



**AFRICAN DEVELOPMENT  
BANK GROUP**

**PROJECT: Indorama Eleme Fertilizer II**

**COUNTRY: FEDERAL REPUBLIC OF NIGERIA**

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**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) SUMMARY**

**Date:** *March 2018*

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|---------------------------|-------------------|-------------------|---------------------------|--------|
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**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT [ESIA]**

**SUMMARY**

|   |                                     |
|---|-------------------------------------|
| Project Title: <b>Indorama Train-2 Fertilizer</b> | Project Number: <b>P-NG-BG0-002</b> |
| Country: <b>NIGERIA</b>                           | Department <b>PITD</b>              |
| Division: <b>PITD.2</b>                           |                                     |
| Division: <b>PESR.2</b>                           | Project Category: <b>1</b>          |

## **1.0 Summary**

Indorama Eleme Fertilizer and Chemicals Limited (IEFCL) is a company organized and existing under the laws of Nigeria, with its registered office at Indorama Petrochemicals Complex, Eleme, Port Harcourt, Rivers State, Nigeria. IEFCL manufactures 2300 MTPD Ammonia & 4000 MTPD Urea Fertilizer (IEFCL-Train 1) at its Eleme manufacturing complex. IEFCL is undertaking the development of IEFCL-Train2 fertilizer project to increase the production of Urea adjacent to the IEFCL-Train 1 within the existing manufacturing Indorama complex at Eleme.

As part of mandatory requirement from Federal Ministry of Environment (FMEnv), Nigeria, a detailed ESIA has to be carried out to establish the criteria and justification of IEFCL-Train 2 fertilizer project does not have any critical influence on the Environmental Conditions and no Social-economic status.

The detailed ESIA study explains the environmental aspects and the positive impacts. It can be inferred that the project shall not have any adverse impact on air, water and soil pollution. Detailed studies for each aspect has been completed and results have been tabulated at various sections of the ESIA document.

A socio-economic issues were also considered as part of ESIA study. The report clearly established the demographic considerations and enhanced employment opportunities that shall be supplemented as part of the project without affecting the cultural precedence. All stakeholders including communities were consulted and CSR activities shall be carried out.

This ESIA summary illuminates the assessment and management plans designed by Indorama Eleme Petrochemicals Limited to ensure the project complies with both Nigerian legislation, the AfDB's ISS and international development partners E&S policy requirements. The management plans will be implemented and monitored through the company's Environmental and Social Management System (ESMS).

## **2. Project Description and Justification**

### **2.1 Project Location**

The project is located geographically within 4°49'N and Longitude 7°6'E. Maps of Nigeria, Rivers State and study area around Indorama complex, together with the plot plan of Indorama complex (as shown on figures 1 and 2) were used to illustrate the proposed location of Ammonia and Urea Plants in Eleme (the Host community). The IEFCL Train-2 project shall be located in the existing Indorama Complex adjacent to current operating IEFCL-Train1 plant. The proposed project shall be a copy and paste of existing fertilizer plant and once commissioned, will booster the Urea manufacturing output thereby adding necessary revenue to national exchequer besides reducing fertilizer imports.

## **2.2 Present Study**

Study approach adopted was to obtain physical and biophysical baseline data from desktop, field and laboratory studies, interviews and consultations with individuals / representatives of the host communities. For socio-economic & health studies, structured questionnaires were administered to a probability sample of households. The study consisted of a one-season field sampling campaign with participation of community representatives and FMEnv and RSMENV officials supervision, (Wet Season), while data collected from previous studies and compliance monitoring authored by Indorama during the dry season were used as secondary data.

The spatial boundaries considered for baseline studies are, 2km radius for biophysical sampling; 4km for socio-economic and health assessment and 5km for Control samples. The four communities falling in two local Government area were studied for physical and biophysical environmental components by a team of experienced and qualified personnel. The sampling locations within the spatial boundaries is shown below.

**Figure 1: Location of the Indorama Eleme Petrochemical Complex**



## **Figure 2: Location of Train 2 Facilities within the Train 1 complex**

The Sampling points were geo-referenced by means of Global Positioning System (GPS) on the field. Judgment sampling was applied in the selection of study stations, taking into account ecological features, geographical location of communities and control points in apparently undisturbed areas. The universe of households was obtained from listing by guides and assigned field assistants. The quality analysis of collected samples were carried out in FMEnv approved laboratories, which are well equipped with latest sophisticated instruments and managed by well experienced professionals.

### **2.3 Project Description and components**

***Project description:*** Indorama Eleme Fertiliser and Chemicals Limited (IFL) is a registered legal entity in Nigeria and the owner of a world scale, lead technology urea fertilizer plant. The plant which began operation in May 2016 is located on Indorama Eleme Petrochemicals Limited (IPL) site in Port Harcourt, River State and produces 1.4 million MTPA of urea fertilizer.

***Project components:*** The project consists of the expansion of IFL's existing fertilizer complex in Port Harcourt, Nigeria from 1.4 to 2.8 million TPA by adding a new and identical train to the existing fertilizer plant. The new fertilizer plant (Line II) will consist of:

- i. Ammonia unit with a single train of 2,300 metric tons per day (MTPD);
- ii. Urea unit with a single train of 4,000 MTPD granular urea;
- iii. Urea granulation unit with a single train of 4,000 MTPD design capacity;
- iv. Additional small urea granulation unit of 800 MTPD design capacity; and
- v. Inside boundary infrastructure, utilities and storage facilities.

The project will rely on certain outside boundary infrastructure, including (i) Power and certain utilities to be supplied from existing IPL site; (ii) Existing port for export of granular urea at the nearby port of Onne, developed by IPL as part of the existing Line I fertilizer plant project; (iii) A dedicated 10 km pipeline installed by IFL as part of the existing Line I fertilizer plant project for the supply of feedstock gas.

Similar to the existing fertilizer plant, the Train 2 ammonia unit will operate using KBR technology and the urea and granulation units will employ TOYO technology. The EPC contractors are TOYO and Daewoo Nigeria Limited (DNL) respectively.

Urea will be sold in local, regional and global markets. IFL is already the largest seller of urea in Nigeria through its well-established network of distributors and dealers. Domestic volumes are projected to be over 500,000 tons in 2017. Export volumes are projected to be over 700,000 tons sold into West Africa as well as markets in North and South Americas given its locational advantage. Volumes from Line II will be largely targeted towards export.

