

**MINING AND ITS ENVIRONMENTAL IMPLICATIONS: A  
CASE STUDY OF IRON ORE MINING, ITAKPE, KOGI  
STATE**

**BY**

**UMANA, UKEME OKON**  
**(PGD/GEO/99-2000/109)**

**DEPARTMENT OF GEOGRAPHY, SCHOOL OF SCIENCE  
AND SCIENCE EDUCATION FEDERAL UNIVERSITY OF  
TECHNOLOGY MINNA, NIGER STATE.**

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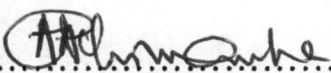
## CERTIFICATION

This is to certify that this project report was carried out by **UMANA,U.O**  
of the Department of Geography, Federal University of Technology, Minna.

.....

Student Signature

.....  
Date

.....  


.....  
25/09/01

Dr. A. Okhimamhe

Date

(Project Supervisor)

.....  


.....  
27/9/2001

Dr.M.T.Usman

Date

(Head of Department)

.....

External Examiner

.....  
Date

## DEDICATION

To the Almighty God, the absolute supreme being of the universe for his gifts of strength, knowledge and discernment and courage to move forward.

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## **ABSTRACT**

Sequel to government identification of Solid Minerals as a supplementary source of national income, there has been a divergence from over dependence on petroleum resources and solid mineral exploitation has continued to receive increasing attention in Nigeria.

The study which seeks to ascertain the mining activities and their antecedents implications on the environment covers the Itakpe Iron Ore Mining Project located at kilometer 15 along Lokoja – Okene road in Kogi State.

Questionnaires were given out in the area to study the extent of the damage on the environment and the response given by the residents of the area was used. The study evaluates the adverse effects of mining on the environment and proffers possible recommendations which will help minimize these effects and avoid them reoccurring on other parts of the country where such activity may be carried out.

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# **CHAPTER ONE**

## **1.0 INTRODUCTION**

### **1.1 BACKGROUND**

Mining activities involves the extraction of mineral resource from the earth's surface and or surface waters and from well through methods such as open cast or surface or strip mining or beneath the earth's surface (Underground mining) for economic purposes. The mineral resources that have been and are still being mined include fossil fuels e.g. crude oil, natural gas and coals; industrial minerals and rocks such as clays, kaolin bauxites, glass sand, limestone; metallic ores such as iron ore, tin ore , galena (lead sulphide) sphalerite (zinc sulphide) precious stones such as gold copper, silver and construction/building minerals such as laterite , sand and granite.

The mining sector contribute significantly to the socio-economic development of many countries, providing raw materials for local industrial and for export e.g. phosphates for the production of industrial chemicals and fertilizers, lead for use in automotive batteries ammunitions and pigments, iron for the construction and transportation industries, gold for electronic equipment jewelry and medicinal use and coal for combustion in steam boilers or metallurgical coke ovens facilitating the provision of

infrastructures such as roads and the opening up of other wise remote areas as well as providing employment opportunities.

Mining is an integrated multi-phasal activity comprising distinct designated phases such as reconnaissance, prospection, exploration, ore and mining processing and mine closure respectively irrespective of the mining techniques employed.

However, mining activities cause considerable adverse impacts such as:

1. Destruction of the natural landscape
2. Pollution of surface and ground water
3. Air pollution (particulate and gaseous emission)
4. Hazardous waste management problems.

Not withstanding the fact that the hazards of mining to the environment are known and recognized in most developing countries there is lack of coordinated effort to assess the environmental impact of mining or the preparation of a guideline (s) to enable governments and mining companies undertake appropriate environmental practice.



### **1.1.2 MINING AND ITS DEVELOPMENT TECHNIQUES**

The use of mineral material and thus mining dates back to the earliest stages of man's history as shown by artifacts of stone, pottery and gold ornaments.

Archeological discoveries indicate that mining was practiced in pre historic times, apparently the first mineral man used was flint, largely for weapons, manganese ore and chalk were also mined and used as pigments. Gold was one of the first metals utilized being mined from streambeds of sand and gravel where it occurred as a pure metal because of its chemical stability. Copper although less stable occurs in native form and was the second metal discovered and used. Silver was also found in a pure state and at one time was valued more highly than gold.

One of the earliest evidence of building with quarried stone was construction (2600BC) of the great pyramids in Egypt (Khufu), the largest of which is 230m (750ft) on a side and contains approximately 2,300,000 blocks of two types of limestone and red granite. The stone is believed to have been quarried from across the River Nile.

One of the most complete early treatments of mining methods in Europe was by a German Scholar AGRICOLA GEORGIUS, he described detailed methods of diving shafts and tunnels. Soft ore and rock were

laboriously mined with a pick and hammer, wedges or heat. The heat fractured the rock because of thermal expansion or other processes depending on the type of rock and ore. The products of mining are not only basic to communal living as construction, mechanical and raw materials but salt is necessary to life itself and the fertilizer mineral are required to feed a populous world.

