%) were male while 50% of residents were male respectively. These results are in consonant with the findings of Asadu *et al.* (2019) who noted that male constituted the larger proportion of landowners and farmers in five agrarian communities in Anambra State, Nigeria. Akukwe (2020) also reported similar finding on household food security and its determinants in agrarian communities of southeastern Nigeria. This finding suggests that land inheritance in Ile-Ife is patrilineal as was found in Anambra State.

Majority (63.3%) of the landowners were Chiefs or Baales. Chiefs and Baales usually have direct access to family lands in Ile-Ife and its environs. Majority (68.3%) of the landowners had no formal education. On the other hand, majority (73.3%) of the farmers and majority (90%) of the residents had formal education. These findings are in consonance with those of Bellwood-Howard *et al.* (2015) that majority of landowners in Tamale (Ghana) and Ouagadougou (Burkina Faso) had no formal education, but majority of peri-urban farmers in the two locations were found to have some level of formal education.

Majority (68.3%) of the landowners were farmers, 66.7% and 76.7% of the peri-urban farmers and residents in the study locations were employees of governments or privately owned businesses. These findings suggest that the majority of the landowners in the study area might not have had regular sources of income and that could have been the reason they opted for parting of land for sand mining for quick

money. The mean household sizes of the landowners, peri-urban farmers and residents were 7, 4 and 4 persons respectively. This finding shows that the landowners whose majority were farmers had large household size and by extended application, the household heads had more mouths to feed, and hence the need to look outside farming work for money to cater for the family. On the other hand, large household size is an advantage to farmers in terms of family labour force assistance on the farm. Farmers in the southwestern Nigeria were equally found to have large family sizes (Daudu *et al.*, 2021) while peri-urban farmers in Yaounde city were found to have small household size (Manga *et al.*, 2021).

Identification Of Land Use Classifications (ha) in Peri-Urban Area of Ife East and Ife Central LGAs between 2015 and 2019

Three main land use classifications were identified in the study locations in year 2015; these are: cultivated area, built-up area and mined area. These are presented in Table 2. As at 2015, 47.5% and 48.6% of the total land area were used for cultivation purposes in Ile-Funfun and Agogo, respectively; 38.6% and 36.2% of the two locations had been built-up while 14% and 15.2% were already sand-mined. These figures imply that 492 hectares (48%), 382 hectares (37.3%) and 150 hectares (14.6%) of the total land area in the two locations were already cultivated, built-up and sand-mined, respectively as at 2015. These land use classifications suggest that much development had not taken place in the study area as at 2015 and that peri-urban farming was the dominant land use covering approximately 48% of the total land area in the study area.

As at 2019, the three land use classifications in the study area are presented in Table 3. In 2019, 25.4% and 21.4% of the total land area were used for cultivation in Ile-Funfun and Agogo respectively, 43.6% and 40.2% had been built-up while 30.9% and 38.4% were already sand-mined. These figures imply that 238 hectares (23.2%), 428 hectares (41.8%) and 358 hectares (35%) of the total land area in the study area were used for cultivation, building purposes and sand mining as at 2019. The land use classifications in 2019 implied a drastic reduction in peri-urban farming, a marginal increase

Table 2: Land use classifications in peri-urban area of Ife East and Ife Central Local Government Areas (LGAs) in 2015

Location	Cultivated area (ha)	Built-up area (ha)	Mined area (ha)	Total land area (ha)
Ile-Funfun	224 (47.5%)	182 (38.6%)	66 (14%)	472
Agogo	268 (48.6%)	200 (36.2%)	84 (15.2%)	552
Total	492 (48%)	382 (37.3%)	150 (14.6%)	1024

Field Survey Data, 2019

Table 3: Land use classifications in peri-urban area of Ife East and Ife Central Local Government Areas (LGAs) in 2019

Location	Cultivated area (ha)	Built-up area (ha)	Mined area (ha)	Total land area (ha)
Ile-Funfun	120 (25.4%)	206 (43.6%)	146 (30.9%)	472
Agogo	118 (21.4%)	222 (40.2%)	212 (38.4%)	552
Total	238 (23.2%)	428 (41.8%)	358 (35%)	1024

Field Survey Data, 2019

in built-up area and a monumental increase in sand mining activities. The reduction in peri-urban farm land area suggests a loss of arable land in the peri-urban areato the unguidedsand mining activities, a significant evidence of growth in urbanization. This finding is in consonant with the finding of Bonye *et al.* (2021) who reported that increase in urbanization with increase in demand for construction materials had led to changes in land use in Wa municipality, Ghana. Increase in demand for sand, gravel and stone implies an increase in sand/gravel mining activities at the detriment of agricultural activities and a resultant reduction in food security of people in urban and peri-urban areas. A similar finding was reported by Mngeni *et al.* (2016) in their study of the effects of sand mining on rural communities of the wild coast of South Africa. They reported that sand mining carried out in an unguided manner portends negative consequences for land in the rural communities.