The existing Eleme complex encompasses 361 hectares of land out of which 164 ha are currently used. IPL will sub-lease a portion of this site to IFL for the expansion project. The lease agreement will be for a term up to 30 Dec 2083.

## **2.2 Justification of the project**

The gross imbalance in the supply and demand of fertilizer for agricultural productivity in Nigeria goes to support the need to establish fertilizer plants. The use of Natural gas for production of fertilizer will support Federal Government's Gas Revolution Policy on alternative uses for natural gas instead of the wasteful practice of flaring.

The project will help achieve the objectives of the federal gas revolution programme providing necessary infrastructure for natural gas based industries, thereby boosting the Nigerian agricultural sector by providing the most crucial agricultural input. The current economic diversification and agricultural policies of Nigeria promotes the responsible use of green revolution technologies namely fertilizer, in the efforts to achieve food security and for generating exportable surplus of farm products in a market-friendly way. The project will also contribute to increase the competitiveness of local and regional agriculture by enabling the sale of fertilizers at competitive prices.

## **3. Policy, Legal and Administrative Framework**

The project has been categorized as category one project by the Federal Ministry of Environment (FMEnv), who confirmed the need to conduct a full blown ESIA.

The Legal basis for environmental permitting, applicable National and International Legislative and Administrative framework including international laws and conventions pertaining to this industry were reviewed and documented. The ESIA Report was drafted taking into account the following national and international regulatory guidance and

frameworks:

- The African Development Bank's Integrated Safeguards System (ISS)
- Guidance on EIA, EIS review, June 2001, European Commission;
- Equator Principles, June 2013, Equator Principles Association;
- International Finance Corporation (IFC) Sustainability Framework, 2012 Edition, Performance Standards;
- Environmental, Health and Safety Guidelines, April 30 2007, World Bank and IFC;
- Environmental, Health and Safety Guidelines for Nitrogenous Fertilizer production, April 30 2007, World Bank and IFC;
- EIA Procedural Guidelines, 1995, Federal Environmental Protection Agency of Nigeria;
- EIA Sectoral Guidelines, Oil and Gas Industry Projects, Sub-sectoral Guidelines for Petrochemicals, 1995, Federal Environmental Protection Agency of Nigeria;
- EIA Sectoral Guideline, Manufacturing Industry
- Environmental Impact Assessment Act 86 of 1992
- Rivers State Environmental Protection Agencies Edict No 2 1994
- Rivers State Noise Control Edict, 1985
- Rivers State Waste Management Agency Law No.2, 2014
- Pollution Compensation Tax Edict, 1994

The project has been assigned a category 1 by the African Development Bank in line with the guidelines within the bank's Environmental and Social Assessment Procedure. Consequently, Operational Safeguards (OS)1 on Environmental Assessment has been triggered because the component activities have the potential to generate significant environmental and social impacts to identified receptors within its area of influence which if not well managed can lead to disruption of ecosystem services. OS 4 on Pollution Prevention and Hazardous Substances is triggered since construction will involve use of fuels and possibly some hazardous materials. OS 5 on Labor, Working Conditions, Occupational Health and Safety is applicable since the construction will involve a significant number of construction workers.

#### **4. Description of the Project Environment**

##### **4.1 Ecology**

The objectives of the study was to examine the potential impacts that might be associated with the establishment of the IEFCL-Train2 fertilizer plant on the ecology of the area with emphasis on the vegetation (flora) and wildlife (fauna) in the area. In view of the aforementioned, the study area is classified under the Eleme Okrika industrial belt. However, in the study of ecology which covered thematic region of 5km radius, a total of 13 tree/shrub species within 12 families with *Elaeisguinensis* being the only common species and Apocynaceae being an occasional family was observed in the area. Similarly, a total of 18 herbaceous species occurred in the area within nine families. On the other hand, a total of 21 faunal species were observed to be found in the area and they comprised of mammals,

rodents, wild ruminants, reptiles and aves. Invariably, the plant health conditions were also analyzed and it was ascertained that the vegetation in the area was in good condition in spite of a few diseases symptoms that were associated in the area. Environmental management plan proffered for the project will ensure yearly monitoring of the ecology of the influenced area of the project

## **4.2 HYDROBIOLOGY**

### ***Phytoplankton***

The phytoplankton communities were represented by four taxonomic groups in the dry and wet seasons. The groups are: Bacillariophyceae (diatoms), Chlorophyceae (green algae), Cyanophyceae (blue green algae) and Euglenophyceae. Forty-eight (48) species were identified with the Bacillariophyceae dominating the phytoplankton community in the wet season and Cyanophyceae in the dry season. The seasonal changes in the species composition and population density maybe attributed to the changing environmental conditions. Results of the ecological indices (Shannon-Weiner index) suggest effect of anthropogenic activity (sand mining) in both climatic regimes. The analytical results of the surface water lends credence to this finding. The order of dominance was as follows: Bacillariophyceae >> Chlorophyceae >> Cyanophyceae >> Euglenophyceae (Wet season); Cyanophyceae >> Bacillariophyceae >> Chlorophyceae (Dry season).

### ***Zooplankton***

The zooplankton community comprised of Copepoda, Rotifera, Tintinidae, Cladocera and Cichlidae in the wet and dry season. A total of 4 species were identified in the dry season and 15 species in the wet season. The Rotifers were the most dominant zooplankton taxonomic group representing about 72.14% and 42.86% in the dry and wet season. The dominance of Rotifers maybe attributed to the presence of sediments in suspension in the surface water bodies. This suggest that the surface water body is stressed between both seasons, as result of the intense sand mining. In increasing order, the dominance pattern of the zooplankton community were Rotifera >> Copepoda >> Tintinidae (Dry season); Rotifera >> Copepoda >> Cladocera >> Cichlidae (Wet season).

### ***Benthic invertebrates***

The Benthic invertebrates were represented by three taxonomic groups in the wet and dry season. The taxonomic groups are Oligochaeta, Insecta and Nauplii comprising of 4 taxa in the dry season and 10 taxa in the wet season. The insect dominated the benthic fauna community with a percentage composition of 75% in the dry season and 52.38% in the wet season. The dominance of Insecta is not uncommon in freshwater ecosystems as it has been reported to tolerate extreme conditions and high competitive capacity. The Shannon-Weiner diversity index suggests disturbed sediments in both climatic regimes. In increasing order, the dominance pattern of the benthic fauna were Insecta >> Oligochaeta (Dry season); Insecta >> Oligochaeta >> Nauplii (Wet season).



