

Executive Summary

Social and Environmental Impact Assessment

Obajana Cement Project **(OBAJANA, KOGI STATE)**



SUBMITTED BY

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PROJECT DESCRIPTION

The Obajana Cement Project (OCP) involves the construction and operation of a greenfield cement plant at Obajana, Kogi State, 220 km southwest of Abuja, the Nigerian capital. The Project will have a combined production capacity of 4.4 million metric tonnes per annum (mtpa) and includes a 135 MW captive gas power plant; a 94 km gas pipeline; a limestone quarry with associated 7.5 km conveyor belt; a 13m high dam impounding a reservoir with a total storage capacity of 5.1 million m³ and a 351 unit housing complex for all staff within a particular grade level (both foreign and local staff). The estimated project cost is US\$798 million, to be financed with sponsor's equity of US\$319 million (40% of the Project's capitalization) and US\$479million in form of long-term debt from local and international lenders. The Sponsor is Dangote Industries Ltd ("DIL"), a leading Nigerian manufacturing and trading company. The project represents their first venture into cement production. Project implementation started in 2003 and commissioning is expected in 2005.

This executive summary covers the Environmental Impact Assessments (EIAs) for the (1) cement plant and captive power plant; (2) quarry; (3) dam; and (4) gas pipeline. Land acquisition for the project involves involuntary resettlement. The project did not involve physical displacement; but did cause economic displacement from cropland and forests. To ensure that the project meets the policy requirements of its international lenders, DIL commissioned an independent resettlement audit. Thus, this executive summary also covers (5) the resettlement audit.

Activities carried out during the execution of the EIA studies included the acquisition of biophysical, socio-economic and health related data. Sources of information included field survey, government/non-governmental agencies, existing databases, professionals and communities and households. The studies were carried out in accordance with Nigeria's EIA procedures, using appropriate guidelines and standards.

This document is divided into five parts:

- the first covers the EIAs for the cement plant/captive power plant, quarry and dam, which all have similar baseline social and environmental characteristics;
- the second covers the gas pipeline;
- the third covers resettlement; and
- the fourth the environment, health, safety and social (EHSS) action plan.

As of January 2005, the legal status of the EIA documents was as follows:

- the EIA for the cement plant and captive power plant received provisional approval from the Federal Ministry of Environment (FMoE) in July 2004. Final approval is pending;
- the EIA for the quarry, conveyor and mine access road is pending provisional approval from FMoE;
- the EIA for the dam and reservoir is pending provisional approval from FMoE;
- the EIA for the gas pipeline received final approval from FMoE in July 2004.

Meetings with FMoE officials indicate that OCP has been in breach of EIA regulations by breaking ground before provisional approval has been granted. This is the case for all project components except the pipeline. As a result, OCP has been required to pay fines to

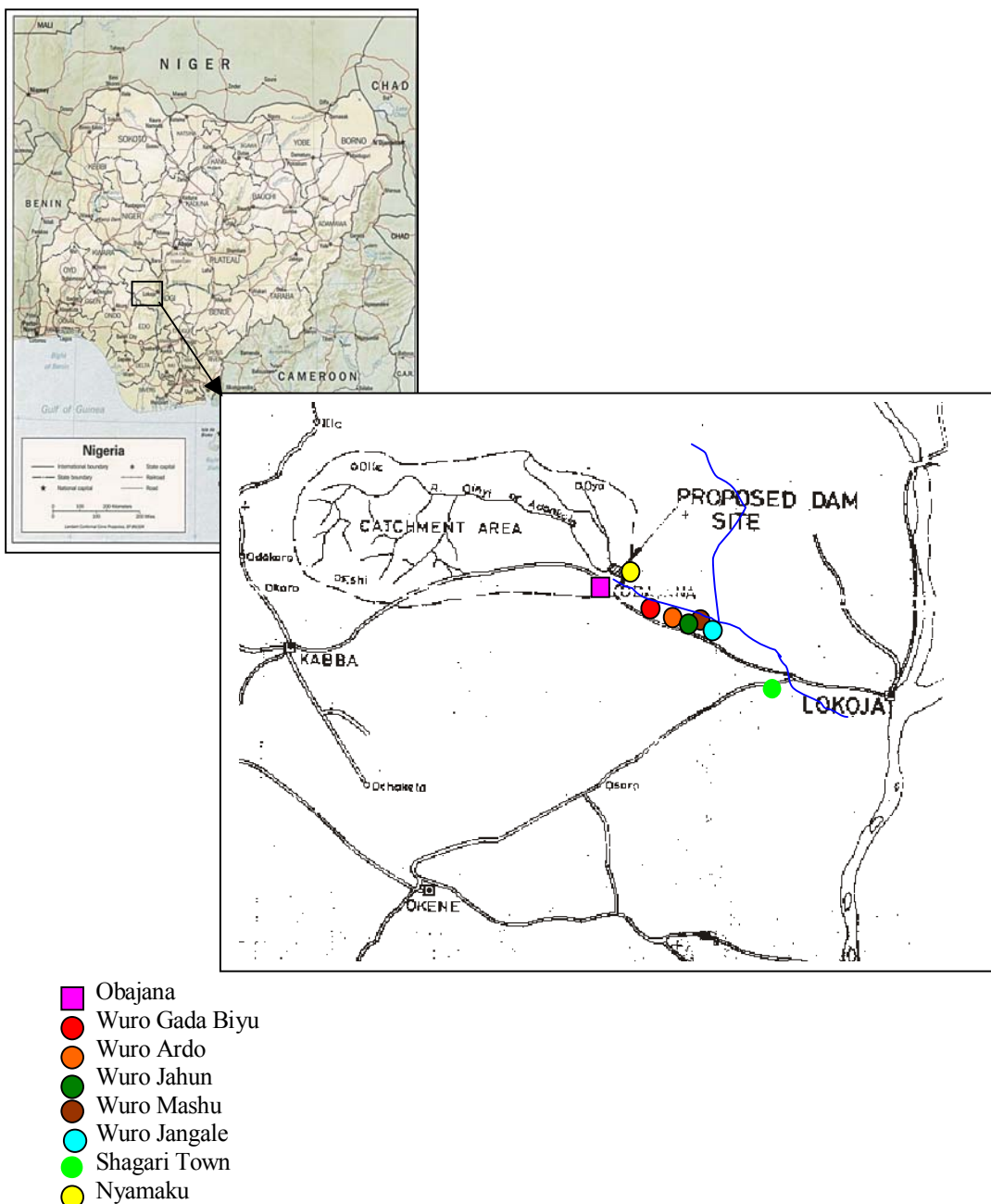
the Ministry and these have been duly paid. The EHSS action plan for the project addresses the need for OCP to develop appropriate management systems, which ensure compliance with Nigerian law. IFC will not take the project to its Board until the FMoE provisional approval has been granted for all project components.

PART ONE - CEMENT PLANT, CAPTIVE POWER PLANT, QUARRY AND DAM

A. SOCIO-ECONOMIC CONDITIONS

Affected Settlements

Communities affected by the project include Oyo-Iwa, Obajana, Oile, Oshokoshoko/Eshi and Nyamako and its environs. Apart from Obajana, Iwa and Oshokoshoko, the settlements are remotely located and not easily accessible. All these communities are inhabited by the native landowners, except Nyamaku and environs, which are inhabited by Tiv settlers on Oyo-Iwa land.



Obajana and Downstream Communities

The community of Obajana is located next to the site of the cement plant and truck park. Communities downstream of the project include several Fulani migrant settlements (Wuro Gada Biyu, Wuro Ardo, Wuro Mashu, and Wuro Jahun) and ‘Shagari Town’ which is inhabited by Bassa people (on Igbira land). The Fulani settlements are remotely located and access is only via footpaths. Although the Fulani are nomadic by nature, they can settle where they find favourable conditions for both themselves and their cattle. In this case, these communities have been settled for about 20 years.

Population/Age Structure: Apart from Obajana, which was enumerated during the 1991 national census, there are no official records for the rest of the affected settlements. Due to the Project-induced influx of people, Obajana has experienced a population boom. An estimate of the present population was conducted using an estimated average household size and the number of dwelling houses.

There are more men than women at Obajana, Wuro Ardo, Wuro Jangale, Shagari Town and Nyamako, while the reverse is the case for Wuro Gada Biyu, Wuro Jahun, and Wuro Mashu. Children make up 20.1 – 39.2% of total population in the study area, indicating a large dependent population. (Children are defined as under 15 years of age). Obajana, which is accessible by tarred road and host to the Obajana Cement Plant, had the lowest proportion of children, largely due to the large influx of job seekers.

Ethnic/Religious Compositions: The original inhabitants of Obajana are Oworos, who claim to originate from the Yoruba. There are also Fulani and some other tribes (Hausa, Tiv, Igbo, Bassa) in the study area, although they are not indigenous. Obajana is a rural community, characterised by low income and the absence of social amenities. The predominant religions in the area are Christianity and Islam, although a few of the peoples practice African traditional religions.

Means of communication: Oworo language is the major medium of communication. Other languages spoken include Hausa, Yoruba, Fulfulde (Fulani), English, Tiv, and Igbo.

Occupational Pattern: Occupations of the people include cattle rearing, rain-fed farming, hunting and petty trading. The agricultural system in the study area can be categorized into an intensive smallholder rain-fed agriculture. This system is characterized by small plot farms (0.5 to 2ha) growing mostly rice, sweet potatoes, maize, millets, pepper, cassava and cowpea. Principal tree crops in the area include cashew and palm tree especially in swampy areas. Flood plain cropping, i.e., the Fadama agricultural system, is being practiced in some parts of the study area. Since the only source of water – the River Oinyi - dries up during the dry season, there is generally no irrigation farming in the study area.

Health Care Facilities and Services: There are no healthcare facilities in any of the affected communities. There is only one drug-dispensing store in Obajana. The majority of the people resort to self-help medical care or they patronise herbal medicine men. For those that can afford it, they travel to Lokoja for the treatment of their ailments.

Housing/Household Energy: The primary source of energy is firewood. The sources of lighting at nights are mostly kerosene lanterns and/or candles as there is no electricity. A handful of people own small power generators.

Morbidity/Mortality pattern: As there is no recognised health institution in Obajana and environs, there are no detailed records on mortality and morbidity. However, records of clinical diagnosis for the Oworo people at the General Hospital in Lokoja shows that majority (80%) of the ailments affecting the people are communicable diseases. Only 9% of the complaints of Oworo people are as a result of non-communicable disease, while 11% of the people attend hospital to undergo surgical procedures.