Evaluation of Changes in Land Use Classifications in Peri-Urban Area of Ife East and Ife Central LGAs between 2015 and 2019

The magnitude of changes in land use classes in peri-urban area of Ife East and Ife Central LGAs between 2015 and 2019 is depicted in Table 4. The table shows thatcultivated areas in the two study locations declined inmagnitude. In Ile-Funfun, cultivated area declined from 47.5% to 25.4% (-22.1%) while in Agogo, it declined from 48.6% to 21.4% (-27.2%). The built-up area in Ile-Funfun marginally increased from 38.6% to 43.6% (5%) while it increased from 36.2% to 40.2% (4%) in Agogo. On the other hand, the sand-mined area substantially increased from 14% to 30.9% (16.9%) in Ile-Funfun and it increased from 15.2% to 38.4% (23.2) in Agogo. In relation to the entire study area, cultivated area substantially decreased from 48% to 23.2% (-24.8%), built-up area increased marginally from 37.3% to 41.8% (4.5%) while sand-mined area increased from 14.6% to 35% (20.4%). The implication of the general decrease in magnitude (-24.8%) of the cultivated area is that land uses lose land to sand mining in a larger proportion compared to built-up area. This implies that cultivable land for peri-urban farming was losing close to 5% of its total land extent annually to other land uses, largely due to sand mining activities in the study area between 2015 and 2019. The implication of the positive magnitude of change (20.4%) for land use devoted to sand mining is that

land use for sand mining was encroaching into land uses for other purposes, particularly cultivated area by about 4% of its total land extent. These findings are in consonant with that of Abass *et al.* (2018) who observed and recorded that growth in peri-urbanization had resulted into loss of arable land and natural vegetation in Kumasi Metropolis, Ghana.

Although there are socio-economic benefits that can be derived from sand mining activities in any nation, a wide range of adverse environmental and socio-economic impacts are equally associated with these small-scale mining activities (Sumani, 2019).

Socio-Economic Factors Influencing Parting of Land for Sand Mining by the Landowners

Logit model was used to examine the socioeconomic factors that influence parting of privately owned land for sand mining by landowners. The estimated relationship is presented in Table 5. The chi-square was 60.02 and it is significant at 1%. This shows there is relationship between the socioeconomic characteristics of the landowners and their decision to part land for sand mining. The null hypothesis of no relationship between parting of land with the independent variables is rejected.

From the analysis, the pseudo *R* square was 0.4256. This shows that there is a relationship of 42.56% between the predictors and the predictions. It implies that about 42% of the likelihood of the landowners parting of land for sand mining is explained by the independent variables. None of the independent variables had a standard error (SE) greater than 2, this confirms the absence of numerical problem of multi-collinearity among the independent variables.

The result of the analysis shows that the coefficient of age was significant at 5% and positively related to parting of land for sand mining. The positive sign of the coefficient is in consonant with the *a priori* expectation. This implies that if the parting of land for sand mining results into immediate and greater income than giving a land for peri-urban farming for landowners, the landowner is 18.12% more likely to part land for sand mining. This result is expected. Elderly landowners who are economically inactive may see parting of land in their possession for sand mining as a better way of earning income for family sustenance. Compared to parting of land for agricultural purposes, a portion of land given out to sand mining is certainly going to yield higher and quicker money to a landowner in southwestern Nigeria. This finding contrasts with Govindaraj *et al.* (2013) who reported that elderly farmland owners were attached more to their land and considered the land as an asset and declined to part their land for sand mining.

The result also reveals that the coefficient of educational level was significant at 5% level and negatively related to parting of land for sand mining. The negative sign of the coefficient is in consonant with the *a priori* expectation. This implies that as the educational level of landowners increases, they are 16.24% less likely to part land for sand mining as

Table 4: Changes in land-use classifications in peri-urban area in Ife East and Ife Central LGAs between 2015 and 2019

Location	Cultivated area (ha)		Built-up area (ha)		Mined area (ha)		Total land area (ha)
	2015	2019	2015	2019	2015	2019	
Ife-Funfun	224	120	182	206	66	146	472
	47.5%	25.4%	38.6%	43.6%	14%	30.9%	
Agogo	268	118	200	222	84	212	552
	48.6%	21.4%	36.2%	40.2%	15.2%	38.4%	
Total	492	238	382	428	150	358	1024
	48%	23.2%	37.3%	41.8%	14.6%	35%	