### 4.3 Ambient air

The Ambient Air Quality, Noise and Meteorology study was conducted in the month of September in the wet season, while secondary data for previous studies conducted in the area were used for dry season analysis. The exercise was carried out in compliance with statutory requirements and in line with national and international policy on the protection and conservation of the environment. Monitoring locations within and outside the project area were chosen for the air quality study, an hourly mean monitoring was carried out for 8 hours as recommended by Federal Ministry of Environment (FMEnv) and the United States Environment Protection Agency (USEPA). Baseline results were compared with FMEnv and the National Ambient Air Quality Standards (NAAQS).

The air quality study exercise was conducted using air monitoring equipment, while noise levels were measured using portable noise instrument. The parameters measured during ambient air study are: CO, SO<sub>2</sub>, NO<sub>2</sub>, H<sub>2</sub>S, THC, VOC, NH<sub>3</sub> and particulate matter (TSP, PM<sub>10</sub> and PM<sub>2.5</sub>); meteorological parameters monitored are, temperature, relative humidity, wind speed, and wind direction.

A total of nine (9) sampling locations were selected for the assessment of the existing ambient air quality status of the project area. Measurement of baseline concentration levels of particulate matter (TSP, PM<sub>10</sub> and PM<sub>2.5</sub>), sulphur dioxide, nitrogen dioxide, carbon monoxide, hydrogen sulphide, ammonia, total hydrocarbons and VOCs was established. It was observed that average values of particulate matter (TSP, PM<sub>10</sub> and PM<sub>2.5</sub>) for all monitoring locations were well within FMEnv, IFC and NAAQS limits. The average concentrations of SO<sub>2</sub> and NO<sub>2</sub> were well below statutory limits in both seasons. The mean concentrations of CO, H<sub>2</sub>S, NH<sub>3</sub>, VOCs and THC were low (below both FMENV permissible limits) for all monitoring locations in the project zone.

Baseline concentrations of SO<sub>2</sub>, NO<sub>2</sub> and H<sub>2</sub>S were generally low in both seasons. Mean concentrations of NH<sub>3</sub> was  $0.10 \pm 0.13 \mu\text{g}/\text{m}^3$  in wet season and  $0.30 \pm 0.12 \mu\text{g}/\text{m}^3$  in dry season. The average concentration of total suspended particulate matter (TSP) was  $26.7 \pm 16.79 \mu\text{g}/\text{m}^3$  in wet season and  $86.7 \pm 14.37 \mu\text{g}/\text{m}^3$  in the dry season. The mean concentration of particulate matter PM<sub>10</sub> was  $17.9 \pm 10.81 \mu\text{g}/\text{m}^3$  in the wet season and  $41.1 \pm 3.88 \mu\text{g}/\text{m}^3$  in the dry season; while the average concentration of particulate matter PM<sub>2.5</sub> was  $8.8 \pm 6.09 \mu\text{g}/\text{m}^3$  in the wet season and  $18.4 \pm 2.39 \mu\text{g}/\text{m}^3$  in the dry season.

Baseline measurement showed that concentrations of air pollutants in the area are generally low. These values are well below the FMEnv guidelines and represent baseline condition of the study area.

The environmental baseline describing the pre-construction air quality of the project area has been conducted through intensive measurements of air pollutants in the project area. Existing air quality in the study area is controlled by local weather condition and particularly the

strength of the North-East and South-West trade winds that are prevalent in the area during the dry and wet seasons respectively.

#### **4.4 Noise**

The average noise level in the wet season was  $55.5 \pm 7.98$  dB(A), while the average noise level measured within the project area was  $61.4 \pm 9.42$  dB(A) in the dry season. The measured noise level values are well below the FMEnv guidelines and represent baseline noise level of the study area. The noise survey also conducted in day and night hours to establish the base line noise level of the study area.

#### **4.5 Waste management**

Indorama utilizes the 4R (Reduce, Reuse and Recycle and Recover) as a basic principle of its waste management policy. The proposed Ammonia and Urea Plant IEFCL-Train 2 will use the existing incinerators at site for incineration of inenarrable wastes. New waste segregation units will be built for IEFCL-Train2 plants where solid waste will be segregated into properly labeled receptacles according to the types of waste from where it will be collected for final disposal. There is a dedicated scrap yard where large volume of waste is temporarily kept before reuse, recycling or disposal. Waste manifest, waste tracking, waste vendor certificate verification and vendor reassessment, waste quality assessment before final disposal are the quality control measures that will be used to assess the efficiency of the waste management scheme for the proposed project.

#### **4.6 Effluent treatment**

Effluent streams comprising sewage, process waste water, and blow down are collected into dedicated pits and pumped via pipelines to respective treatment units where it undergoes processes such as hydrolysis, stripping, neutralization, demineralization, and equalization. The quality assessment of treated effluent is assured at Inside battery limit (ISBL) treated effluent pit and at Effluent treatment plant (ETP) before final disposal.

#### **4.7 Stack emissions**

Gaseous emission will be minimized by the plant process design including scrubbing and final emissions will be discharged via stacks. Most of the gaseous emissions from the plant will be normal atmospheric components - nitrogen, oxygen, carbon dioxide, water vapour and inert gases - that will be discharged via stack at an appropriate height.

#### **4.8 Soil**

##### ***Soil Sampling***

Composite soil samples were collected at two depths: 0-15cm (Topsoil) and 15 – 30cm (Subsoil) with the aid of Dutch stainless steel hand auger from Seven (7) sites at different locations within the proposed project area and two control sites outside the project area. A total number of Eighteen (18) soil samples were collected.

### ***Morphological properties***

The soils of the study area are coarse grained, gravelly, locally fine-grained, poorly sorted, subangular to well rounded (Assez,1975). Ojanuga et al (1981) stated that the genesis of these soils have resulted from cycles of soil formation which alternated with cycles of erosion in the mid tertiary to Holocene era in Nigeria. Soil consistency as observed during the field exercise were between wet (slightly sticky and non sticky) and moist (friable), while soil colour were between black (10YR2/1), Dark red (2.5/YR3/6), Brown (10YR5/3) and Strong brown (7.5YR4/6). The topography of the study area were relatively flat with some gentle slope as observed around station one (SS1- Okulu Aleto).