Amongst the communicable diseases, malaria was the most prevalent followed by gastroenteritis and then sexually transmitted diseases. Malaria is the number one cause of morbidity in sub-Saharan Africa, and the study area is devoid of potable water, thus the high rate of gastroenteritis. Since there are no screening centres in the area, it is difficult to determine the occurrence of HIV/AIDS in the affected communities. A recent survey (2003) carried out by the Federal Ministry of Health of the Federal Republic of Nigeria shows that Kogi State is amongst the 13 states with highest sero-prevalence of HIV. The average percentage of people infected with the HIV virus in Kogi State is 5.7%: higher than the national average of 5.0%. Generally the level of HIV prevalence in Kogi State is higher amongst the less educated populace, and those living in or around urban centres (7.0% for urban and 4.4% for rural population). HIV prevalence is highest amongst young people: in the North Central zone of Nigeria (Kogi State inclusive), 6.7 – 8.2% of people aged 15 to 29 years tested positive, as compared to 2.6 – 5.8% of those aged 30 to 49 years.

Oyo-Iwa: Baseline Socio-Economic Conditions

Ethnography/History: The proposed quarry area, part of the dam and the housing complex are located within the territories of Oyo and Iwa communities. Although Oyo and Iwa settlements are physically separate, they are essentially two ‘clusters’ of the same community, with common heritage and land ownership. Iwa is a small nucleated settlement strung east-west along the Lokoja – Kabba road, while Oyo is situated near the proposed quarry site, 9 km north away from Lokoja-Kabba road, teeing off from Obajana. The original people of Oyo-Iwa are Oworo. Overall, Oyo is said to be 70% Christian, 20% Muslim and 10% Traditionalists. There is also the belief in unseen spirits and the society is conceptualized as consisting of the dead, the living and the unborn, and that the spirits of the departed still influence the living.

Traditional Political Structure and Governance: The Village Head (Obaloo) and his council oversee all traditional aspects of the life of the people, such as maintaining peace and order, resolving conflicts, observing cultural festivals, and organizing community work. The Obaloo and the Secretary are responsible for external relations, while only the Obaloo is also responsible for allocating farmland to migrant farmers, and adjudicates in case of conflict. There is a Youth Leader and a Women Leader who represent their respective constituencies, who attend Village Council meetings to present matters of importance to their groups.

Population/Ethnic Composition: According to the 1991 National Population Census, the Oyo settlement had a population of 272 people. This was projected to 391 at this current

year (2004). However, community respondents estimate that their total population stands between 2,500 and 3,000 at the time of this survey (September 2004). This higher figure may include people from the village who have moved elsewhere. In addition to the native Oworo, there are Tiv, Fulani, Hausa and the Bassa who arrived four to five years ago, having been displaced from their former settlements in Nasarawa State by ethnic conflicts.

Marital Status /Household Size: Most households are large in an extended family system. Most families are polygamous, with wives and children helping with farm work. A majority of households have between four (4) and nine (9) children.

Occupations: Farming is the dominant occupation and provides 90% of all cash income. Other occupations in Oyo-Iwa include cattle rearing, civil service, trading, hunting, carving, and artisanship.

Land Ownership and Access: In Iwa and Oyo, land is communally owned. The Eleso (the title for the Chief) of Iwa and Obaloo of Oyo exercise more than supervisory authority over the land. They are the landowners as heads of the original clan that made up Iwa and Oyo. The core clan members of the communities have more than mere usufruct rights. They can plant tree crops and harvest economic trees (e.g. cashew), but do not hold timber rights. Other indigenes (long standing migrants who have spent over 20 years and behaved well) have usufruct rights and can farm anywhere but they can neither plant nor harvest economic trees, except cashew or when permitted to do so by the Obaloo/Eleso. They also do not pay any form of rent.

The Oba is the owner of all naturally growing economic trees and approves the cutting of timber trees without reference to the Village Council. He exercises authority over the land as its owner and makes decisions over granting land for public projects.

Income Levels: It is extremely difficult to obtain accurate data on income levels, because there are no records, and also Oworo tradition does not favour the disclosure of wealth.

Educational and Health Facilities: Iwa and Oyo have one primary school each. However, many Oyo people send their children to schools in Lokoja where they stay with relatives. Neither Iwa nor Oyo has any standard health care facility. The people of Iwa go to the neighbouring Oshokoshoko where there is a clinic and medicine store. Those who can afford it travel to hospitals in Lokoja or Kabba for their healthcare problems.

Electricity/Water Supply: Neither Oyo nor Iwa has access to electricity supply. There is no source of potable water supply and the communities depend on rivers, rainwater and hand-dug wells for their water. The river/streams in the project-affected communities are however, seasonal and thus dry up in the dry season thereby compounding the water situation.

Community Consultations

Consultation visits were paid to the communities that would be affected by the proposed Project. The outcome of the consultation revealed the community concerns and wishes are summarised below.

Community Concerns

- Non-indigenes are taking most of the jobs and dominate most of the businesses. The inability of indigenes to raise money to start business is of major concern.
- Although not alarming yet they have begun to see evidence of increased crime (fighting, drunkenness and theft) because of a large number of migrants, many of whom are not known and cannot be monitored.
- Most people mentioned the possibility that migrants might bring diseases that are not common in the area as a critical problem.
- Safety problems from the increasing number of big trucks used in construction work.
- Dissatisfaction with the method of assessment and payment of compensation for crops and economic trees on land taken by the Company.
- People of Obajana complained of a lack of potable water and loss of access to the dam site and adjoining areas. The greatest concern of the Fulani communities is also lack of water, especially during the dry season. They wished to have a reliable source of potable water within their communities.
- Another important concern of the Fulani is lack of schools, as they are desperately in need of a primary school.
- Although Julius Berger Plc, the civil contractor for the cement plant, has provided concrete water tanks, as a temporary measure, to store water for inhabitants of Obajana village, they are not refilled regularly. They wished the present ad hoc water supply arrangement be changed to a more permanent solution, e.g., drilling of boreholes to supply water to Obajana community, and also demanded to be supplied with electricity, and a hospital established to cope with the anticipated influx of people.
- Although the Company paid out compensation, the people of Oyo claim that compensation paid for their acquired land and economic trees thereupon are inadequate of monies given them for farm crops.
- In addition, the Chief of Oyo is concerned that the usual rituals of ‘appeasing the gods’ for the new development (dam) to be sited on their land has not been performed, which is repugnant to their cultural norms.
- The Tiv (Nyamaku) and Bassa (Shagari Town) settlements are concerned with dam construction and the potential lack of water.
- There is about 200% inflation in the prices of goods in Iwa. The price rise included a rise in transport costs, which community members did not link with increasing fuel costs, even though there have been several fuel increases in the past two years.
- Change in culture and values. Most people fear that the culture and values of their people would be lost over time. Already general respect for elders, decent dressing and chastity are being eroded.

Community Expectations. Views on expectations of what the proposed project would bring to the people were unanimous and people ranked them in the following order of priority:

- Pipe-borne water supply;
- Primary health care centers/clinics;
- Electricity supply;
- Security (Police) Post;
- Extension of the mine road to Oyo;
- Establishment of a credit scheme to increase investment in farming, businesses, and registering with the Company as cement distributors when production starts;
- The Oba of Oyo and Obajana requested assistance building good palaces.

The people perceived that the provision of these facilities would lead to a better quality of life by eradicating poverty. There was very clear evidence of the expectation that the factory was going to lead to solution of most of their problems.

B. ENVIRONMENTAL CONDITIONS

Project Alternatives

Option 1: No project option: This would not increase domestic production and conserve foreign exchange. Therefore, it was rejected.

Option 2: Import bulk cement and bag: Several companies in Nigeria presently practice this option. This option was rejected because it is not economically viable in the long-term, does not generate many jobs in Nigeria and because of the loss of foreign exchange.

Option 3: Import already bagged cement: Importing bagged cement is also not economically viable in the long-term, denies local employment opportunities. Also government restrictions on importations are increasing. The option of importing bagged cement will have the least impact of releasing dust into the environment but it is no longer politically viable and is therefore not acceptable.

Option 4: Manufacturing from raw materials (considered option): Though it has some social and environmental impacts, the proposed cement plant is expected to provide 2500 jobs in all categories and lower the cost of cement. In addition, there is the transfer of technology associated with installation, operation of the equipment and maintenance and savings on foreign exchange, hence this alternative was chosen.

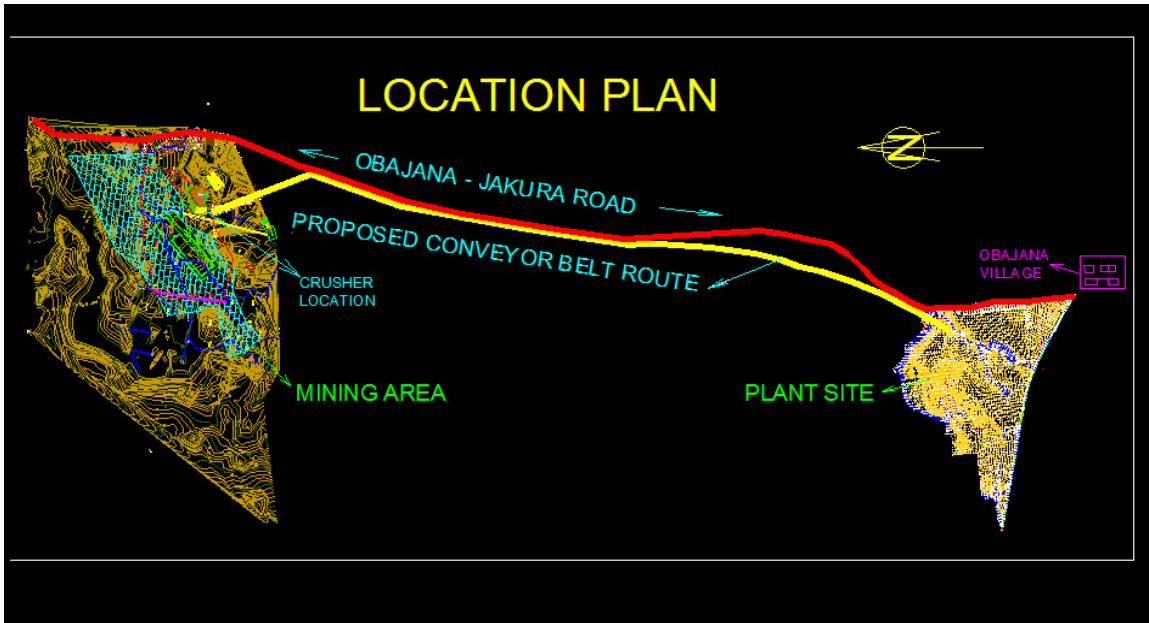
Envisaged Sustainability

All the raw materials needed for the manufacture of cement are available in Nigeria. The basic raw materials for the production of cement are limestone, clay/marl, laterite, and gypsum. All of these raw materials, with the exception of gypsum, will be obtained from a dedicated mine to be located about 7.5 km away from the cement plant. Gypsum will be sourced through vendors in the northeastern region of Nigeria. The limestone quarry has proven 20-year reserves, with a further 80 years anticipated.