### **1.1.3 MINING ACTIVITIES IN NIGERIA**

According to Clark (1992), mining is defined as a deep excavation in the earth by under ground workings, to extract minerals-metals and metallic ores. A distinction is sometimes made between mining (also termed deep mining), by underground workings and quarrying (also termed surface mining), conducted at the surface (pit quarry). Open cast mining is associated with extensive surface working extent.

Mining started of the Europeans and even the Arabs who preceded them. It was carried out by traditional methods with locally available technology. Gold, clay, iron ore, tin, salt and soda were among the most important minerals worked. The minerals are used in body adornment, fabrication of weapons, tools and vessels for building construction and in the diet etc. thus, mining occupied a highly respected position in the traditional

economics of large parts of Nigeria and contributed greatly to intra-tribal and inter tribal commerce as well as conflicts.

Following the arrival of the British in the last century, the number and variety of minerals mined in Nigeria increased and commercial scale mining commenced. Other minerals which occur in Nigeria include petroleum, natural gas, coal, limestone, lead, zinc, sand, feldspar, diamonds, sapphire, gemstone, tantalite, marble, columbite, zircon and uranium. The minerals can be classified into 3 groups for convenience:

- (a) Fuel minerals: Coal, lignite, petroleum, natural gas, uranium.
- (b) Metallic minerals: Cassiterite, gold, columbite, iron and tantalite.
- (c) Industrial minerals: Limestones, marble, gypsum, gravel, feldspar and sand.

### **IRON ORE**

Most of the iron ore so far discovered in Nigeria occurs in Kogi, Benue, Kaduna and Anambra States. The reserves are estimated at well over 120 million tonnes. They have been considered large enough to warrant the establishment of a major iron and steel works in the country. Following the survey in 1972 of iron ore deposits at Itakpe less than 10 km away from Ajaokuta in Kogi State.

#### 1.1.4 HISTORICAL BACKGROUND OF ITAKPE

Mining is considered to be a very ancient type of human industry. At an early stage, the survey were still primitive, drilling techniques were not yet developed and geophysical methods did not exist at all.

This is particularly the case for the Itakpe mining project. The Itakpe hill which is named after an Igbira traditional priest called " Itakpe "had been recognized as an important source of iron ore since 1905 and was already mined by local ancient forefathers, probably at the beginning of the Precambrian Era. Iron implements were produce in small "furnaces" and till date there are piles of clay around Itakpe hill which were used to blow air into the furnace from goat-skin blower (bellows). This was already a direct reduction process using charcoal as reduction agent. The mud hut of the priest "Itakpe" located at the summit of the hill at about 400m above sea level had to give way for mining development in 1982. Samples of clay pipes, iron slags, round quartzite and quartz pepples, probably used for grinding are still scattered as artifacts around all known iron ore site. The Federal Government of Nigeria was led to the idea of setting up Itakpe mine by among other reasons, the positive results obtained as far back as 1963 from aerial photographs interpretation of the federal surveys of Nigeria 1:250,00 series topographic sheet No.246 (Kabba South East). A critical

study of the Canadian aeromagnetic maps, ground mapping by geologist of the defunct Nigerian Steel Development Authority with the assistance of the technological experts of former USSR and the desire of the Federal Government of Nigeria to have an effective steel sector using local raw materials.

Below are the important chronological events that led to the establishment of Itakpe mine.

1. The Federal Government of Nigeria, promulgated decree No.19 on 14<sup>th</sup> April 1971 setting up the Nigerian Steel Development Authority (NSDA) with the following responsibilities.
  - a. Planning, constructing, operation and maintaining iron and steel plants in the country.
  - b. Conducting, managing and co-ordinating surveys, mining operations and other necessary activities for obtaining in Nigeria raw materials of the kind needed for iron and steel production.
  - c. Establishing facilities and conducting tests and operations for ascertaining and improving the qualities and performance of raw materials and processes.



2. In 1979, Decree No. 60 of 18<sup>th</sup> September dissolved the NSDA and established six companies to foster the National Steel industry. Among these companies the Associated ores Mining Company (AOMC) was established to develop the mining. The mining division of the defunct NSDA and it inherited all the responsibilities of NSDA in the filed of mining and production of iron ore and other raw materials for steel making
  - a. To avoid an overlap in function, the supervisory ministry of mines, power and steel rationalized the roles and responsibilities of parastatal under its port folio and in February 1987 A.O.M.C was renamed National Iron Ore Mining Company (NIOMCO). Accordingly, NIOMCO's responsibilities of exploring, exploiting and processing for the Nigerian steel industry were restricted to iron ore.
  - b. To enhance funding of the mine at the stage it was then, the Board of directors of NIOMCO was dissolved by the Ministry of Power and Steel and the named was finally turned to National Ore Mining Project (NIOMP) in March 1992. This resulted in higher productivity and on the completion and successful commissioning of the processing plat in December 1992.