### ***Physiochemical properties***

The textural classification of the two soil depths within the study area and control site was predominantly fine-grained fairly consolidated Loamy Sand, Sandy Loam and Sandy Clay Loam soil (using the soil particle size matrix), with considerably low clay content.

The soil reaction falls within acidic pH range of 4.70–5.6 ( $5.22 \pm 0.39$ ) for topsoil and 4.30 - 6.80 ( $5.37 \pm 1.03$ ) for subsoil indicating that the soil is slightly acidic, which is typical of a Niger Delta soil. The Organic matter content of the soil ranged from 0.09-0.21 at the topsoil, while the subsoil ranged from 0.08 – 0.16% indicating low organic matter content of both topsoil and subsoil according to FAO (1990) classification, which also reflected in the Total Organic Carbon results recorded during this study

Total Nitrogen levels ranged between 0.08 -0.39% and 0.08 – 0.27% for both the top and sub soil respectively indicating that Medium to high soil fertility according to FAO (1990) classification of soil.

### ***Microbiology***

The total population of total heterotrophic bacteria (THB) ranged from  $0.52 \times 10^4$  to  $4.50 \times 10^4$ (cfu/g) for topsoil and  $1.50 \times 10^4$  to  $3.95 \times 10^4$ (cfu/g) for subsoil; total heterotrophic fungi (THF) ranged from  $0.15 \times 10^4$ –  $1.59 \times 10^4$ (cfu/g) for topsoil and  $0.45 \times 10^4$ –  $2.00 \times 10^4$ (cfu/g) for subsoil. The population of total hydrocarbon utilizing bacteria (THUB) ranged from  $0.25 \times 10^4$ –  $1.96 \times 10^4$ (cfu/g) for topsoil and  $0.37 \times 10^4$ –  $1.99 \times 10^4$ (cfu/g) for subsoil, and the total hydrocarbon utilizing fungi (THUF) ranged from  $0.64 \times 10^4$ –  $3.00 \times 10^4$ (cfu/g) for topsoil and  $0.22 \times 10^4$ –  $3.50 \times 10^4$ (cfu/g) for subsoil,

### ***Heavy metal***

Heavy metals analysis in the soil samples revealed Iron (Fe) having the highest concentration (Mean 6847.25mg/kg topsoil and 6685.20mg/kg subsoil), while mercury (Hg) and Vanadium (v) were below detection limit.

Conclusively, soils of the area with the exception of some localized variations are characterized by the following very good physical features, poor inherent fertility status, low degree of acidity Low cation exchange capacity FAO (1990) and Predominant sandy texture

#### **4.9 Surface Water**

The water body is a fresh water body with pH slightly acidic at the upstream which is typical of the Niger delta surface water bodies. The pH during the rainy season fieldwork (2017) ranged from 6.80 to 6.95 and 6.55 – 6.60 at the control stations compared to 6.73 to 8.24 and 7.10 for control station for dry season. All parameters analyzed during study show compliance to existing regulatory standard.

#### **4.10 Sediment**

The color of the sediment samples ranged from black to dark grey coloration. The silt fraction was higher than the sand and clay content making the sediment Silty in texture. Nutrients are adequate to support the healthy growth of benthic population. The concentrations of nutrients in sediment around the study area are indicated below; Sulphate concentrations varied from 51.8 to 483.5 mg/kg and 185.7 to 362.7 mg/kg for rainy season (September 2017), nitrate content ranged from 2.64 to 19.23 mg/kg and 8.22 to 10.4 mg/kg control stations for rainy season. Total Petroleum Hydrocarbon was low for all samples taken 9.62 to 18.22 mg/kg and control stations with 2.90 to 4.76 mg/kg for rainy season.

#### **4.11 Socio Economic and Cultural Environment**

The IEFCL-Train2 project will generate a lot of interest and expectations from the host communities. For investigating the socio economic component a dedicated questionnaire and focused group of interviews were the primary means of data collection. Four communities in two local government areas of Rivers State of Nigeria were surveyed for this study. The communities are Agbonchia, Aleto and Akpajo in Eleme Local Government Area and Elemenwo in Obio/Akpor. The people of Eleme claim a common ancestry, language and ethnicity. Elemenwo is of Ikwerre origin. Among Aleto and Agbonchia settlements, there are also three family units, respectively Okerewa, Njuru and Akpankpan. Okerewa is studied under Aleto, while Njuru and Akpankpan are covered under Agbonchia.

The total population of the four communities surveyed in this study is 66,614 in 2010 (Field survey and National Population Commission Publication 1996). The Federal Government of Nigeria (2007) estimates that the annual growth rate of population in Rivers State is 3.4% which is close to the situation in the study area as 3.5% in 2016. There are more male population (57%) than female (43%). The study also revealed that 0-14 years of age represent 41%, working age represent 59%. This implies that the study area has high population dependency burden. Under the working class 48% are self-employed, 21% are Government workers, 12% are company workers while 19% are unemployed. Under the category of self-employed 56% are business men and contractors, those involved in farming represents 29%,

trading 12% and others 3%. The mean daily income in the study area is 700 Naira which is slightly above the National monthly minimum wage of 18,000 Naira.

Large industrial complexes prior to the entry of Indorama in the region have not attracted medium manufacturing industries to utilize their products in the area. This lack of backward integration permeates to the level of small aspiring entrepreneur. As reflected in the occupation structure, people either farm, work for government or do small business. Outside the large industries in Eleme local government area, the other common enterprises are contractors, vendors, welding/ fabrication workshops, sand mining, and traditional food processors.

The farming system is a limited form of shifting cultivation whereby a land is cleared and cultivated for several years until productivity diminishes; it is then abandoned until natural processes regenerate the soil. The fallow period was up to 7 years about 30 years ago, it reduced to about 4 years 10 years ago, but now the farms are rarely left fallow. Farming tools and inputs are also basic. Seedlings are obtained from the previous year's harvest. Cutlasses, hoes and spade make up the farming tools. Mechanization is non-existent.

The sole source of domestic water supply is shallow boreholes. The water tables in the study areas are close to the surface and water can be tapped at 10m in most cases from the first aquifer.

Movement from one place to another is by road in the communities studied and major means of transportation is motor, bicycles, 2-stroke tri-cycles (popularly called Keke-NAPEP and buses). All the study communities are big enough to require some sort of internal transport which is met through the use of tricycles. In Aleto and Agbonchia motor bikes are the most important means of internal transport. Every community in the study area has a model primary school. All the communities also have a secondary school. Adult literacy rate in the study communities is commendable.