The technology proposed for the construction of Obajana cement is the best available globally. Throughout the project, there will be a transfer of this technology to Nigerian engineers. The development of Obajana cement will facilitate the development of Kogi state as a commercial centre.

Cement and Power Plants - Project Location

The central facilities of the OCP/ CPP project is sited in Obajana village, on 968,000 m² of land allocated to Obajana Cement Plc by the government of Kogi state. The site is a relatively flat terrain, originally bearing a Guinea Savannah vegetation type. The captive power plant is located on the cement plant site. The housing colony is sited about a kilometre away from the OCP/ CPP site on a land originally belonging to Oyo-Iwa community.





Cement and Power Plants - Site Selection

The proposed cement manufacturing plant is located near vast limestone deposits it intends to exploit in Kogi state. The site is also strategic: The Obajana Cement Company should produce most of the cement required in the middle belt, North Eastern and the North Central states of Nigeria. The production of cement at Obajana will reduce the cost of cement occasioned by the high cost of transport in moving cement from Lagos, Port Harcourt and Ewekoro in Ogun state and Ashaka in Gombe State. Production from the Benue Cement Company alone cannot satisfy market demand in the area.

Beneficial Impacts

- The establishment of the OCP will contribute to enhancing Nigeria's domestic productivity, and help diversify Nigeria's economy, reduce the cost of cement and local construction and lead to significant saving of the foreign exchange Nigeria spends on cement importation.
- Provision of employment and stimulation of local economy.
- Enhancement of community development through implementation of Company community development programme, which will ensure the provision of basic facilities that are lacking and improvement of existing ones.
- Opportunities for commercial activities will be created in the area in the form of increased local sourcing of food, equipment, housing and tools. The project will lead to an increase in water recharge, as more rainwater will infiltrate through the dug

trenches/pits. In addition, the company will dig water trenches for the use of the local villagers, which is a beneficial effect.

Baseline Environmental Characteristics

Climatic Characteristics: the climate of the proposed project site is moist (Guinea) savanna - characterized by a mixture of trees, shrubs, tall grasses and herbs in a mosaic pattern. Rainfall lasts from May to October, with dry season occurring in-between. Wind speeds range between 3.0 and 4.6 Knots in the months of June/ July and 1.5 to 3.7 knots for December/January. The prevailing wind direction for the months of June/July and December/January is south to southwesterly and northeasterly respectively.

Air Quality: The concentration of suspended particulate matter in the area showed seasonal changes in value, being low in the wet season and much higher during the dry season (13.4 to 30.2 ppm), probably due to the dustier conditions. The concentrations of the pollutant gases such as SO₂, NO₂, NO, CO and H₂S were found to be either not detectable or detected at very low concentrations.

Surface Water: The pH of River Oyini ranged from 5.51 to 5.65. The results for conductivity indicate that the water is freshwater, TDS (90.0 to 142.0 mg/l), TSS (1750.0 to 3913.0 mg/l) and hardness (1.51 to 1.94 mg/l). As the results of Ca₂₊ demonstrated, River Oyini (1.24 to 1.50 mg/l) appear to have dissolved ancient rocks containing CaCO₃. NO₃ result was 0.05 mg/l, which is low. DO and BOD₅ ranged from 5.8 to 6.8 mg O₂/l. The phosphate contents vary widely (range: 6.04 – 13.85 mg l⁻¹). There are no remarkable seasonal variations in water quality parameters. The results of the chemical analysis of water samples show that the river was not polluted in any way.

Soil

Soils/Vegetation/Biodiversity: The soils found in the study area are generally friable and slightly acidic (mean pH 5.82) with organic matter content ranging from 1.14% to 2.35% and total N of 0.06-0.14%. The soils are generally very productive and farmers do not need to add fertilizers to obtain 'good' crop yields. The organic matter content of the topsoil varied from 0.69% to 4.21%. The heavy metals contents were relatively normal for mineral soils, except lead and iron, which appeared high.

River Sediment: The textural class of the sediment samples was sand to loamy – sand the sediment pH ranged from 5.20 to 5.89 while the total nitrogen content ranged from 0.03 to 0.32. % organic carbon ranged from 0.30% to 3.69% while % organic matter ranged from 0.52 to 6.38%. The levels of lead and iron were high for a pristine area like Obajana.

Vegetation Type: The vegetation type is a form of Guinea Savannah vegetation, which is a mixture of two types based on the proportion of woody species.

- Savanna woodland where trees and shrubs form a fairly close canopy
- Tree savanna where the trees and shrubs are scattered.

Typical trees include Locust Bean, Abo, Ilorin Balsam, Thoning's Piliostigma, Bushe, Orinla, Breadfruit tree, Acacia and Shea butter tree. Common weeds include grasses such as Gamba grass, Roofing grass, Feathery Pennisetum and Siam. Whenever the canopy is open, grass is dominant. Abo trees tend to grow in almost pure communities, with stands of rather small scrubby trees on sandy eroded slopes of sparse grass cover. Kafafago trees are locally dominant on low hills or slopes while rocky hills have their own characteristic

vegetation usually with abundant sprawling shrubs such as Acacia. In general, the average tree height in the area ranges between 6-8m while the grasses are tall with an average height of 0.8-1.5m. Important timber trees found in the area include Mahogany, Abura, and Black Afara.

Riparian Forest occurs immediately adjacent to watercourses; tree and shrub species are generally the same as those in the adjacent location, Common riparian species identified include the Pterocarpus, Bushe, Bush Cola and Umbrella tree.

Wildlife: The birds are represented mainly by cattle egret, Quelea, Black kite, Bush fowl, Bush sparrow and vulture. The area does not have wide species diversity, but does have a relatively moderate population abundance.

Among the reptiles and the amphibians, the West African toad is the prominent amphibian around the stream. The reptiles were more diverse; represented by the rainbow lizard, monitor lizard, the Nile crocodile, tortoise and the puff adder. The squirrels, the Grass-cutter, and the rabbit represented the mammals. The monkeys, the bush pig and bush dog represent the larger sized populations.

Within the precincts of the project site, a portion of the wildlife habitat is being altered but all of the animals are mobile. As such, the construction site does not interfere with any special habitat. Some of the listed species are involved in some measure of seasonal drifts/migrations.

Fisheries: Fishing was not reported as an occupation of the people; nevertheless some form of fishing activities is practiced after the rains when the volume of the river is replenished by runoffs from the hills. The main gears used are fish traps and fish fences. The common types caught are Catfish, Tilapia and Snakehead.

Adverse Impacts: Proposed Mitigation

Identified Impacts	Mitigation Measures
<ul style="list-style-type: none"> Removal of vegetation cover/ the destruction of wildlife habitats and accelerated erosion. 	<ul style="list-style-type: none"> Vegetation will be cleared in sequence: OCP site, housing colony and CPP site, in order to avoid generation of large biomass at the same time. Community members will be allowed to harvest useful portions of the vegetation if they so wish. To compensate for the loss of wildlife habitat, OCC will facilitate the development of a watershed management plan.
<ul style="list-style-type: none"> Dust emissions/solid wastes disposal during construction. 	<ul style="list-style-type: none"> Most of the dust generating activities during construction will last for a brief period about 12 weeks, when excavation works are executed. Thereafter, vehicular movement will generate most of the dust. Dust will be suppressed using water bowsers to spray exposed land surfaces and particularly areas likely to be disturbed by trucks and other vehicles during the construction of the

	<p>factory premises. Vehicular speed limits of 25 km/h will be observed in order to minimize dust generation.</p>
<ul style="list-style-type: none"> Air emissions during the operation phase of OCP cement plant, especially dusts 	<ul style="list-style-type: none"> Dust emitted during cement manufacture is generally non-toxic, non-corrosive, non-inflammable, non-explosive, and also not hazardous. Nevertheless, adequate mitigation measures such as Electrostatic Precipitators (ESP) and Fabric Filters will be put in place. Low NO_x emitting burners will be used to reduce NO_x emission levels. In addition, further NO_x reduction will be achieved by firing limestone under reducing atmosphere. Also, additional NO_x reduction will be achieved through recycling of kiln flue gases for use in the pre-heaters and pre-calcinators. SO_x levels are expected to be quite negligible because Nigerian gas is sulphur-free
<ul style="list-style-type: none"> Impacts associated with liquid effluents (storm water, sewage, cooling water). 	<ul style="list-style-type: none"> Sewage will be piped into septic tanks, which when filled up will be evacuated using sewage trucks to be treated in a sewage treatment plant prior to discharge. For the storm water, a network of internal drainage system have been designed to collect water into a sedimentation tank, prior to discharge through an existing stream. Cooling water will be recycled as much as possible, but prior to recycling; it will be cooled in a cooling tower before discharge into a retention pond from where it is recycled. Any spill-over from the retention pond will be discharged via an existing stream at approximately the same temperature as that of the stream water.
<ul style="list-style-type: none"> Impacts associated with solid wastes 	<ul style="list-style-type: none"> Wastes such as cement bags, wooden pallets, paper, etc., will be reduced at source, reused or recycled via accredited vendors. Spent mill balls and ceramic brick linings used in the kiln will be recovered and re-used by adding it to raw materials for cement manufacture.
<ul style="list-style-type: none"> Impacts of accidental spillages 	<ul style="list-style-type: none"> The integrity of storage facilities will be ensured Drip pans will be made available where necessary Surface storage will be avoided, and underground storage tanks will be properly lined and monitored periodically
<ul style="list-style-type: none"> Conflicts due to loss of agricultural land/income derived from land 	<ul style="list-style-type: none"> A resettlement audit has been prepared according to IFC's OD4.30, which will form the basis for livelihood restoration. Provide reasonable compensation for lost crops/economic trees.