Field Survey Data, 2019; LGAs - Local Government Areas

Table 5: Socio-economic influencing parting of lands for sand mining by landowners

Variable	Estimated coefficient	Standard error	Z -value	Marginal effect
Age (years)	1.405	0.684	2.40	0.181**
Education (years)	-0.006	0.596	-2.04	-0.162**
Social status	0.511	0.518	1.00	-0.000
Household size (number)	0.104	0.054	1.76	0.022**
Primary occupation (farming is 1)	0.206	0.066	3.08	0.026**
Gender (male is 1)	-0.008	0.044	-0.26	-0.001
Marital status (married is 1)	0.248	0.625	0.42	0.029
Constant	1.508	1.421		
Log likelihood	50.655			
Likelihood Ratio chi 2 (10)	60.020			
Prob > chi 2	0.000			
Pseudo R ²	0.4256			

Field Survey Data, 2019. ** - significant at 5%

against the giving of land for peri-urban agricultural practices. Education brightens human reasoning of a landowner and it adds to his human capital development. It plays an important role in the decision to part land among different uses, particularly when the use to which such land is put can lead to degradation. Higher education leads to better understanding on the importance of land and can deter landowners from parting their land for unguided sand mining which can result into an uneasily reversible land degradation. However, landowners in this study area with low level of education are those with large family size. This large household size implies that the landowners will need quick financial sources to cater for the large number of people in the household as a result of high consumption expenditure in the country. This finding is at variance with the finding of Daudu *et al.* (2021) who reported that majority of farmers who owned their lands in southwestern Nigeria were literate with an average of 8.7 years of schooling.

The result further shows that the coefficient of household size was significant at 5% level and positively related to parting of parting of land for sand mining. This result is in agreement with *a priori* expectation. It implies that if the household size of landowner increases, the landowner is 2.21% more likely to part land for sand mining. This is because landowners with large household sizes will require large amount of money to cater for large family sizes in terms of high consumption expenditure on children school fees, hospital bills, feeding expenses, and many more. This finding agrees with Okeke *et al.* (2015) who reported that yam entrepreneurs with large family size in Benue had high dependency ratio which translates to more consumption expenditure.

The coefficient of primary occupation was significant at 5% level and positively related to parting of land for sand mining. The positive sign of the coefficient agrees with the *a priori* expectation.

It implies that if the primary occupation of a landowner is farming, the landowner is 2.64% more likely to part his land for sand mining as against parting it for agricultural purposes. This is because sand mining can easily translate to quick money to the landowner as compared to parting the land for farming. This finding agrees with the finding of Sumani (2019) who reported that majority of landowners who gave out their lands for sand and gravel mining in Danko, upper west region of Ghana were farmers.

CONCLUSION

The study examined the effects of sand mining on peri-urban agriculture in Ife East and Ife Central LGAs. The study revealed that agricultural land in peri-urban area in these LGAs had lost major part of its space to evidences of urban growth and development. The study particularly attributed the loss of agricultural land space in the area partly to growth in built-up residential area and mainly to the unguided activities of sand miners between 2015 and 2019. Sand mining activities had encroached deeply into area that was previously devoted to peri-urban crop cultivation. Physical measurement of the area revealed that huge encroachment into agricultural land in peri-urban Ife East and Ife Central LGAs had resulted to loss of farm land, placing serious constraints on expansion of crop cultivation area.

The study further revealed that age, household size, primary occupation of the landowners in the area positively influenced the parting of land for sand mining while education level of the respondents negatively influenced the decision to part land for sand mining. By extension, elderly landowners who were mostly farmers would be more willing to part land for sand mining than younger landowners because sand mining translates to quick money for a landowner compared to giving of land for crop cultivation. Landowners in the area had large household size and majority of them were farmers and

would be more willing to part land for sand mining. In most cases, farmers in Nigeria need family labour in doing farming work. Also by extension, in order to cater for the large family size, the respondents would need other sources of income and the nearest alternative to farm income source is parting of their lands for sand mining which translates to quick money. On the other hand, landowners who had some level of education would be less willing to part land for sand mining. Education gives enlightenment. Educated landowner would understand the danger of losing land to degradation which may take longer time and huge investment to recover.

Based on these findings, it was recommended that strategies and policies aimed at close monitoring of land use in every part of the country should be put in place by governments to prevent occurrence of land and environmental degradation. It was also recommended that the Land Use Act of 1978 should be revisited and effort should be made to bring in all the stakeholders with the aim of preventing multiple ownership of land, land related conflicts and misuse.

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