Energy demand in the study area is for lighting, cooking, and driving machines (including automobile). The experience during the fieldwork is that all energy types are in short supply. Electric power is erratic and there are occasions when they receive only a few hours of power in a week. The petroleum based fuel are scarce and expensive, like kerosene and cooking gas for domestic use, which gives credence to the dependents of wood as a major source of domestic fuel.

Most respondents live in own houses. Majority of the houses are constructed with concrete blocks and roofed with corrugated iron sheets. Other types of houses reported by respondents are concrete blocks roofed with iron sheets, earth block and iron sheets, and the traditional wattle and mud houses roofed with thatch or iron sheets. The average households is between eight/nine persons.

Four activities dominate the cultural calendar of communities in the study area namely; wrestling, traditional marriages, new yam festival and dances. The only surviving historical forest as a result of rapid industrialization in the area is the Onura forest. Social Affiliation in the societies includes politics, co-operatives, social clubs, education, religion and cultural associations. Dispute over land boundary and ownership is the primary cause of intra and inter communal conflicts in the study settlements. The courts are the main avenue for dispute resolution.

#### **4.12 Traffic Survey**

The four communities in the study area are traversed by two major highways: the East – West Road that begins from Warri and end in Eket and the Port Harcourt – Aba Expressway.

A survey of the existing traffic volume on the East- West Road (Direction from Akpajo to Port Harcourt) indicated that Indorama complex will affect traffic volume during the peak hours of 8:00am to 9:00am and 5:00pm to 6:00 pm. In view of the findings, traffic management plan has been instituted by Indorama.

#### **4.13 Health Assessment**

The Health Assessment of the project area was conducted in and around the facilities and the communities to determine the baseline characteristics of the health status of the project area against which future impacts of the project can be compared. Secondly to determine the probable/potential impacts of the project on the health of the workers within the IEFCL facility, the people around the communities (Agbonchia, Aleto, Akpajo, and Elemenwo) so as to determine the type of intervention/s needed to ameliorate these negative potential impacts. These communities were sampled by the health personnel to obtain information regarding mortality and morbidity rates, types of health hazards, most prevalent diseases, disease vectors, nutrition, health facility infrastructure capability and usage, average family size, sexual reproductive health, immunization status and coverage, sewage and waste management system, air quality, water quality, radiation sources and levels. The state of health delivery facilities/services in the area is below standards expected of an urban area. The principal communicable diseases in the area are Malaria, Diarrhea, skin rashes, upper respiratory tract infections and STIs. While prevalent non-communicable diseases in the area are hypertension, food poisoning and occupational injury.

### **5. Project Alternatives**

In determining the project options, issues such as ease of availability of raw materials, choice of appropriate location and best available technology for producing the Urea were reviewed. These formed the basis of suggesting that the chosen project option of sitting the project in the already prepared Indorama complex and the use of the latest energy efficient technology is the most appropriate solution for the development of the project.

## **5.1 Site Justification**

The proposed project will be sited in Indorama Eleme Fertilizer & Chemicals limited facility within Indorama complex. The site has well established off-sites infrastructures and other related facilities for the project to support efficient operations. Other advantages that justify the sitting of the Ammonia and Urea plant in the existing Indorama complex includes: available land with proper soil conditions and a distance of about 15 km from Onne Port (that will be used and adequately equipped to market Urea Fertilizer product), with good marine conditions and limited influence from monsoon weather. Site selection considered also the geographical and meteorological conditions of the location area, in order to take into account any potential effect deriving from air inversion or trapping of pollutants and where prevailing winds are towards sensitive areas.

## **5.2 Need**

The gross imbalance in the supply and demand of fertilizer for agricultural productivity in Nigeria goes to support the need for expansion of existing fertilizer plant.

The Federal Governments Gas revolution policy which authoritatively orders the use of gas for the setting up of fertilizer plants in various parts of the country amongst other uses emphatically supports the need for this project. The project will improve the use of nation's gas resources thereby avoiding wastage of natural resources through gas flaring that contributes to greenhouse gas emissions resulting to global warming.

In Nigeria, use of fertilizer in the year 2016 was estimated at 12.6 kg/ha (FMARD 2016) slightly above sub Saharan average of 9 kg/ha but much below the 200 kg/ha recommended by the United Nations Food and Agriculture Organization (FAO). Over-dependence on external supply was brought about by the substantial availability of budgetary resources to support imports and overvaluation of the local currency in the past. The domestic production of Nitrogenous fertilizer from both IEFCL Train1 and Train2 projects will add value to the need for adequately addressing the low fertilizer consumption scenario of the country.

The arable urea outlook also favors the need for Nigeria to endeavor to share in the global market. The demand for urea fertilizer is growing in developing countries as well due to population growth, changes in per capita income, food preferences and increase in food prices.

The proposed project will help to solve the urgent need for a strategic investment program to increase the availability and use of fertilizer in the much needed Green Revolution in Nigeria that will usher in food security for Nigeria in the long term.

## **5.3 Alternatives / options**

The availability of reliable source of the feedstock (Natural gas), well-endowed project site with all the resources required for a steady production of fertilizer, limited the considerations for site and production alternatives. The evaluation of alternate raw material such as coal,

concluded that such options will not be economically viable. In view of this fact, availability of raw material and location assumed the critical factors. Alternative site for the factory or the use of alternative raw material which call for different manufacturing technologies would have stretched environmental safety, engineering technology and logistic requirements with concomitant high economic cost for design, engineering and construction.

Consequently, the decision arrived at choosing the option with the best site alternative, easy raw material availability and tested technical sustainability. The following paragraphs therefore describe the alternatives and the reasons considered in selecting such options.

### ***Option 1: Natural Gas as Raw Material***

The usage of natural gas as major feed for the production of Ammonia and Urea was considered more cost beneficial and environmentally friendly than the usage of other raw materials, such as coal and biomass, in these respects:

- i. The natural gas will be available at the plants battery limit. A separate authorization is in place to assure the delivery of such raw material;
- ii. The reserve of the natural gas will suffice well above the life cycle of the plants;
- iii. Natural gas is cleaner during breakdown to the useable components of CO<sub>2</sub>, H<sub>2</sub> than Coal or Biomass;
- iv. Coal or Biomass as major raw material for the project would be capital intensive because of the cost of trucking or transporting coal from the nearest commercial deposit (Enugu) to Project site in Eleme;
- v. The environmental cost that would be incurred from the processing of coal or Biomass as raw material would be very uncompetitive. As a matter of fact, use of coal or biomass as feed for production of fertilizer would have more environmental implications, concerning in particular air pollution and residual waste management;
- vi. The option of using coal or biomass would also demand land take, which can bring to loss of vegetation, biodiversity and other natural resources.
- vii. Finally, if coal or biomass would be used as raw material, the engineering task and cost in developing the site for process units, utilities, waste water treatment, and offsite would be more significant.