	<ul style="list-style-type: none"> • Liaise with the chief of Obajana to help provide alternative sites to displaced farmers. • Provide subsidies for procurement of farm inputs to assist affected farmers that may wish to continue farming on other lands.
<ul style="list-style-type: none"> • Disruption of livelihood as a result of loss resources 	<ul style="list-style-type: none"> • As much as possible, junior staff will be sourced from qualified members of the local communities. • Skill acquisition programmes will be established to assist members of the project-affected communities to acquire useful skills. • A micro-credit scheme will be put in place to assist locals that may take up to trading/self-employment.
<ul style="list-style-type: none"> • Gender disparity in adverse social effects/benefits 	<ul style="list-style-type: none"> • Special programs (e.g. ‘female sexuality & HIV’, ‘women in agriculture’, etc.) will be put in place to target local women • Compensations will be paid directly to women for crop/trees owned by them • Preferential treatment of women will be encouraged where necessary taking into consideration their particular role and circumstances
<ul style="list-style-type: none"> • Social tension due to unprecedented influx of people 	<ul style="list-style-type: none"> • Develop with communities an influx management plan. • Train workers to respect cultural sensitivities in the host communities • Participate in local communities during festivals, e.g., Christmas, <i>Eid</i> ceremonies, New Yam Festivals, coronations, etc. • Improve basic facilities/utilities such as water supply, school, and health infrastructure/supply • Put in place ‘early warning’ mechanisms to identify potential source(s) of tension/prevent them from escalating
<ul style="list-style-type: none"> • Danger of escalation of HIV/AIDS and sexually transmitted diseases (STDs) 	<ul style="list-style-type: none"> • A HIV/AIDS awareness and prevention program will be put in place to guide staff control their conducts. • Support NGOs to empower inhabitants of communities to take informed decisions about sexual behaviours. • Strengthening of healthcare system to provide voluntary counselling and testing for workers / members of host communities.
<ul style="list-style-type: none"> • High noise levels during cement production process. 	<ul style="list-style-type: none"> • The OCP/ CPP project will utilise the latest technology, which will guarantee low noise levels. Noise will further be attenuated by the use of mufflers and silencers as dampeners. • Equipment, machinery and tools will be serviced regularly to ensure low noise emission. • The use of ear protectors will be mandatory in high noise sections of the OCP & CPP

<ul style="list-style-type: none"> Road traffic hazards due to approx. 1000 truck/vehicle movements per day 	<ul style="list-style-type: none"> OCP understands that the Kabba Junction – Kabba road will be expanded by the Federal Ministry of Works. OCP will liaise with the Federal Road Traffic Commission (FRSC) in training of driver and road surveillance. Road signs will be placed at appropriate locations to alert motorist along the highway. Speed limits will be enforced for all vehicles approaching the OCP/ CPP. Traffic warden will be stationed at strategic locations to guide traffic, especially around and within the factory site. Separate inlet and outlet routes will be provided for trucks moving into and out of the factory.
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Decommissioning and Abandonment

Feasibility studies carried out in relation to the project indicate a useful life span of over 50 years. At the expiration of the useful life of the project, adequate arrangements will be made to remove all movable assets. These may be sold or moved to another factory. Almost all the equipment and machinery will be re-used for other industrial purposes. All plant facilities and machinery that are not deemed to be of further use will be sold off as scrap or recycled at metal depots/rolling mills.

QUARRY, CONVEYOR BELT, ACCESS ROAD

Project area/site

The proposed quarry project will be located on 527 hectares land belonging to Oyo-Iwa communities in Kogi state of Nigeria. The proposed project will be located at Oyo in Lokoja local government area of Kogi state of Nigeria. The mine is located about 8 km off the Zariagi – Kabba road, at a junction adjacent to the proposed Obajana cement plant.

The quarry is within 9 km distance from the Obajana cement plant and since proximity to raw material is a factor in selection of industry, the proposed limestone quarry project is valuable.

Envisaged Sustainability - Quarry

Based on the details obtained from exploratory survey, an estimated 119 million tonnes of limestone exists in the Mining Lease Area (MLA). Apart from limestone, it is estimated that approximately 29 million tonnes of additive materials are also available. Preliminary investigations indicate the occurrence of about 450 million metric tones of limestone and 112.5 million tonnes of additive materials in 6 other Exclusive Prospective Leases (EPLs) held by Dangote Industries Ltd (20 km² each). This gives a tentative total of 569 million tonnes of limestone and 119 million tonnes of additive materials in the area (present MLA plus 6 EPLs). The present available limestone reserves of both inferred and measured category is expected to last, at the proposed daily limestone requirement of 16,500 metric tones, for >90 years. The cement plant is scheduled to last for only 50 years, therefore the project is sustainable.

Project alternatives considered - Quarry

Alternative 1: A ‘no project’ scenario means there will no mining of limestone. The implication of this option is that Obajana cement plant will have to source limestone from elsewhere. Since 95% of the raw material needed for cement production is expected to be derived from the proposed quarry, a ‘no project’ option as well means no Obajana cement plant. Therefore this option was rejected.

Alternative 2: This option entails the execution of the proposed project, which entails mining limestone from a dedicated quarry. This option was accepted because it will make possible the processing of cement locally.

Beneficial Impacts

The value of the proposed quarry project lies in the need to operate the Obajana Cement Plant so as to achieve all the anticipated benefits associated with the operation of the cement plant.

Scope of the Project

The scope of the project involves mining, production and development of 527 hectares of limestone deposit with its associated. The details include the following.

- Construction of approach ramps and mine ramps;
- Mining operation (drilling, hauling/transportation, blasting, crushing activities among others);
- Construction of a 7.5 km conveyor belt for conveying crushed limestone and additives;
- Rehabilitation of the existing Obajana - Oyo road, and construction of mine access roads;
- Infrastructural developments- construction of approach roads and buildings;
- Maintenance of roads; and
- Reclamation, afforestation and rehabilitation programmes.

Process Description

Conceptual Mining Plan: A conceptual mining plan based on technical and economic considerations has been put in place to ensure a sustainable mining operation. The entire deposit will be mined up to 45m depth. The block will be mined section by section, so that as one section is exhausted, it will be refilled by waste generated from adjacent section. The mining operation will be phased: Phase I will involve the initial mining operation at south of River Mimi while phase II will succeed Phase I and will be at the south of River Mimi.

For the first 5-year period, preparatory works will be carried out (within first six months) and full-fledged mining operation will start. During the second 5-year period, there will be no overburden removal but mining of limestone. At the end of 10th year, the south block will reach its ultimate level.

In the third 5-year period, the area mining will shift to the north of River Mimi and a new set of approach ramps will be needed to access the mine pits, about 7 million tonnes of overburden will be removed up to the ultimate pit limit. Prior to that, the topsoil (arable soil of first 0.3 m) will be removed first and will be spread in the overburden dump for reforestation, followed by removal of rest of the soil and other overburden. Out of the 7.0

million tonnes of overburden material around 3.62 million tonnes will be utilized as corrective material and the remaining 3.38 million tonnes will be used to refill the exhausted portion south block and to form the bund along the diverted course of River Mimi. An area about 13 hectares at southeastern corner of the pit will be refilled up to +265 RL. The topsoil removed during this period will be stored separately to be used for reforestation.

During the fourth 5-year period, since the overburden is removed up to the conceptual limit there will be no further overburden removal during this plan period. At end of this period, the entire limestone will be mined down to the economic level and the pit will attain its conceptual limit. The top arable soil stored during the first five years period will be spread over the refilled area and then afforested.

Mining Activities/Process: The activities/processes for the mining operations include:

- Clearing of bushes over an extent of about 900,000 sq meters;
- Mining to a maximum depth of 45m;
- Scrapping and storing of the top arable soil of 0.3m thick in the bush cleared areas;
- Removal and storage of other top soils around 1.5m height for future afforestation purposes;
- Formation an approach ramp to reach the floor of one beach (+250RL);
- Landing the ramp in the floor level and mining al the overburden along with some limestone above this level (+250RL); and
- Stacking the mines limestone separately for future use.

Drilling Activities: The drilling activities will be carried out by self propelled crawler equipped with dust extraction and collection system - this facility will completely eliminate air borne dust generated during drilling operation.

Hauling: For hauling, 10 90-tonnes dumpers and 8 40-tonnes dump truck will be used for limestone, additives and reject handling. The equipment will be transported on a well-laid road within the mine that will be constructed and maintained.

Crushing: The limestone will be transported to the crusher, which will be installed just adjacent to the mining area. The distance between the mine entrance and the crusher hopper will be around 400m.

Belt Conveyor: The crushed materials (both additive and limestone) will be transported from the point of crushing to the stacking area in the factory via an approximately 6.9 km long conveyor belt. The conveyor will be covered protect against the weather conditions.

Baseline Environmental Characteristics

The characteristics of the natural environment are similar to the cement plant.

Surface Topography: The mine areas are defined by hills in form of ridges tending in a north-south direction. The terrain is very rugged and comprise of quartzite ridges sometimes rising as high as 100 meters above the low lands. The area is drained mainly by River Mimi and its tributaries, which discharge into the River Niger.

Geology: The regional geology of the study area consists of basement complex rocks predominated by strongly folded gneisses and meta-sediments. The rock type found in the study area includes of schist, pegmatite, quartzite, limestone, granite and granulites. An overburden of 2 to 8 meters thick of soil overlies the limestone.

Surface Water: River Mimi is a semi-seasonal river, flowing during the rainy season and some part of the dry season, but ceases to flow at the peak of the dry season. Generally, the results of the chemical analysis of water samples shows that surface waters in the quarry area were not polluted at the time of this study.

Sediment Characteristics: The sediments found in River Mimi were generally sandy with ph in the range of 5.20 to 6.24. The total nitrogen content varied from 0.02 to 0.05%, organic carbon, 0.19% to 0.54% while organic matter content ranged from 0.45 to 0.66%. The various parameters measured showed a similar trend during both dry and wet season.

Vegetation Type: The vegetation type can be broadly classified as Guinea Savannah with typical tree species that that are similar to the plant site.

Adverse Impacts: Proposed Mitigation

Identified Impacts	Mitigation Measures
<ul style="list-style-type: none"> Erosion hazards due to bush clearing & soil disturbance. 	<ul style="list-style-type: none"> Erosion control measures will be put in place, which will protect exposed surface with vegetation. Bush clearing will be done according to land space requirement so as to avoid the generation of large biomass at the same time. Cleared vegetation will be stacked off the path of run-off water to avoid being carried into the stream course.
<ul style="list-style-type: none"> Impacts associated with mine pit lakes. 	<ul style="list-style-type: none"> About 13 hectares in areas south of the mine will be refilled up to +265 RL and the remaining will be used as water reservoir to be used for reforestation and other purposes. The overall pit slope will be maintained around 45⁰ to avoid bench failure, and the pit lakes will be useful in groundwater recharge
<ul style="list-style-type: none"> Impacts associated with overburden removal 	<ul style="list-style-type: none"> The surface soil layer will be stored separately from the rest of the overburden. The entire periphery of the mine will be banded and garland drainage provided to avoid inrush of surface water during rainy season.
<ul style="list-style-type: none"> Possible impacts on groundwater during mining 	<ul style="list-style-type: none"> Provision of sump to accommodate any seepage, and for settlement of suspended solids, and the water will be pumped into a settling tank for desiltation before discharge into the stream. Also bund garland drainage will be provided on the entire periphery of the mine and sides of the stream and River Mimi