## **1.2 PROBLEM STATEMENT**

The major problem caused by mining in the study area, Itakpe is the reduction in availability of land for proper development. As a result of land use changes due to mining, arable lands which hitherto would have supported agricultural practice have been rendered unfit for this practice. The land shortage is as a result of the extensive landscape destruction and coverage of mining spoils and tailings. There is the issue of soil destruction and removal of the topsoil due to the over burden removal in the process of exploitation.

Faunal and floral habitats have been destroyed and the level of fertility of the soil has been reduced drastically. There is also the case of aesthetic displeasure as the common site is that of hill ranges and boulders which litter the areas. Hence there is need for urgent attention as even the tailings from the concentrations are exposed off at the base of the river Pompomi in the area.

## **1.3 AIMS AND OBJECTIVE**

The aims of this study is to ascertain the adverse effect of mining on the environment making use of questionnaire and reconnaissance survey of



the mining activity going at Itakpe where iron ore mining is taking place.

The objectives of this study are:

1. To examine the mining operation of Iron Ore at Itakpe.
2. To outline the environmental impacts of this activity on both man and his environment.
3. Recommend possible ways of ameliorating this adverse effects and prevent similar occurrence in the future in other parts of the country where iron ore may be exploited

#### **1.4 JUSTIFICATION**

The justification of this work lies in the act of sustainable development which encourage the use of land without jeopardizing the further use of such land for the next generations yet unborn.

Mining activities has led to and is still causing damage to the land hence the need for us to ascertain the extent of damage caused and seek for proper conservation measures as mining activity can not be ruled out in the history of man.

It is hoped that this study will assist decision-makers and a planner in taking decisions as to the effective use of our mineral resources without causing damage to the environment.

## **1.5 DESCRIPTION OF STUDY AREA**

### **1.5.1 LOCATION**

Itakpe which is on latitude  $7^{\circ}42'E$  and Longitude  $6^{\circ}20'N$  is about 500km North East of Lagos and about 50km South of Lokoja, the capital of Kogi State. The area selected for study is around km 15 Okere-Lokoja road very close to the mining site. The area has a good network linking the town to Okene, Lokoja and Auch. A good percentage of the roads is in perfect condition i.e there are tarred but most of the feeder roads connecting the villages are full of potholes and gullies but fairly accessible.

The occupation of the people is mainly farming, trading, mining e.t.c. The major settlement is around the mining town and the Federal College of Education.

### **1.5.2 CLIMATE AND VEGETATION**

Rainfall figures for Okene (1225 – 1230mm) gives an idea of the annual total rainfall for the area. The double maximum regime which features prominently in the south western Nigeria but decreases in intensity towards the north and east is virtually unnoticed in Okene and in the study area in particular.

The rainy season begins in late March but maximum precipitation occurs towards the end of the rainy season and is followed almost