### ***Option 2: Use of Indorama Complex as Project Location***

Locating the project in the existing Indorama Complex has numerous positive advantages over the acquisition of a virgin land based on the following reasons:

- i. Land acquisition and associated socio-economic disadvantages would not be an issue, if the project is sited within the existing Indorama complex;
- ii. The engineering tasks and cost involved in preparing a new virgin land are not necessary and required.

Choosing the Indorama complex as Fertilizer plant site is also advantageous since it is already endowed with power, water, wastewater treatment facilities, storage facilities, adequate and available manpower and technology.



### ***No Project Alternative***

This option as the title imply involves abandoning the idea of building the new plants. This option is anti-development as well as been detrimental to the nation's policy on Agriculture, and Food Security in addition to national economy. It will perpetuate the situation where importation of the urea will be the only means of satisfying our agriculture and chemical industrial sectors. The no-project option would also deny the host communities, the huge benefit of acquiring skills and empowerment. Consequently this option is not likely to be considered a valid alternative to the realization of the project.

## **6. Potential Impacts and Mitigation/Enhancement Measures**

### **6.1 Associated and Potential Impacts**

Associated and potential impacts evaluation for the project was based on the results of technical studies, together with established facts in relevant literatures, perceptions and evaluations of stakeholders, project characteristics and general observations obtained during field data gathering. For all project phases (Construction, including recruitment phase and site preparation, Operation & Maintenance and Decommissioning) activities that can affect the environmental and social components have been identified, together with potential and associated impacts. Also the Health & Safety issues have been similarly considered.

Occasionally hydrocarbon odor is perceived in the study area; traffic volume variations & associated issues are experienced. Positive impacts include capacity development, job opportunities and vendor patronage for host communities and increase economic activities in the study area in particular.

### **6.2 Cumulative Impacts**

The proposed project will be sited in the existing Indorama complex, where already IEFCL-Train1 operate in addition to other plants. Therefore the cumulative impact assessment was conducted to ascertain the combined effect of the operating unit & proposed project to the valued environmental component (VECs) immediate to this facility in order to proffer mitigation measure. Based on the individual impact assessment for the projects, majority of the cumulative impacts would occur during the operational phase only, as construction is not expected to coincide with any other construction within the Indorama complex. Most of the cumulative effects would occur, when there is an overlap of activities. These activities will be taking place within an area of about 2 km<sup>2</sup> radius.

The cumulative positive impacts identified are

- Business Opportunity/Economic enhancement
- Skills acquisition
- Increase in revenue for the Government, Community and Indorama

The cumulative negative impacts identified are:

- Increase in cost of living/Inflation during construction

- Increase in potential for road traffic volume
- Stress on existing security structures during construction

The significance rating of each of these impacts has been obtained through the process of impact identification, ranking and quantification, in each of the project phases.

The evaluation of impacts in the different phases of the initiative considered the predicted implementation of the above mentioned actions and it is briefly reported hereinafter.

### **6.3 Mitigation Measures**

Various mitigation measure, (technical and administrative) are proffered specific to environmental problems that may arise during construction, operations and even abandonment and decommissioning stage. An environmental and social management system will be adopted to help enhance the results of the mitigation measures.

A summary of potential impacts and mitigation measures during the construction and operational phases of the project is presented in Table 1.

**Table 1: Summary of Impacts and Mitigation Measures**

| Item              | Specific Related Impact   | Specific Activity /Action  | Schedule   |
|-------------------|---|--|--|
| Air Quality       | The new Fertilizer Project may have impacts on the air quality  | - IEFCL will implement a Traffic Management Plan to minimize potential effects on air quality associable to the additional vehicular movements generated by the project.   | Within three months of the construction activities started   |
|                   |   | - IEFCL will permit only vehicles with pre-mobilization certificates to operate in Project area as to reduce emissions from vehicle exhaust.   | Strictly implemented. It will be maintained during the life span of the project  |
|                   |   | - In accordance to the Monitoring Program (see Chapter Seven) IEFCL will periodically verify stack emissions and air quality levels. On the basis of monitored data, dedicated actions for the safeguard of ambient air quality will be implemented, if necessary.                   | Air quality monitoring for existing plants already in place.<br>For new Fertilizers plant will be implemented after the start up of the plant. |
|                   |   | - IEFCL will implement a Leak Detection and Repair (LDAR) Program that controls fugitive emissions by regularly monitoring. On the basis of monitoring activities, dedicated actions for the safeguard of ambient air quality will be implemented, if necessary (see Chapter Seven). | 1 month after the start-up of the process plants.  |
|                   |   | - Water will be sprayed on construction/ decommissioning sites during dry season to reduce dust levels especially during dry season.   | From the opening of site preparation activities.   |
| Health and Safety | The new Fertilizer Project may have an impact on the existent Health and Safety conditions of the host communities/workers interested by the project. | - IEFCL will ensure that demobilization activities are according to regulatory agencies' approved plan (see Chapter Seven, par. 7.1.9)   | From the opening of the decommissioning activities   |
|                   |   | - IEFCL to ensure that good, and sufficient water supply will be maintained for workers to avoid Waterborne/water-related and water-based diseases.  | From the opening of construction activities.   |
|                   |   | - IEFCL will ensure that site clinic is provided to take care of minor illnesses for all construction workers.   | Already in place   |
|                   |   | - Provision of regular pest control and insecticide in residential and office area inside the complex  | Already in place   |
|                   |   | - Health awareness lectures shall be given to workers on the mode of transmission of STIs (including HIV/AIDS).  | At the starting of construction activities.  |
|                   |   | - IEFCL will conduct enlightenment campaign and health education for the abatement of abuse of drugs, alcohol among workers throughout the life of the project. Alcohol and drug policy shall be implemented to encourage healthy lifestyle for workers.                             | After construction is started program will be done regularly   |
|                   |   | - IEFCL will ensure that contractor enforces the alcohol and drug policy for their   | During the plant construction stage of the   |