	to avoid inrush of surface water during rainy season.
<ul style="list-style-type: none"> Impacts associated with mine water discharge 	<ul style="list-style-type: none"> Mine water discharge will be carried out only when there is excess water in the mines. The natural river flow will be considered to avoid the possibility of flooding downstream
<ul style="list-style-type: none"> Impacts associated with blasting 	<ul style="list-style-type: none"> Optimum spacing of boreholes to avoid flying fragments. Minimisation of vibrations using millisecond non-electric delay detonators. Use of less detonating fuses to avoid plaster shooting, and timing of blasting to minimise noise impacts.
<ul style="list-style-type: none"> Loss / disruption of livelihoods/ physical displacement of persons. 	<ul style="list-style-type: none"> A resettlement audit has been prepared according to IFC's OD4.30, which will form the basis for livelihood restoration. After exploration, trenches and pits will be covered.
<ul style="list-style-type: none"> Creation of breeding grounds for disease vectors. 	<ul style="list-style-type: none"> Inspect for the presence of disease vectors and help in strengthening of local health facilities through public enlightenment and direct contributions in terms of provision of infrastructures, etc.
<ul style="list-style-type: none"> Health problems associated with dust / atmospheric emissions 	<ul style="list-style-type: none"> Use of covered conveyor. Landscaping of exposed areas / use of water browsers to control dusts. Machinery will be maintained in good conditions to minimise emissions.
<ul style="list-style-type: none"> Influx of people in search of employment and market speculators 	<ul style="list-style-type: none"> A comprehensive influx management and community development plan will be put in place to cover the entire cement development project of which this project is a component part.
<ul style="list-style-type: none"> Escalation of HIV/AIDS issues in locality 	<ul style="list-style-type: none"> A HIV/AIDS awareness and prevention program will be put in place to guide staff control their conducts. Support NGOs to empower inhabitants of communities to take informed decisions about sexual behaviours. Strengthening of healthcare system to provide voluntary counselling and testing for workers / members of host communities.
<ul style="list-style-type: none"> Occupational safety and health impacts 	<ul style="list-style-type: none"> Hazardous working conditions will be eliminated. Health clinics will be put in place and ambulances provided for emergency evacuations

Decommissioning/Abandonment

Decommissioning of the project will as such be done as follows:

- In the first 5-year phase, removal of topsoil and formation of approach ramp will take place. An area of about 14 hectares will be re-vegetated around the mines office, workshop and the area adjacent to crusher.
- At the end 2nd 5-year stage, the south block would have been exhausted and ready for refilling and about 10 hectares will be re-vegetated.
- In the third 5-year Plan Period, an area of about 13 hectares at south-eastern corner of the pit exploited for additive on the non-mineralised area will be refilled up to +265 with materials from the reject dump located in the south block. The top arable soil stored during the first five years period will be spread over the refilled area and then re-vegetated. The remaining mined out area will be used as water reservoir.
- In the fourth 5-year plan period, there will be no developmental activity. Mining activity, which started in the area north of River Mimi in the third phase, will continue until the lowest bench is achieved. However, the re-vegetation of the refilled portion of the pit (about 13 hectares) will continue during this period.

At the expiration of the useful life of the project, all movable assets will be removed and either sold or used for another quarry. Almost all the equipment and machinery may be used for other industrial purposes. All plant facilities and machinery that will not be deemed to be of further use will be sold off as scrap materials.

DAM AND RESERVOIR

Project Alternatives Considered

Prior to the choice of the proposed project, five alternatives were considered and these include:

1. 'No project' scenario: This was rejected as it counters development, since the cement plant cannot be operated without water.
2. Exploitation of groundwater: This is not feasible as investigations revealed that groundwater resources are inadequate to sustain the establishment of the cement plant: the geology of the study area is underlain by basement complex rocks, characterized by igneous and metamorphic formations with low aquifer porosity and slow recharge capacity.
3. Source water from elsewhere: This option is also not feasible as Obajana and its environs are devoid of municipal waterworks. Besides, there are no nearby water sources that can sustain the operations of the proposed Obajana Cement Plant.
4. Obtain from River Oinyi (without dam): This entails pumping water from River Oinyi without damming, which is also not feasible because the river is seasonal and dries up during the dry season. Besides, there are no permanent water bodies in the area.
5. Construct a dam: This is the proposed project, which is the construction of an earth fill dam across River Oinyi. This option was considered the best option because it will guarantee sustainable water supply to the proposed cement factory, utilise rainwater that would otherwise be wasted, and provide other opportunities like provision of

recreational site, increase in fisheries resources, and potential for improvement of biodiversity conservation.

Beneficial Impacts

Because the cement project is viable and there is the apparent lack of existing water supply to sustain its operation, efforts to provide the needed water to the plant will be of immense value. The value of the proposed earth dam project, therefore, lies in the need to operate the Obajana Cement Plant so as to achieve all the anticipated benefits associated with the operation of the cement plant. The dam will also provide a water supply to local communities during the dry season.

Description of Proposed Project

The scope of work of the proposed Obajana Earth Dam project is as follows:

- Installation of penstock inlet/outlet works;
- Construction of embankment and related facilities;
- The construction of spillway and related facilities; and
- Construction/installation of Pump House, pump assemblage and pipeline for transporting water to the Obajana Cement plant.

The details of design parameters of the dam are as follows:

Total Annual Rainfall	1071.3 mm
Catchment's Area	70 km ²
Average Annual Runoff	74,988,620 m ³
Type of Dam	Homogenous (Zone Earth Fill)
Total Volume of Earth Fill	68,826.0 m ³
Total Storage (at crest level)	5,166,666.66 m ³
Active Storage Capacity (ASC)	4,277,666.67 m ³
Dead Storage Capacity (5% of ASC)	258,333.33 m ³
Surface Area	130 Hectares
Expected Time of filling	2 days
Maximum Base Width	75.95 m
Maximum Height	12.9 m

The dead storage is independent of active storage: dead storage water cannot be released (even through penstock control valve) under any condition.

Operations and Maintenance Philosophy

The dam design incorporates features that will guarantee a desired economic lifespan of 50 years. The dam is designed for unmanned operations, but the reservoir will be monitored periodically. Although detailed geophysical and geotechnical investigations indicate that the embankment strength is sufficient for the reservoir, a standard water reservoir monitoring policy will be put in place.

Baseline Environmental Conditions

The characteristics of the natural environment are similar to those of the cement plant.

Climate / Air quality: The project area lies within the sub-humid tropical zone, and has a mean annual rainfall that ranges from 1100 to 1320mm. It experiences two main alternating seasons: dry and wet seasons. Rainfall lasts from April/May to September/October,

characterised by moisture laden Southwesterly winds blowing from the Atlantic Ocean, while the dry season lasts in-between with predominantly Northeast trade winds.

Total suspended particulate (TSP) concentrations along River Oinyi range from 5.0 to 25.0 $\mu\text{g m}^{-3}$. The upstream areas of River Oinyi (mostly remote and pristine) had lower concentrations of TSP, while the Obajana area is moderately inhabited, busy and had higher ambient concentrations of TSP. The downstream sections are also generally without any significant human habitation, except for some nomadic Fulani tribesmen who live in the interior of the forests, with near pristine air quality.

Geology of the Area: The geology of the study area consists of Basement Complex rocks, predominantly composed of folded gneisses and metasediments. The dam site is characterised by two types of landforms: domed shaped residual hills and river valleys.

Drainage: The dam study area is drained by a single large river called River Oinyi, which is a tributary of River Niger to its west. The Oinyi River is semi-perennial with portions of it seasonal in nature (ephemeral), flowing only after rains. The streams are turbid at the beginning of the rainy season due to high clay content of runoff water that drains into the river during this period. The Oinyi River has a semi-perennial flow, while most of the smaller stream and drainage lines that dissect the hills are water-barren during the dry season. The surface water resources of Obajana are used for domestic, agricultural and industrial purposes.

Hydrogeology / Hydrology: There are two types of aquifers in the Obajana area: fractured crystalline aquifer and soft overburden aquifer. The overburden aquifers usually consist of 2 to 3 layer sequences made up of sands, gravel, silts and clays. Groundwater in these aquifers occurs mainly under unconfined water table conditions. The water table is not so deep, mostly not more than 20 - 30m below ground level.

Water Availability: There are serious water supply problems in the area of study due to its geologic history, basement nature and difficult terrain. Groundwater reserves in the area are generally low, because there is high run-off of rainfall and slow aquifer recharge due to the nature of topsoil in the area, and the basement terrain of the area. However, potentials for the development of surface water resources exist.

The inhabitants in the area source their water from hand-dug wells and the semi-perennial Oinyi river system. This river serves as a major source of domestic water for the inhabitants of Obajana area and other settlements in the area. Rain harvesting is a good source of clean water, more especially as there is an abundance of rainfall in the area during the wet season. It is one of the major sources of water for domestic purposes in the area, though little attention is given to its importance.

Other sources of water in the area are streams and crudely excavated wells. As these willow water wells dry up, the people (usually women and children), are often forced to trek long distances to fetch water.

Surface Water Quality: The surface water was not polluted and there were no obvious differences in measured physico-chemical parameters of the river in both wet and dry seasons.

Hydrobiology: Although fishes constitute part of the ecology of the temporary pools of surface waters that abound in the valleys within the study area, there is a general absence of fishermen in the study area mainly because of the absence of fishes in the river to warrant profitable exploitation. However, youths do catch fish in the numerous pools of water, using fish nets/hooks, and their catch included Catfish and Tilapia.

Vegetation/Biodiversity: The vegetation pattern of the study area is basically moist savannah as for the quarry and plant site. The hilly areas located westwards from the proposed dam site is known to contain a rich assemblage of wildlife species: a previous study has listed a total of 38 species, belonging to 24 families, as existing in the Obajana area. These include 17 mammals, 14 birds, 5 reptiles and 2 amphibian species. The most frequently hunted animals include antelopes, monkeys, hares, rats, and guinea fowl.