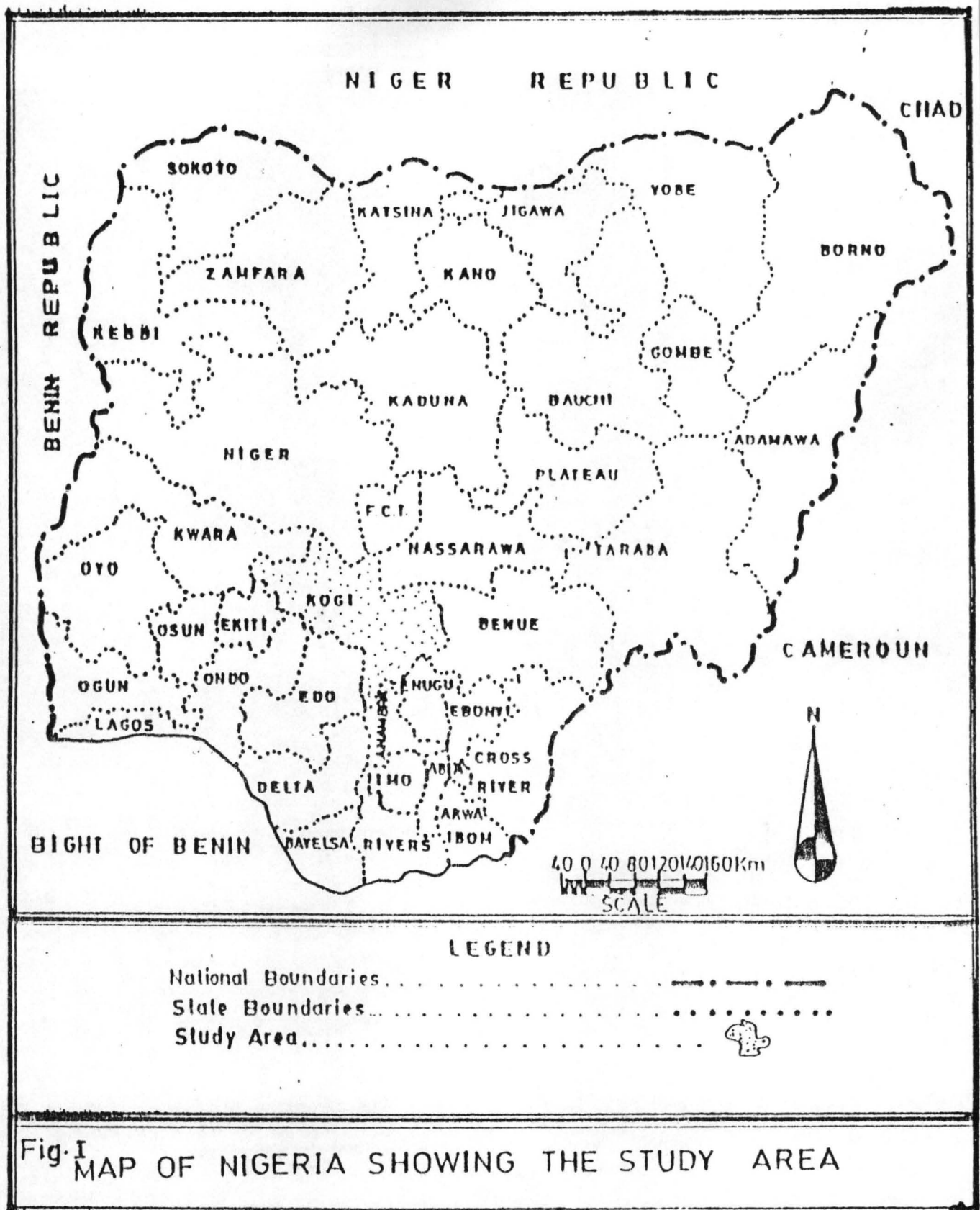
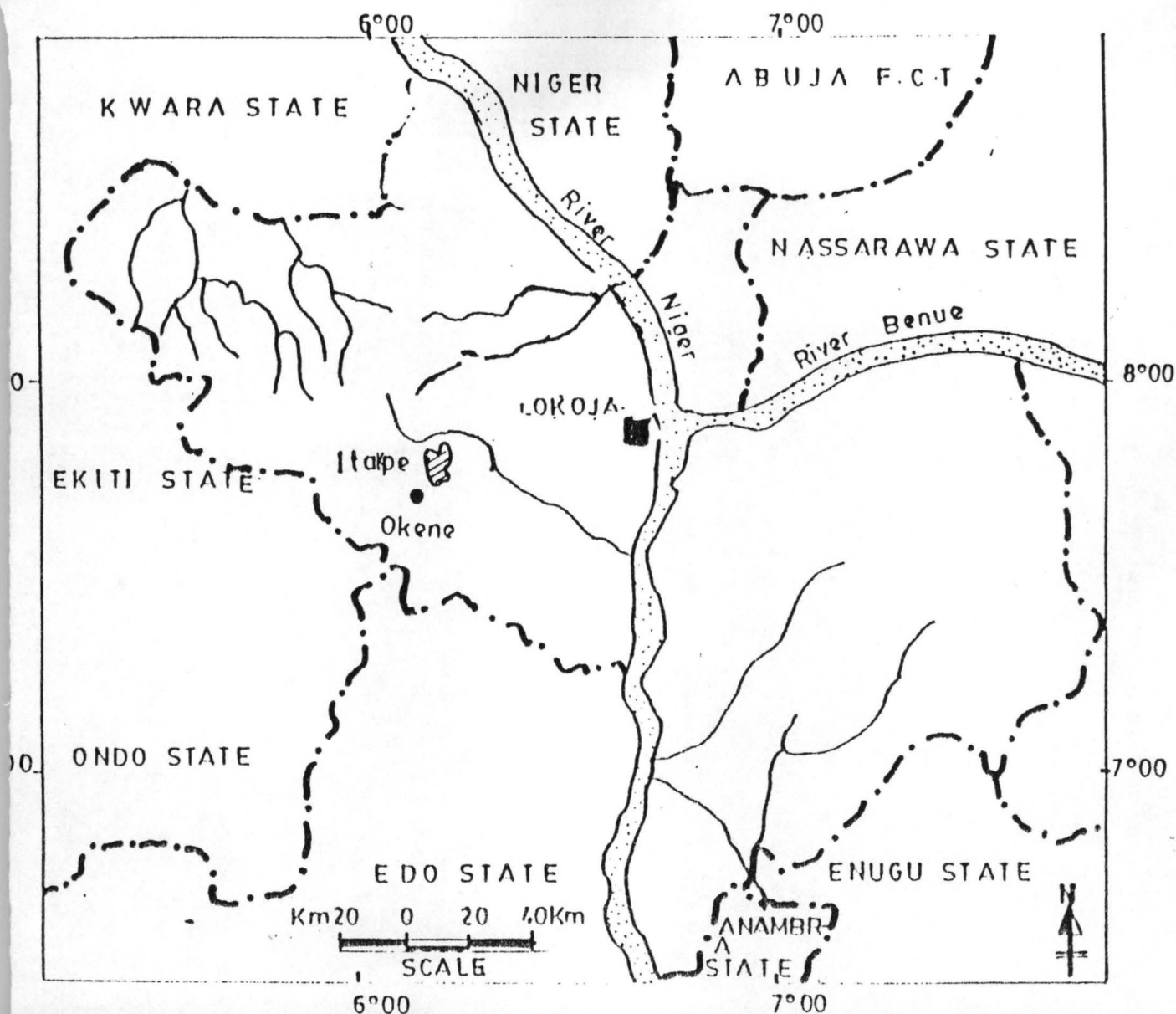