| Item                 | Specific Related Impact  | Specific Activity /Action  | Schedule  |
|----------------------|--|--|---|
|                      |  | <ul style="list-style-type: none"> <li>staff</li> <li>- IEFCL will ensure that there are adequately trained and sufficient numbers of first aiders at each site.</li> <li>- IEFCL will ensure that anti-venom/anti-histamine is provided on site to mitigate snake bites and insect stings.</li> </ul>   | <ul style="list-style-type: none"> <li>project.</li> <li>At the starting of construction activities, during construction phase</li> <li>From the opening of construction activities.</li> </ul>   |
|                      |  | <ul style="list-style-type: none"> <li>- IEFCL will implement an Occupational Health and Safety Management Plan, to minimize the risk of potential increase of workplace accidents / diseases (see Chapter Seven), also including a Hazardous Materials Risk Management Plan to minimize the risk deriving from spills of hazardous materials (see Chapter Seven).</li> <li>- A quantitative Risk Assessment (QRA) of the whole complex will be implemented to verify that the adopted safeguard measures are consistent with the required high level of protection.</li> <li>- IEFCL will ensure that the regular workshops will be organized to identify, evaluate and recommend contingency plans for all security risks related to safety of personnel and property.</li> </ul>  | <ul style="list-style-type: none"> <li>Already in place for existing plant. For the new plants 1 month before the starting of the construction activities</li> <li>By the end of the project detailed engineering activities.</li> <li>1 month before the opening of construction activities.<br/>During the life span of the project.</li> </ul>   |
| Loss of biodiversity | Due to Project, the new stream of workers could stress the wildlife nearby the IEPL/IEFCL Complex. | <ul style="list-style-type: none"> <li>- Monitoring of the effects of changes in water quality that may influence activities of fishes, benthic organisms etc. shall be undertaken in the projects life cycle, by IEFCL HSE department.</li> <li>- IEFCL will undertake to educate construction workers and locals on the sensitive nature of the biodiversity of the area and the need for conservation.</li> <li>- IEFCL will train its personnel by an Environmental Capacity Building Program for minimizing the environmental impact and risks (see Chapter Seven).</li> <li>- In accordance to the Monitoring Program (see Chapter Seven) IEFCL will verify the characteristics of water discharges and the quality of receiving water body (water and hydrobiology quality) in order to implement dedicated actions, if necessary.</li> <li>- In accordance to the Monitoring Program (see Chapter Seven) IEFCL will evaluate possible effects of the project on vegetation and wildlife in the area interested by the project and will yearly monitor Hydrobiology parameters in the receiving water body interested by the project. On this basis, if necessary, dedicated actions aimed at minimizing any potential risk in loss of biodiversity will be implemented.</li> </ul> | <ul style="list-style-type: none"> <li>Already in place. It will be done from time to time</li> <li>From the opening of construction activities.</li> <li>From the opening of construction activities in different phases.</li> <li>Already in place and maintained during construction and different phases of the Project.</li> <li>After production started and based on environmental audit guidelines</li> </ul> |

| Item                | Specific Related Impact  | Specific Activity /Action   | Schedule  |
|---------------------|--|---|---|
| Noise               | Possible noise annoyance associated to the project   | - IEFCL will develop a dedicated study for the noise impact assessment aimed at ensuring the compliance with regulatory guidelines/standards. If necessary, mitigation measures will be implemented.  | By the end of commissioning of the project.   |
|                     |  | - In accordance to the Monitoring Program (see Chapter Seven), IEFCL will periodically check the project is in compliance with noise standards in order to implement dedicated actions, if necessary.   | After 1 month from the opening of construction activities and during the life span of the Project |
|                     |  | - IEFCL will alert communities in advance of such activities that are likely to increase noise in the very nearby residential houses.   | During the life span of the project, if necessary.  |
|                     |  | - Transportations activities during night hours will be minimized up to extent possible   | Already in place<br>It will be maintained during the life span of the project.                    |
|                     |  | - IEFCL will verify that all vehicles and equipment conform to World Bank limits for noise.   | From the opening of construction activities.<br>During the life span of the project.              |
| Environmental risks | The Fertilizer project may increase the risk of spills of hazardous materials and waste, thus causing soil and ground water pollution. | - IEFCL will ensure that a controlled fuelling, maintenance and servicing protocol for construction machinery at worksite is established and followed to minimize leaks and spills.   | From the opening of construction activities.<br>During the life span of the project.              |
|                     |  | - IEFCL will ensure that all maintenance and repair of equipment and vehicles are done in a secure location with clean-up materials (e.g. drip pans, containers, absorbent materials etc) readily available.  | From the opening of construction activities.<br>During the life span of the project.              |
|                     |  | - IEFCL will ensure integrating prevention and control measures set in a General Hazardous Materials Management program.  | From the opening of construction activities.<br>During the life span of the project.              |
|                     |  | - In accordance to the Monitoring Program (see Chapter Seven) IEFCL will verify the status of ground water quality in order to adopt, if necessary, dedicated actions aimed at minimizing the risk of contamination of ground water from spills of hazardous materials. | Already in place. It will be continued during the life span of the project.                       |
|                     |  | - IEFCL will implement a Risk management Plan for Contaminated lands in order to identify, if necessary, dedicated actions aimed at minimizing the risk of land contamination caused by accidental spills of hazardous materials (see Chapter Seven)                    | It will be taken care in the ESMS   |
|                     |  | - IEFCL will implement a Hazardous Materials Management Plan to minimize the risk deriving from spills of hazardous materials (see Chapter Seven).  | Already in place for existing plants. To be implemented accordingly for new plants from           |