Adverse Impacts: Proposed Mitigation

Identified Impacts	Mitigation Measures
Sedimentation in the reservoir.	<ul style="list-style-type: none"> • Ensure regular penstock releases • Increase frequency of releases when sediment load of inflowing water increases. • Ensure catchment's protection and watershed management
Release / accumulation of by-products of anaerobic decomposition	<ul style="list-style-type: none"> • Ensure regular penstock releases • Monitor water quality, including penstock releases
Migration and productivity of fish species.	<ul style="list-style-type: none"> • Ensure spillway is free from any blockage • Seed fish, if necessary, to maximise fisheries productivity.
Changes in primary productivity due to biochemical reactions	<ul style="list-style-type: none"> • Ensure penstock releases (from the lower depth of the dam) • Spillway will release water from the surface
Risk of eutrophication / growth of non-native and/or invasive species.	<ul style="list-style-type: none"> • Monitoring of in-stream water quality • Partner in enlightenment for increased environmental awareness in surrounding communities.
Opportunistic growth of aquatic macrophytes in the littoral and sub-littoral zone of the reservoir	<ul style="list-style-type: none"> • Monitor for any unusual floral species • Remove such species when seen.
Creation of favourable habitats for the growth and proliferation of disease vectors	<ul style="list-style-type: none"> • Monitor the presence of disease vectors • Contribute to strengthening of local health facilities through public enlightenment • Contribute public health programmes to eradicate / protect against malaria, schistosomiasis &, etc • Direct contributions in terms of drugs, provision of infrastructure, etc. • Spillway ensures continuous flows, hence the likelihood of creation of habitats for bilharziasis is remote
Alterations in the flow of water	<ul style="list-style-type: none"> • Adequately divert the river away from

and changes in water quality during the construction of the dam embankment	<ul style="list-style-type: none"> • construction areas • Ensure good practices
Obstruction of flow of the River Oinyi during dam filling.	<ul style="list-style-type: none"> • Carry out commissioning at the peak of the rainy season • Ensure penstock releases if flow is critically below expectations.
Changes in downstream water quality	<ul style="list-style-type: none"> • Ensure regular penstock releases, • Monitor quality of penstock releases • Increase frequency if necessary.
Impacts due to air emissions/noise, and dust generated during earthwork / construction	<ul style="list-style-type: none"> • Ensure that emission levels of machinery are within permissible limits. • Ensure that there is no night work
Enhanced erosion / changes in topography due excavation.	<ul style="list-style-type: none"> • Put erosion control measures • Obtain earth fill from flooding zone. • Re-vegetate with native species
Risk of accidental drowning. Injuries during dam construction and/or due to vehicular traffic	<ul style="list-style-type: none"> • Keep unauthorised persons away from dangerous zones • Put warning signs (written in English and local languages) at strategic sites • Ensure regular monitoring of embankment, penstock and spillway.
Changes in downstream ecology	<ul style="list-style-type: none"> • Ensure minimum ecological releases, • Monitor seepage /penstock release volumes
Possibility of creation of mosquito breeding grounds due to the alteration of the natural flow pattern of river Oinyi through penstock releases during dry season	<ul style="list-style-type: none"> • Minimise penstock releases during the dry season and monitor and control the possible creation of mosquito breeding sites
Loss of terrestrial habitats due to impoundment	<ul style="list-style-type: none"> • To put in place catchment protection and watershed management plan
Socio-Economic/Health Impacts	Mitigation Measures
Loss of control / income of land to be inundated by the reservoir	<ul style="list-style-type: none"> • A resettlement audit has been prepared according to IFC's OD4.30, which will form the basis for livelihood restoration. • Compensate for farm crops and/or economic plants. • Liaise with chiefs to allocate alternative land to farm. • Subsidise clearing new farmlands and assist affected farmers
Risk of introduction of new diseases as schistosomiasis	<ul style="list-style-type: none"> • Monitor for the presence of snails of <i>Bulinus</i> species • Contribute to strengthening of local health facilities

Changes in downstream water quality	<ul style="list-style-type: none"> • Monitor water quality • Provide appropriate alternative source of water for downstream settlers
Gender disparity in the adverse effects of land take	<ul style="list-style-type: none"> • Gender equity in compensation • Ensure payment is to affected women.
Massive influx of people during dam construction	<ul style="list-style-type: none"> • Strengthen basic facilities • Avoid actions that could cause or escalate tension • An influx management plan being prepared to address influx related issues
Changes in sexual behaviours leading to the spread and/or escalation of sexually transmitted diseases (including HIV/AIDS) and unwanted pregnancies	<ul style="list-style-type: none"> • Enlighten personnel about STDs (HIV/AIDS) and use of condoms. • Partner with NGOs in campaign to stop the spread of HIV/AIDS. • Help strengthen healthcare system
Conflicts resulting from insensitivities of dam construction personnel to the local culture, traditions and lifestyles	<ul style="list-style-type: none"> • Educate workers on the cultural sensitivities in the host communities. • Identify with the host communities during festivals
Reduced availability of river water, downstream (especially during dry season) to downstream users	<ul style="list-style-type: none"> • Ensure penstock releases during dry season to mimic minimum ecological flows

Compensation Measures

Some measures of compensation are considered as part of the environmental management plan. This is considered as some form of repayment for residual adverse effects, or impacts that can neither be avoided nor adequately mitigated. These include the following.

- Ensure the preservation of the dam catchments area especially the hills to the northwest of the proposed dam site.
- Collaborate with Kogi State government and relevant NGOs/CBOs to adopt measures that will enhance the protection of the watershed as compensation for biodiversity losses due to the proposed dam.
- Seeding of dam with fingerlings to enhance fisheries potentials.

Explore the possibility of integrating the dam and the watershed into a nature reserve.

Decommissioning/Abandonment Plan

At the end of the design life, the dam will be decommissioned and abandoned. A comprehensive plan will be prepared for the restoration and subsequent protection of the ecosystem. The decommissioning and abandonment activities will comply with international standards (World Commission on Dams).

PART 2 - GAS PIPELINE

Background

The cement factory will be equipped with a 135 MW Gas/Steam turbines to generate its own electric power for use by the cement kilns and other production processes. The natural Gas supply will originate from a tie-in point on the NGC Oben - Ajaokuta gas supply line. The envisaged gas volume requirement is 68.2 Mmscfd (million standard cubic foot per day), considering 100% capacity of two lines of cement plant and three gas turbines in operation. The project consists of an 18"x 90km long Gas Pipeline that will run from Ajaokuta at a tie-in point from a manifold to Obajana. The gas pipeline will supply natural gas 68.2 Mmscfd as the primary fuel for the generation of electricity and turning of kiln at the proposed Obajana Cement Factory in Kogi State.

Consequently, the gas pipeline system is designed to achieve a maximum delivery of 70 Mmscfd. The design pressure and temperature of Ajaokuta - Obajana pipeline is 100 barg and 50 deg C respectively whereas the maximum allowable operating pressure is 55 barg with expected operating temperature of 32 deg C. b- Line break valves (LBV) installed at approximately every 30 km and upstream downstream of river crossings to minimize the release of HC incase of line rupture. Slam shut valve has been provided at tie-in to Oben - Ajaokuta Gas Pipeline to perform the same function as LBV. c- ESD system at OCP pressure reducing and metering facility.

Over 90 km of right-of-way (ROW) are to be acquired for the pipeline route.

Value / Benefit of the Project

The development of the proposed gas pipeline from Ajokuta to Obajana is undertaken to utilize abundant natural gas to power cement kilns and generate electricity of 75-100mw capacity at the proposed Obajana Cement Plant. The proposed factory will enjoy quality and more reliable electric power supply. Consequently, the cost of production will be lowered due to the use of cheaper and cleaner source of energy, this will in-turn lower the cost of cement in the country. The utilisation of gas for the factory will also contribute to the gas flare-down policy of the Federal Government of Nigeria.

Envisaged Sustainability

The proposed gas pipeline project is both economically, technically and environmentally sustainable. Complete reliance on NEPA with the present low/inadequate generation of electricity in the country by industries and individuals will lead to stoppages culminating in facility under-utilisation. Gas, a by-product of oil production is presently being flared. Gas utilisation by industries to generate power, turning of kiln, is a welcome development. Gas reserves in Nigeria runs into over 170 trillion cubic feet (tcf), and can be harnessed and put into commercial use.

Technically, the existing pipeline system capacity has been computed for 62.01 barg pressure, i.e., equal to 90% of pipeline design pressure. Results of analysis carried out indicate that the system capacity is 141.12 Mmscfd. The total gas throughput required at Obajana cement factory is 115 Mmscfd, which includes 34 Mmscfd gas required for future power plants whereas 81 Mmscfd gas is required for present needs. It corresponds that spare capacity of 26 Mmscfd is available for Ajaokuta Steel Company Limited (ASCL) or any other future consumers.

The pipe within road, rail and overhead cable crossings will be with insulated with three layer polyurethane coated carrier pipe in accordance with standard construction specifications. In marshy/swampy areas and water crossings the pipeline would have a yard-applied concrete coating over the external, anticorrosion coating.

The gas supply project to the cement factory can be sustained for a minimum of 25 years.

Project Alternatives

Gas Pipeline Development Options

No Action: This option would favour continued reliance on existing inadequate NEPA Power Supply to Obajana Cement Plant. This alternative is rejected because the present power load for Obajana cement factory of about 75-100mw cannot be met by NEPA alone.

Use Natural Gas to Produce Electric Power for Obajana Cement Factory: This option is **acceptable** due to the following reasons: Natural gas is readily available in Nigeria; utilisation of natural gas to produce power for electricity and turning of kiln is cleaner and more environmentally friendly, than liquid or solid fuels; the growth and increase in productivity of the Obajana Cement Factory will create more employment opportunities for the people.

Gas Pipeline Route Options

1. A new ROW route from NGC gas manifold at Ajaokuta Steel Complex along the Ajaokuta - Okene dual carriage road to Eganyin, passes through Itakpe Iron Ore Company, cut across Okene-Abuja road runs and terminates at Obajana. This route was not acceptable.
2. The proposed new pipeline route from NGC gas manifold at Ajaokuta Steel Complex along the Ajaokuta - Okene dual carriage road to join the existing Pipeline Product Marketing Company of NNPC (Oben -Kaduna) pipeline route at Eganyin in Ajaokuta Local Government Area and veer-off at Lokoja-Kabba junction to Obajana. This route is accepted because of the following considerations.
 - Avoidance of settlements
 - Avoidance of archaeological sites particularly shrines and burial grounds . Avoidance of natural routes for the movement or migration of animals Avoidance of forest reserve areas
 - Acquired 53km of New ROW and 37km of 10 M wide ROW adjacent to the present ROW of PPMC already acquired by PPMC Avoidance of land areas with rock-outcrops or very willow soils (< 2m deep).

Project Scope

Design, Procure, Install/Commission

- Develop the gas pipeline tie-in point to existing NGC Oben - Ajaokuta gas supply pipeline to Ajaokuta Steel Company;
- Engineering and construction of a 18" x 90 km pipeline of API 5L X65, class 600; Install adequate Pigging manifolds and block valve stations;
- Establish a 90 Mmscfd capacity Gas Treatment/Metering Station about 1 km to Obajana cement factory or within the cement yard;
- Acquire a 25 M new pipeline right-of-way (ROW).

Location of Project

The settlements along the route are mainly Ebira, Bassa, Gwari, Oworo and in some cases Hausa, Ibo, Tivs and Yoruba migrants. The main occupations are crop farming, animal husbandry, fishing and petty trading.

Pipeline Activities

Various sections of the pipeline length will be constructed in several stages, each by the main construction team. The activities of this team would result in sections of fully welded pipe, which would be laid in the trench and backfilled. Additional activities would involve field bending of pipes, installation of manifold/valve stations and major water, road and railway crossings also operate as necessary.

In each stage, the pipeline laying and construction will be through a cut and fill process.

Existing Environmental Conditions Relief/Topography

The terrain heightening of most of the areas under study ranges from elevation of 45 - 205m. However, within these ranges, some isolated areas rise up to 400m particularly between Ajaokuta and Itakpe iron ore areas.