Fig. I MAP OF NIGERIA SHOWING THE STUDY AREA



#### LEGEND

State Boundaries

Local Govt Boundaries

Rivers



Itakpe (Study Area)

II

### KOGI STATE MAP SHOWING THE STUDY AREA

Source (Adapted from Ajibade, 1993: 560)

immediately by drought conditions. September is the wettest month with over 8 inches of rain but in November the region is already dry that all parts receive less than one inch of rain.

Tornadoes, which usually herald the coming and end of rainy season, are rather destructive of crops and dwelling but crops suffer more as a result of delayed rains as well as variability in the monthly rainfall.

The dry season, which last from November to early March is usually a period of high temperature 98°F in the day and intense heat. At this time of the year, rivers and stream dry up and water becomes very scarce especially for domestic use.

Climatic and soil conditions favour the growth of dense savanna woodland but centuries of human interference have reduced the land to open Savanna woodland. Tall grasses often exceeding 5ft in height and trees with crooked and gnarled stems are predominant though vegetation is of high forest type around stream valleys.

### **1.5.3 LANDFORMS AND SOIL**

The upland are underlined by igneous and metamorphic rocks of the basement complex which outcrops as massive ridges and rocky hills.

The general elevation of the land is about 1.200ft but the peaks rising above 2,000ft. In his study of erosion surface in west Kabba, Clayton (1958) recognized 2 major land surfaces in the area stable land surface and erosional land surfaces.

The stable land surfaces which he sub divides into African lateritic plains and Niger lateritic plains consist of level or undulating plateau surface at over 1200ft for African lateritic plains and 750ft for Niger latrific plains. Both surfaces are characterized by smooth rounded inselbergs.

Patches of red-clay occur at the foot of the inselbergs and a more extensive feature of clay patches at the lower table lands with a marked cateria arrangement of lateritic clay on the upper slopes and fine grained to sandy clay at the base. These clay area provides areas for fertile farmlands.

The widespread layer of ironstone found on the stable land surface is a product of intense chemical weathering. One of the main water sheds in Nigeria lies in this upland region and seperates streams draining northwards and eastwards into the Niger from those which drain directly into the sea.

#### **1.5.4 GEOLOGY OF THE AREA**

From investigations, the Itakpe iron ore deposit is seen as a Precambrian iron formation of the migmatite –gneiss of the basement



complex of Nigeria and comprises over 25 individual ore bodies (14 being most prominent) that are interbanded with migmatites, gneisses, schist, amphibolites, quartzite and intruded in places by granites pegmatites, and aplites all of which form a ridge over 4km long generally trending in a east-west direction and dipping southwards. The ore bodies outcrop on the surface in some places but in other areas they are covered by the overburden that could be as much as 3 metres.

### **1.5.5 ROCK TYPES**

#### **1. Migmatites**

These are rocks of complex structures and composition. Microscopically they consist of gneiss, amphibolite and schist and an intrusion of quartz-feldspatic dykes, quartzites and pegmatites. Sometimes in strong deformed area they include in their matrix pegmatic crystals of tourmaline, hornblende and mica. Migmatites occur in Itakpe hill as high-grade category of metamorphism and occur mainly as gangue.



## **2. Granites**

There are found intruded into the migmatite and gneiss. They are medium to coarse grained porphyri leucogranites. The rock specimen has an even mottling of light and dark minerals.

In certain places, they are even strongly sheared showing minor folding and cracks. In thin section, they consist of large feldspars in a ground mass of quartz, biotite and hornblende. The feldspars are euhedral to subhedral with microline twining and some of the grains are undergoing alternation and contain inclusion of iron oxides.

## **3. Pegmatites**

Intense metamorphism enhanced the formation of numerous pegmatite veins along contact and weakness zones across the general strike of the deposit. The vein trends generally to NNE-SSW (North-North-East-South –South-West) and occur at irregular intervals.

## **4. Aplites**

In hand specimen, the sample is sugar textured light pink rock. Small grains of dark minerals, some of which are surrounded by alternation haloes gives the rock a sparse uneven mottling appearance.

## **5. Quartzites**

The quartzite in the area are of medium to low grade category of metamorphism and can be divided into two major categories.

### **NON-FERRUGINOUS QUARTZITES**

- a. Coarse grained variety
- b. Highly fissile variety
- c. Bedded

In hand specimen the quartz grains are usually anhedral and often contain minor inclusion of iron oxide. Other accessory minerals include biotite, cordierite, silimanite and iron oxides.

### **FERRUGENOUS QUARTZITES/IRON ORE**

In hand specimen the iron ore of ferrugeinous quartzite consist of alternating bands of quartz and iron oxides (haematite and magnetite).

The mineralogical analysis of an average sample of the ores as contained in several detailed project reports show that:

ROCK TYPE	PERCENTAGE COMPOSITION(%)
Haematite	30
Magnetite	20
Quartz	35
Silicate	15

From the above therefore, the ratio of haematite to magnetite can be put at 3:2. Magnetite crystals are coarse grained and closely interlocked while magnetite are fined grain. Other rocks which iron ore alternate confortably include gneiss, amphibole and schist.

There are proven reserves of about 200million tonnes of iron ore in Itakpe. From an iron oxide grain size stand point, three zones have been identified.

- a. A coarse ore zone located in the northern layers.
- b. A medium ore zone located east of the central layers.
- c. A fine ore zone located east of the southern layers

Infact, each zone contains a more or less large proportion of fine and coarse grain ores and depending on this proportion, the ore of a layer located in a particular zone may tend to be coarse medium or fine. The ore layers occur parallel to one another and there are 14 main layers in Itakpe deposit. They

are zoned into groups for easy reference – northern intermediate, central and southern zones.

## **1.6 SCOPE AND LIMITATION**

The landscape features of the areas where mining activity have taken place are not uniform and the extent of landscape disruption depends on the method of mining employed. Going round the entire mines posed a problem as the routes which are untarred though accessible with cars is not encouraging as a result of boulders scattered here and there hence it involved distance trekking and climbing of hills and the problem of dust when attempted to survey with cars as the field work was carried out during the intense dry season.

There is also the problem of inadequate literatures and materials which made the whole exercise tedious and more time consuming as the workers were not ready to give out much information for fear of letting out their secrets.

All the same, the little data and information acquired from various places, through questionnaires and reviewed literatures were used effectively.

## CHAPTER TWO

### 2.0 LITERATURE REVIEW

Land degradation from surface mines is a serious problem, which deserves urgent solution especially in areas where land is insufficient for agricultural, industrial and rural development.

Oxenham (1966) carried out a study on reclamation of derelict land. Derelict land is a land which has been damaged by extraction or other industrial purposes and /in its existing state is unsightly and incapable of reasonable beneficial use. Thus, mined land as derelict land like the case of Itakpe has resulted in a lot of problems on the environment thereby calling for means of reclamation

Beavers (1984) in his pioneer survey of the black country defined derelict land as land which has been so damaged by extraction or other industrial processes or by any other form of urban development that is default of special action, it is likely to be effectively seen again or may be a public nuisance in the mean time.

During mining operations extensive landscape is destroyed hence FAO (1982) asserts that larger areas of land (tropical) are cleared of their natural cover and a considerable number of plants and animals are becoming extinct. It is therefore in mankind's interest to leave intact any area of bush

or forest which does not have to be cleared in order to conserve what species remain.

To obviate this problem, Wallwork (1974) identifies the following subdivisions of derelict land.

1. **Extent dereliction:** This refers to land now derelict but including sites caused by planning conditions and permissions.
2. **Potential dereliction:** Refers to land, which will on cessation of present use of land become derelict unless remedial action is taken.
3. **Partial dereliction:-** This is subdivided into: Regressive: That is land which has been derelict and although not reclaimed has been put to other use.
4. **Progressive:-** Referring to land which has began to deteriorate and will become derelict unless remedial action is taken.

However, wall work makes an exception to the following categories of land from derelict land.

1. Land which has been restored
2. Land which although not in current use is subject to planning permission for future use.
3. In filling sites, war damage and urban clearance scheme awaiting redevelopment.



4. Land which has blended into the landscape in the course of time or has been put to some acceptable form of use.
5. Land derelict from natural causes.

This grouping can be used mainly for academic purpose although its tenable that the extent of dereliction of land for example from mining will determine the use to which such land can be put to use. It is in his view that conscious reclamation programmes can give more importance to restoration for amenity and agricultural uses which in past reflect uncertainty about the ultimate function of some sites.

He also states that reclamation of derelict land will solve the problem of recreational and general amenity purposes though this may produce low financial yield in comparism with the use for industrial, housing or agricultural projects.

Bruce Marsh (1999) assets that land after reclamation should be such that the lands will be productive to support sustainable development. It therefore concurs wallworks assertion that reclaimed lands can be put to housing projects as done in Cologue, USA.

Bruce marsh (1999) in Irian Jaya, Indonesia stated that tailings reclamation studies have shown that Ajkwa river area where deposition is done by freeport-McMoRan Copper and Gold company in Indonesia can be



readily revegetated with native and agricultural plant specie once mining is completed. This he said will transformed the tailing into a productive soil creating a more stable socio economically area that can provide long term benefits to the surrounding area and Irianese population in particular.