Climate/Meteorology

The project area is within the Guinea Savanna zone as the rest of the project.

Air Quality and Noise

With the exception of SPM concentrations that exceeded the limits around Ajaokuta and Itakpe areas, the concentrations of all other air quality parameters measured were below FMOE limits.

Soil

The soil types observed ranged from sand to loam with the sand fraction varying from 68.3-95.3%. The percentage sand content generally decreased with depth at any particular sampling point. The percentage silt content varied from 2.3 - 20.7% while the clay content varied from 2.3 - 20.0%. The soils are acidic to slightly alkaline (pH 3.8 - 7.6).

Vegetation

The vegetation of the entire study area is savanna woodland. It includes the vegetation of the southern and northern Guinea savanna types. Generally, this ecological zone is made up of mixtures of trees, shrubs, herbs and grasses. Within the savanna woodland vegetation, mean tree and shrub density are higher between Eganyin and Obajana (1089/ha) than between Ajaokuta and Eganyin (895/ha), but there were more herbs with higher biomass between Ajaokuta and Eganyin than between Eganyin and Obajana and beyond. Plant species diversity was high in the savanna woodland vegetation, but stem girth measurements at breast height were small. Due to this, timber-size trees decrease as one moved northwards. More than 50% of the total number of economic plants per hectare of land area is leguminous species. The economic importance of these plants vary and they include their uses as fuel, timber, dyes, vegetable, edible fruits and seed trees, medicinal and religious plants and sponge. The economic trees include Ilorin Balsam, Locust bean tree, Abura and Mahogany.

Animal Ecology

The study area is endowed with a large variety of animal species. They vary from small arthropods like mites and ticks to very large mammals like the hippopotamus. The Phylum Arthropoda dominated the invertebrate community; they are represented by insects, spiders, millipedes, etc.

Various groups of vertebrates were encountered and they included amphibians, reptiles, birds and mammals. The large animals encountered were mainly browsers or grazers and they include antelopes and duikers. Others were the white-bellied pangolin, monkeys and fruits bats.

Water Quality

Most water bodies are dry during the dry season. Turbidity levels were high during the wet season and lower during the dry season indicating more turbid waters during the wet season. The values were generally above the FMOE/DPR limit of 10 NTU. The water bodies were slightly acidic or slightly alkaline with pH values varying from 6.1 to 7.8

Fish/fisheries

Twenty-nine fish species distributed in 17 families were identified. In terms of species richness, the families Mochokidae, Bagridae, Characidae, and Cichidae were dominant. Generally, there were more fish during the wet season compared to the dry season. There was no observation of disease infestation, abnormalities or physical deformities. Analysis of the condition factors (KF), an index of the well being of the fish, showed that the fishes were healthy and well fed in relatively undisturbed environment. The factors on the average were well above the critical value of 1.0.

Sediment

The sand fraction varied from 85.9% to 93.4% while the silt content varied from 0-17.8%. The clay content also varied from 0 to 12.0% making the sediment sandy in texture. The sediment samples were acidic (pH4.7-6.6).

Geology

The geology of the area reveals that the rocks are of Pre-cambium crystalline basement complex and the cretaceous (Campanian-Maastrichian) sedimentary of the Mid-Niger Basin.

Hydrology and Hydrogeology

The major water bodies encountered within the study area include River Niger, Ajaokuta, Atami and Osara. Only River Niger flows during the dry season.

Health Status

The public health facilities in the project area consist of health posts, primary healthcare centres and general hospitals. There are also patent medicine stores and traditional medicine practitioners in all the communities. Private healthcare centers exist and renders curative and preventive healthcare services. The tertiary healthcare institutions serve as referral centres.

Based on hospital records, questionnaire responses and on-site observations, the health outcomes in the project area have been categorised as communicable diseases consisting of malaria, diarrhoea, upper respiratory tract infections (e.g., pneumonia), skin rashes, sexually transmitted diseases (STDs), and cerebrospinal meningitis. Non-communicable diseases include insufficient food intake and micronutrient deficiency among immigrants; injury from traffic crashes and collisions on the major highway traversing the project area, accidents from motor-cycle operation in towns and mental disorder caused by substance abuse.

Stakeholder Engagement

Consultations were held with stakeholders that are likely to be affected by the proposed project activities. Consultation sessions will be sustained with Kogi State, Ajaokuta, Adavi, Lokoja LGAs, communities and all the regulatory bodies.

Impacts**Land Acquisition**

Addressed in the resettlement section.

Site Preparation

Site preparation will involve removal of limited amount of vegetation to provide a path for the survey. The removal of wildlife habitat (vegetation) will lead to temporary migration of wildlife. Trenching would involve the use of trenching machines and excavator. There may be changes in water quality at river crossing. Increase in SPM, (dust content) when the trenching is carried out during the dry season is anticipated. There will be temporary road and railway obstruction/diversion during trenching activities. The back filling may affect the drainage pattern of the area if not properly carried out. The back filling may induce erosion, if soil is not properly re-instated. The effect is non-significant, reversible and has short-term duration.

Transportation of Personnel, Equipment, and Materials

Increase in traffic may increase the rate of exposure to accidents. Roads and railways may temporarily be obstructed or diverted to allow for movement of heavy equipment and materials.

Operation and Maintenance

Changes in air quality may occur as a result of emissions from leaks during pipeline operation and maintenance.

Socio-economic

The project will bring about increase in employment resulting in increased income level.

Social Infrastructure

The most common social infrastructures in the host communities are primary and secondary schools, healthcare facilities and water supply systems. The project will engender population growth due to the temporary influx of workers. The capacity of local infrastructures in some of the communities is very limited and so cannot cope with the increased demand that will result from population growth during the construction of the pipeline.

Health Impact Assessment

The beneficial health impacts from the activities of the pipeline project include availability of more job opportunities, which will improve income and make healthcare affordable, probable introduction of immigrants with new skills and perspectives, and the introduction of improved waste management/sanitation methods. The non-beneficial impacts include: increase in communicable diseases especially sexually transmitted diseases as a result of influx of casual labour force, injury from fire outbreaks that may result from pipeline damage and pressure on health facilities in clinics/hospitals as a result of increase in population.

Adverse Impacts: Proposed Mitigation

Impacts	Mitigation Measures
<u>Site Preparation</u> Impacts from removal of vegetation.	<ul style="list-style-type: none"> • Use environmental route/path for site survey. • Avoid excess land take and minimize bush clearing during site survey.
Impacts on wildlife	<ul style="list-style-type: none"> • Enforce "no hunting of game animals" during site preparatory activities.
<u>Construction Phase</u> Noise/emissions from equipment	<ul style="list-style-type: none"> • Use equipment, which emit low levels of noise with acceptable exhaust gases, which conform to national standards and specifications.
Solid waste generation	<ul style="list-style-type: none"> • Enforce proper waste management practices and good in-house sanitary practices for base camp workforce.
Removal of productive land	<ul style="list-style-type: none"> • Use existing access/right of way if available.
Silt from run-off during construction	<ul style="list-style-type: none"> • Carry out major construction/civil works during dry season or provide silt curtains to control the suspended particles in the run-offs. Wet grounds to reduce dust.
Impacts on streams and other water bodies	<ul style="list-style-type: none"> • Reduce water and road crossing for pipeline, plan for run-off during wet season.
Impacts from removal of vegetation	<ul style="list-style-type: none"> • Reduce time frame between clearing trenching, pipe laying, and backfilling/revegetation.

.Health and safety of construction area	<ul style="list-style-type: none"> • Prevent intruders/from inquisitive onlookers from work site to protect them against welding radiations. • Use proper PPE including ear defenders at high noise zones. • Place/caution signs.
<u>Pre-commissioning Phase</u> Corrosion	<ul style="list-style-type: none"> • Enforce the installation of cathodic protection devices on the pipes to maintain their integrity/prevent corrosion.
<u>Operation Phase</u> Impacts from encroachment from people/vegetation	<ul style="list-style-type: none"> • Ensure regular maintenance of right of way for pipeline.
Vandalism	<ul style="list-style-type: none"> • Provided security to prevent vandalism.
<u>Decommissioning and Abandonment Phase</u> Loss of habitat	<ul style="list-style-type: none"> • Re-vegetate all bare areas and restore site to original land use.
Loss of productive land	<ul style="list-style-type: none"> • Restore land to original form as much as possible and return to indigenes. • Return ROW to indigenes for other land-use.
Removal of pipeline	<ul style="list-style-type: none"> • Educate/guide road users on days of movement of dismantled parts.

Operations Control/Monitoring of Gas Pipeline

Pipeline pressure will be monitored at the pipeline manifold (valve) end at Ajaokuta and flow will be measured at the terminal points at Obajana. These measurements will act as additional indicators that the pipeline integrity is being maintained. Communication between the operations at the Ajaokuta terminal and the terminal at Obajana will be via both radio and telephone systems. Regular surveillance of the pipeline route will form an integral element of the integrity monitoring system.

PART 3 - RESETTLEMENT AUDIT

Introduction

As part of project appraisal, IFC requires assurance that any resettlement resulting from the Project be undertaken in accordance with IFC's Safeguard Policy on Involuntary Resettlement (OD 4.30). This report assesses the measures that OCP has taken to address issues of resettlement associated with the Project and recommends further actions for the Government of Nigeria and the Company to undertake to ensure compliance with IFC's safeguard requirements.

Scope of the Review and Audit

During the field visit, the Team interviewed 27 male and female community members of Oyo and Obajana villages about the land take and compensation process. Each community member was asked to report the quantity of crops and trees affected, the amount of compensation paid, whether s/he was present at the time of enumeration and at payment delivery, whether s/he was satisfied with the process, any complaints made and outcome of any grievances made. To assess individual investment in livelihood restoration and the effectiveness of cash allotments, community members were also asked to disclose how they spent the compensation money. Of the 27 interviewed, 11 were Oworo (originates), 4 were Tiv, 9 were Igbira and 3 were Bassa. Interviewees were equally split among women and men. Group consultations were also conducted with the chiefs and community members of Obajana, Oyo, Iwa, and Apata villages. Finally, interviews were conducted with Dangote Industries Ltd. staff and consultants, the Kogi State Commissioner of the Ministry of Environment and Physical Development and the Deputy Director, Department of Valuation in the Kogi State Ministry of Environment.

Land Use Rights and Procedures

All land is owned by the State. The Governor of Kogi manages the land on behalf of the people. When land is taken for public or private use, one must obtain permission from the Government. According to the 1978 Land Use Act, the office in charge of land take and resettlement is the Lands Department. In Kogi State, the relevant authorities are the Ministry of Environment (MOE) and the Lands Department. The Government recognizes the customary land use rights that existed prior to the passage of the 1978 Land Use Act.

During the field visit, Obajana was declared an urban area. This gives the Kogi State Government the authority to plan the city. The State will now issue titles in place of the Lokoja Local Government.