As can be applied to the Itakpe situation from the case of tin mining in Jos – Plateau Ajeagbu (1981) state that much of the Plateau region is classified as either unsuitable for cultivation or as areas with limitations on cultivation or land with a few agricultural developments programme due to the existence of many rock outcrops and mining waste lands. There is no doubt that mining has encroached on available agricultural land thereby limiting available agricultural land per farmer as the case is in Itakpe.

It can be stated that changes in agricultural land development and management in Nigeria have not balanced with the need for effective land resource planning and utilization. This will require frequent monitoring and predicting the land condition. Despite the fact that many studies have been done on the impacts of mining on the environment in other parts of the world and Nigeria particularly Jos – Plateau, no such detailed studies is known to have taken place in Itakpe. This therefore gave the researcher the need to carry out the study. The above literature review thus serves as a guide to the study.

## **CHAPTER THREE**

### **3.0 METHODOLOGY**

#### **3.1 DATA SOURCE**

The study was carried out by method of interview using questionnaires. The respondents interviewed were mostly the residents around the mining camp.

The study is carried out in Itakpe, Okehi LGA in Kogi State and the selection of the respondents was done randomly. This served as the primary source.

The secondary source of data were also used in the analysis include literature on previous studies on similar problem conducted in other parts of the country and reconnaissance survey of the area was also put to use.

#### **3.2 METHOD OF ANALYSIS**

In order to ascertain the impact of mining on the environment in the area under study, the researcher used response obtain from the residents of the area to discuss the impacts of the mining activity in the area.

During the exercise, 50 questionnaires were given out of which 34 were returned making 68% of the total.

Cumulative frequencies and percentages are used to analyze the data collected. This method is crude and simple, this is due to lack of adequate data hence approximated figures is used mostly.

## **CHAPTER FOUR**

### **4.0 ANALAYSIS AND DISCUSSION**

Based on the survey carried out in the area, result obtained show clearly that the mining of iron ore going on in Itakpe hill, Okehi LGA of Kogi State has some adverse effects on the environment.

The mining activity has both advantage and disadvantages. The survey carried out shows that about 68% of the residents are non-indigenes drawn to the area particularly for business. The remaining percentage is settled as civil servants and traders in addition to a few indigenes who are farmers. The civil servants work in the nearby schools established by the company.

About 85% have been observed to be educated and have settled in the area for about 5 years 82% of the respondents enjoy the area and this is mostly as a result of them securing jobs in the area.

#### **4.1 ENVIRONMENTAL PROBLEMS OF MINING**

#### **4.2 CHANGE IN LANDSCAPE**

From the survey carried out, it has been observed that the general landscape of the area has been badly affected. About 97% of the respondents are of the view that the natural outlook of the environment has

been changed from that of a gentle undulating topography to an open bare land with steep hills which encourages erosion and can even lead to the flooding of the lower part of the area all as a result of the mining activities going on in the place. Here one can infer that the landscape has been degraded causing aesthetic displeasure.

#### **4.3 THE PROBLEMS OF POLLUTION**

As it occurs mostly in other parts of the country where mining activities take place, the Itakpe community is not left out on this issue.

From the data obtained it shows that there is the problem of pollution within the community affecting the air, land and water.

The survey shows that the source of drinking water in the areas is as follows:

About 56% obtain their water from tap, 29% from the stream and 15% from well. All categories of respondents agree that the water is polluted as a result of mining activities. Although there is no recorded research carried out on this issue but according to the survey, respondents state that the water obtained in the area is hard because it has taste and does not form lather easily with soap. They state that it is due to the chemicals and end product of the mining activity, which is washed or dumped into their river channels.

There is no disease or sickness in the area, which can be attributed to the on going mining activity as the survey shows that the major sickness in the area is malaria fever which can be said to be a common occurrence in our country.

#### **Disexternalities observe in the Area**

	<b>Number of Respondents</b>	<b>Cum.Freq./Percentage</b>
Air Pollution	-	-
Water Pollution	9	9 $9/34 \times 100 = 36\%$
Land Pollution	-	-
Diseases	-	-
All of the above	25	25 $\frac{25}{34} \times 100 = 74\%$
	34	100%

***Source of Data: Field work 2001***

From the above, it clearly shows that the community is affected adversely by the activity of the mining going on in the area.

#### **4.4 IMPACTS ON FARMING ACTIVITIES**

The farming activities have been grossly affected in the area. In the survey, it has been observed that about 67% of the farming activities taking place in the area is subsistence agriculture.

About 88% of the respondents agree that the mining activity has a negative impact on farming. It should be noted that the area has been taken



over by mining activity thereby affecting agriculture. This will lead to shortage of food in the area for the residents as only about 9% of the total inhabitants engage in farming. The implication is that the little food produced cannot go round and most of the residents have to travel to other places to buy food.

#### **4.5 EROSION MENACE**

The erosion in Itakpe has been attributed to the mining activity going on in the area. This is obtained from the survey as about 75% of the total respondents point out that the problem of erosion in the area is devastating as it is common sight to see trenches and rill or gullies caused by erosion. This can be said to be true of other areas in which mining activities take place.

In Itakpe about 85% of the respondents are of the view that this erosion problem is as a result of the mining project going on in the area which occurs as a result of clearing the land before prospecting i.e. removal of the overburden.

In summary Itakpe where the iron ore mining activity is taking place, from the above findings, one can say that the area has been seriously affected by the mining activity. It affects all the realms of the environment,

land, air and water. There is change in topography, scattered boulders all over the place resulting in aesthetic displeasure, there is the problem of soil infertility which affects agricultural activities. The tailing or waste dumps on river channels affects the water purity and even affect underground water in the area which is due course may cause one form of disease or other.

## **CHAPTER FVE**

### **5.0 CONCLUSION AND RECOMMENDATIONS**

#### **5.1 CONCLUSION**

Solid mineral exploitation produces adverse effects on the enviroment. Iron ore mining in Itakpe Okehi LGA, Kogi State is a source of environmental degradation. To curtail these impacts on the environment, the Federal Ministry of Solid Minerals should as a matter of duty educate the general populace on the effects of mineral exploitation on the environment.

#### **5.2 RECOMMENDATION**

This project work has focussed on the detrimental effects of mining using iron ore mining at Itkpe as a case study. This is not in any way to under estimate the beneficial effects of mineral exploitation. Population increase, which is inevitable, places a high demand on natural resources thereby placing an urgent need for the continuos exploitation of mineral deposits.

Since man cannot avoid exploiting the mineral resources of his environment, he has to find ways to reclaim lands as soon as possible and not wait until the end of the mining activity. He also have to find ways to

restore and make the land productive to support agriculture in order to achieve that aim of sustainable development.

In view of this, the following is hereby recommended.

1. Land reclamation: this should be made an integral part of the mining cycle. When reclamation is integrated into both the preplanning and operational stages, it can be done more effectively and at a lower cost than as a separate operation. The machines used in the mining operation can easily be used in reducing peaks of spoil piles and establishing controlled drainage from site.
- ii. Management and Monitoring: environmental activities (mining) should be centered around the implementation of comprehensive and expanded environmental monitoring should be done as often as possible to ensure that the reality is in accord with what was predicted.
- iii. Provision should be made for suitable disposal of waste.
- iv. All operations should be done with a view to reduction, reuse, and reclamation and recycling of materials.

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## APPENDIX

### **FEDERAL UNIVERSITY OF TECHNOLOGY MINNA DEPARTMENT OF GEOGRAPHY**

#### Research Questionnaire

Topic: Mining and its environmental implications;

A case study of Iron Ore Mining Itakpe Kogi State.

This questionnaire is designed to obtain a honest and reliable information on the activity of Iron Ore Mining in Itakpe, Kogi State.

Any information received will strictly be used for the purposes of this research only.

Please read the questionnaire below carefully and tick before the alternative that is applicable or express your view where necessary.

Thank you

- 1 Are you an indigene of Itakpe? Yes ☐ No ☐
- 2 What is your level of education?  
Primary ☐ Secondary ☐ Tertiary ☐ None ☐
- 3 How long have you been residing here?  
1-5yrs ☐ 5-10yrs ☐ 10-15yrs ☐ 15-20yrs ☐ 20yrs & above ☐
- 4 Do you enjoy staying here? Yes ☐ No ☐
- 5 Before the commencement of mining activities in the area, how did the environment look like?  
Flat ☐ Undulating ☐ Burrowed pits ☐ Hilly ☐
- 6 Comment on the present state of the area

.....  
.....

7. Do you enjoy any externalities? Yes ☐ No. ☐
8. Comment.....  
.....
9. What of disexternalities?  
Air pollution ☐ Water pollution ☐ Land pollution  
Diseases ☐ all of the above ☐
10. What benefit has the community derived from the company?  
Schools ☐ Good water ☐ Good road ☐ electricity  
☐ Clinic/hospitals ☐
11. Has your community suffered any kind of diseases? Yes ☐ No ☐
12. If yes, what type  
.....  
.....
13. What effort has the company put in place to eradicate this  
problem?.....  
.....  
.....
14. What is your occupation? Farming ☐ Trading ☐ Civil  
Servant ☐ Mine worker ☐ Business ☐
15. How has farming activities been going on in the area? Satisfactory ☐,  
Non Satisfactory ☐, Undecided ☐.
16. What type of farming practice takes place in Itakpe ?  
Subsistence ☐, Large Scale ☐

17. Do you think that mining activity has any negative impact on farming? Yes ☐ No. ☐

18. If yes Comment

.....  
.....

19. What is your source of drinking water?

Pipe-borne water ☐, Well ☐, Stream ☐, River ☐

20. Do you think that the water is polluted?

Yes, ☐ No ☐

21. If Yes Comment

.....  
.....

22. How is the problem of erosion menace affecting the community?

Devastating ☐, Mild ☐, Not too Serious ☐

23. Can you link this erosion problem to the mining activity going on in the community?

Yes ☐, No ☐ Undecided ☐