Traditional Land Use among the Affected Communities

The resettlement audit focused on the four communities of Obajana, Oyo, Iwa and Apata. Land used by the Obajana community is under the traditional authority of the Obajana, which together with Apata are under the paramount leadership of the Olu of Oworo. The Chiefs of Obajana and Apata are both non-classified village chiefs, while the Olu of Oworo is a 2nd Class chief recognized by both the State and Local Government Authorities.

Land Take

Field investigations confirmed that there has been resettlement as a result of the Project to date. According to the EIA, approximately 2,500 people have been affected. All

resettlement associated with the Project, however, has been economic in character with no physical movement of people. The major challenge associated with rural resettlement is to restore the income of affected people who have limited or no access to their productive assets without compromising the social and cultural continuity and lifestyles of their communities.

From 2002 – 2004, the Company took Obajana and Oyo land in seven separate areas for the following facilities/uses: factory site; housing estate; burrow pit; conveyor belt; truck park; dam; and pipeline.

At each of the above sites, economic trees and crops owned by communities, individual villagers and migrants were affected. Twelve structures belonging to Oyo community were affected along the conveyor belt route (a church, a hut, eight mud houses, and two kitchens).

Replacement Land

Affected villagers were provided with replacement land of comparable quality and of equivalent value to the land acquired from them. No serious complaints were made regarding the replacement land and few of the villagers mentioned the quality of their land unless directly asked. Several of the villagers in Oyo and Obajana mentioned that it was inferior to or smaller in size to the acquired land; however, none mentioned the presence of bad spirits. That friendly spirits inhabit the replacement land is a positive signal that villagers are more or less satisfied with it.

Issues Raised by the Community and Government of Nigeria

In addition to the replacement land provided by the community, affected villagers who lost crops and trees as a result of land take were eligible to receive compensation from OCP.

Process for enumeration and valuation of crops and trees

With the exception of the pipeline, the government agency in charge of resettlement (the Kogi State Ministry of Environment Land Office (“LO”)) was not involved in the enumeration and valuation of crops and trees in areas taken for land use by the Company. According to the Land Office, no one on the team was licensed by the State in valuation methods. As a result, additional measures are proposed under the environment, health, safety and social action plan to address the lack of participation by the Land Office in the enumeration and valuation that was carried out for the land take.

According to the villagers, the team did not make an accurate count of trees and crops. The teams did not reportedly use the standard practices of the Land Office in measuring in measuring land area or in counting trees. In some areas, the land was cleared prior to enumeration making it virtually impossible to assess actual numbers. As a result of these haphazard procedures, it is very likely that the reported number of trees and crops severely underestimate the actual number of trees and crops affected.

While these claims are difficult to substantiate, as they are based on verbal reports, analysis of the compensation records support villagers’ claims that crops were not always properly assessed. The records reveal that no systematic practice was followed to value crops based on land size.

Furthermore, there are still outstanding claims with respect to trees and crops once located at the factory site, housing estate, truck park, burrow pit, dam area, conveyor belt, and initial pipeline route. Most claims involve the presence and number of trees actually on the site before clearing. Payment of compensation for farm crops and economic trees along the pipeline route, including the cleared but faulted line is on-going at the offices of the State Ministry of Environment (Lands Dept) and will be completed by the 31st of January 2005.

The Land Office is in the process of enumerating the trees and crops along sections of the pipeline route. The assessments are generally made in the presence of a community member and the landowner. Valuations are made according to tree numbers and crop areas (in hectares). Where there is mixed cropping, the most prevalent crop is valued.

The process of enumeration and compensation at the pipeline is not an issue at this time, as the Land Office appears to be applying consistent procedures that are an improvement to Company procedures. If the official rates are used, thereby according higher compensation for the economic trees, the villagers in the other communities may increase the scale of their demands for additional supplementary payments. Regarding IFC policy, it is most probable that regardless of the rates applied, some additional benefits will need to be provided.

Second, public consultation could have been improved on: the time frame for enumeration and disclosure of counts to the Apata community; the procedures employed; administration of the land surveys and valuation; and notification of the change in leadership from the Company to the Land Office.

Adherence to IFC Policy and Nigerian Law

The lack of involvement by the Land Office in the survey of and compensation for all areas other than the pipeline is inconsistent with best practices on consultation and goes against the 1978 Land Use Act, which states that organs of the state Ministry of the Environment will oversee all environmental matters, including resettlement.

OCP does not yet meet the standards for resettlement and compensation set by IFC/FMO in three areas.

1 Consultation and disclosure of information with affected persons/groups

Affected persons need to be systematically informed and consulted about their opinions and rights. Particular attention should be given to vulnerable groups living in the project area. Public consultation did not meet IFC/FMO standards because it did not occur prior to enumeration. Chiefs and land owners were made aware of land take only at the time of enumeration and/or land clearance. Because IFC/FMO were not involved in the project at this time, the standards did not apply.

2 Formal and transparent process for settling claims

There does not seem to be a formal mechanism in place for settlement of claims. The lack of established grievance mechanism is compounded by the fact that the Land Office does not have a record of the transactions and does not know resettlement process at six of the seven sites. OCP will need to put in place a grievance mechanism that is formal, transparent and responsive.

3 *Compensation at full replacement cost*

Displaced persons should be compensated for their losses at full replacement cost prior to the actual move. Enumeration, valuation, and compensation for lost land should have occurred prior to clearance according to IFC/FMO standards. The Company will need to improve its procedures for compensation to meet IFC/FMO standards. A review of the compensation records suggests that compensation for perennial crops and all trees was below replacement value. In some instances, the rates applied by the Company were lower than Land Office rates.

Loss of Hunting Grounds

The Obajana community claims that they lost access to a major hunting area when the factory site was cleared. Neither the Company nor the Government provides compensation for moveable assets, such as wild animals. According to IFC policy (OD 4.30 p. 5 (15)), all income lost because of displacement needs to be replaced and/or restored. Estimates allow assessment of the magnitude of income lost for the determining suitable income earning alternatives, or both.

Adequacy of Compensation Payments

According to IFC OD 4.30, compensation should be at full replacement cost (the cost of materials and labour to replace the lost asset). The market value of an item is generally considered to reflect replacement cost.

Compensation Rates

The analysis points to the following conclusions:

- In the case of crops, the Company rates are higher than the Land Office rates but lower than current market rates. It is assumed that the differential between LO rates and market prices reflect labour and other costs. The Company compensation rates for crops appear to cover replacement costs, if not exceed them. However, they are likely to be low as the number of crops was underestimated.
- The Company under-valued economic trees and perennial crops. The rates paid by the Company were lower than LO rates and below market prices.

Corrective Actions

To bring the Company's compensation program in line with IFC requirements, corrective actions will be necessary. In considering the appropriate corrective actions, the following things should be noted:

- IFC policy and practice prefer that people be provided with replacement assets rather than cash payments. Thus, the corrective actions should emphasize replacement of assets and income restoration rather than additional compensation. The IFC requirement is for assistance during the period when the assets are not yet productive.
- The Company, however, should meet government requirements with respect to compensation rates. The Company will need to review, with the government, all past compensation to determine if and how much additional compensation should be paid to meet government requirements. The analysis here shows that crops have by-and-large been at above government rates; the difference is mostly found in compensation paid for trees.

- Compensation for crops was probably still below replacement cost. Company rates should therefore be adjusted upwards by a small margin. People who lost farming land as a result of the project have received other land on which to farm. The needs appear to be in improving the productivity of the new land and in restoring livelihoods and other benefits from trees.
- With respect to corrective action for economic trees, fruit and nut bearing trees can be restored to productive levels typically within 2 to 10 years, but in the case of kola nuts 15 years. Assistance should recognize this time period.
- Economic trees other than fruit and nut-bearing trees belong to the community in the person of the chief. Thus, it is reasonable that a community development program, which includes programs that help restore the livelihoods of individuals, is an appropriate compensation mechanism for closing the gap between the past land acquisition and IFC requirements.
- According to the analysis, lost benefits from the trees for Oyo and Obajana are approximately 6.5 million naira over a period of 9 years. The period reflects the weighted average period of regeneration for the lost trees. This amount will be more than covered by the planned community development program, elaborated below.

Income Lost from land take in the hunting area

Obajana community claims that they have lost income from animals they hunted in the forest at the factory. Based on the land area (6.25 square kilometres), hunting frequency, and prices ascertained through interviews with locals, annual income lost to the Obajana community from hunting is estimated to be 2.1 million naira per year. Income replacement measures should cover this amount as well. The Company should also undertake to protect the forest under its control and work with the government to develop better management of the surrounding natural environment.

Livelihood restoration and next steps

One of the main tenets of OD 4.30 is that resettlement should be viewed as a development program in which project-affected persons (PAP) are able to restore or improve their livelihoods. OCP already has a community development program under preparation that will provide benefits in excess of the above-suggested levels of community support. The community development program, directed towards the affected communities, would provide the needed corrective actions to meet IFC policy. It is strongly advised that OCP includes the Kogi State Ministry of the Environment and its Land Office in the planning and implementation of all community development initiatives.

Replacing lost income from trees and crops

Because the estimated amounts of potential additional compensation are large enough that they cannot be easily absorbed by the communities, it is advisable for Dangote Industries, in consultation with the chiefs and the Kogi State Ministry of the Environment, to appropriate compensation toward projects that will benefit the communities in the long term, such as improvements in agriculture, afforestation, small-scale infrastructure, civil works, training and education opportunities. OCP may want to consult with local agricultural experts and NGO representatives as to the most suitable indigenous systems. Wherever possible, the systems should be operated and maintained by the communities themselves. The specific projects should be detailed in the Influx Management/Community Development Plan (IMCDP), which is under development by OCP.

- The Company is already committed to providing 20 million naira toward local community development. This amount is more than double the amount estimated to be needed to meet IFC standards. IFC will require that at least 8.6 million naira go each year toward projects that clearly address the objectives of its resettlement policy.
- Make good on promises. According to the chiefs, OCP made a number of promises that have not been kept. Establishing a community investment strategy will help communities propose ideas that will lead to sustainable benefits, such as employment and improved agricultural technologies.

Future Physical Resettlement

Dangote Industries Ltd. should prepare a Resettlement Policy Framework to ensure that all future land acquisitions are in line with IFC/FMO requirements.

Formal Grievance Mechanism

OCP must ensure that procedures are in place to allow affected villagers to lodge a complaint or a claim without cost and with the assurance of a timely and satisfactory resolution of that complaint or claim. In addition, the Project may have to make special accommodations for women, members of vulnerable groups, and non-indigenes to ensure that they have equal access to grievance redress procedures.

PART 4 - ENVIRONMENTAL ACTION PLAN

See separate document (Environmental, Health and Safety and Social Plan (EHSS Plan) for the Obajana Cement Company PLC (OCP) – Dangote Industries Ltd (DIL) – Nigeria.