| Item             | Specific Related Impact  | Specific Activity /Action   | Schedule   |
|------------------|--|---|--|
|                  |  |   | opening of construction activities.  |
|                  |  | - In case of environmental contamination IEFCL will ensure that a planned risk management approach will be followed.  | During the life span of the project, if necessary.   |
|                  |  | - IEFCL will ensure a deep characterization of soil after site cleaning, to detect potential historical releases of hazardous material <sup>1</sup> .   | By the end of decommissioning activities.  |
| Odor Annoyance   | The production processes may be associated as a source of odor annoyance by the local population.                                    | - Adopt operational measures to avoid possible fugitive emissions.  | Already in place for existing plants. To be implemented accordingly for new plants.  |
|                  |  | - If necessary, adopt technical methods to prevent fugitive emissions.  | Immediately, during start-up operation   |
|                  |  | - Hold yearly environmental awareness/education programs for the stakeholders   | 1 month before the start-up of the new plants.   |
| Waste production | The new project will determine an increase in solid / liquid waste production.   | - In accordance to the Monitoring Program (see Chapter Seven) IEFCL will yearly verify the waste production in order to implement dedicated actions, if necessary.  | Already in place. It will be maintained during the life span of the project.   |
| Security         | New people attracted by work opportunities may cause an increase in levels of crime and other social vices in the local communities. | - In order to beef up security for the project, IEFCL will contact government authorities to improve the strength of the police force and shall consider providing assistance with equipment to ensure improved security, if necessary. | Upon receiving the Project Authorization, if necessary.<br>As per requirement IEPL / IEFCL security department will take care. |
|                  |  | - If required, additional security arrangements will be made to enable the existing federal security forces to cope with such situation   | If required, from the opening of construction activities.<br>During the life span of the project.                              |
|                  |  | - IEFCL will ensure that both contractor and IEFCL personnel develops a high level of security consciousness both within and outside the work area.   | From the date, worker starts his activity  |

<sup>1</sup> For decommissioning phase only

| Item                       | Specific Related Impact   | Specific Activity /Action   | Schedule  |
|----------------------------|---|---|---|
|                            |   | <ul style="list-style-type: none"> <li>- IEFCL will ensure that a liaison to foster partnership with the community so as to guarantee security for the project is established and sustained.</li> </ul>   | <p>From the opening of construction activities.<br/>During the life span of the project.</p>                |
| Social impact              | The new opportunities, allowed by the Project, could modify the social equilibrium, potentially causing frictions and social strains. | <ul style="list-style-type: none"> <li>- According to the MoU with host communities, IEPL/IEFCL will ensure that all host communities are represented in the employment of locals during land clearing and excavation to avert any conflict that could arise from perceptions of unfairness.</li> </ul>   | <p>From the opening of recruitment phase.</p>   |
|                            |   | <ul style="list-style-type: none"> <li>- IEFCL will ensure the monitoring of host communities development to identify and minimize possible causes of conflict.</li> </ul>  | <p>From the opening of construction activities.<br/>During the life span of the project.</p>                |
|                            |   | <ul style="list-style-type: none"> <li>- IEFCL will adopt a Social Management System to avoid possible inter and intra communities conflicts or possible socio-cultural conflicts between the construction team and members of the host communities.</li> </ul>   | <p>From the opening of construction activities.</p>   |
|                            |   | <ul style="list-style-type: none"> <li>- IEFCL will regularly hold Stakeholders Forum with the representatives of the communities</li> </ul>  | <p>From 6 months after the opening of construction activities.<br/>During the life span of the project.</p> |
|                            |   | <ul style="list-style-type: none"> <li>- IEFCL will make adequate accommodation arrangement for expatriates prior to mobilization of workforce to reduce pressure on local housing.</li> </ul>  | <p>Before the opening of construction activities.</p>   |
| Socio-economical condition | The Fertilizer project will be a new opportunity to improve the socio-economical condition of the communities and the workers.        | <ul style="list-style-type: none"> <li>- IEPL/IEFCL will abide by all Memorandums of Understanding (MOUs) signed with the host communities providing:               <ul style="list-style-type: none"> <li>- Building of/arrangements to educational/health facilities;</li> <li>- Access to micro credit system and merit scholarships for members of the communities.</li> </ul> </li> </ul> <p>For more details, see Stakeholders Engagement Plan in Appendix 7.2.</p> | <p>Existing MoU under review and will be signed before opening of construction activities.</p>              |
|                            |   | <ul style="list-style-type: none"> <li>- IEFCL will ensure that contractor implements social and health awareness programs for all workers at induction and on a continuous basis throughout the life span of the project.</li> </ul>   | <p>From the opening of construction activities.</p>   |
|                            |   | <ul style="list-style-type: none"> <li>- In accordance to the Monitoring Program (see Chapter Seven) IEFCL will support for health check up programme of communities.</li> </ul>  | <p>Already in place<br/>During the life span of the project.</p>  |

| Item    | Specific Related Impact  | Specific Activity /Action   | Schedule   |
|---------|--|---|--|
|         |  | <ul style="list-style-type: none"> <li>- IEFCL will carry out enlightenment campaigns to encourage positive influences on cultural values and healthy lifestyles (e.g. breast feeding habits, alcohol and drug use, exercise, monogamy, high moral values with regard to sexuality, etc.) and discourage adverse influences (e.g. prostitution, drug abuse, alcoholism etc).</li> </ul> | From the opening of construction activities.   |
|         |  | <ul style="list-style-type: none"> <li>- IEFCL will support skill development programs.</li> </ul>  | By 1 year after the Project Authorization.   |
|         |  | <ul style="list-style-type: none"> <li>- In accordance to the Monitoring Program (see Chapter Seven) IEFCL will yearly verify the status of Assisted Projects in order to verify their effectiveness and to identify possible actions to be taken aimed at obtaining an enduring improvement in the existing living conditions inside the host communities.</li> </ul>                  | 1 year after the start of Assisted Projects.<br>During the life span of the project. |
|         |  | <ul style="list-style-type: none"> <li>- IEFCL will assist the activities of the state action committee on STIs/HIV/ AIDS within the local communities.</li> </ul>  | Already in place. It will continue during the life span of the project.              |
|         |  | <ul style="list-style-type: none"> <li>- If Authorities will take projects for provision of potable water to host communities, IEFCL will also assist up to extent possible</li> </ul>  | Whenever required  |
| Traffic | Movement of workers (staff, labour and construction workers), equipment, materials and Urea product. | <ul style="list-style-type: none"> <li>- IEFCL will adopt a dedicated traffic management plan for the mobilization of vehicles during the construction, operation and decommissioning phases (For more details, see Traffic Management Plan in Appendix 7.1) to minimize the risk of traffic accidents,</li> </ul>  | From the opening of construction activities.<br>During the life span of the project. |
|         |  | <ul style="list-style-type: none"> <li>- Ensure maintenance of roads of any damage caused by project</li> </ul>   | From the opening of construction activities.<br>During the life span of the project. |



## **7 Monitoring Program**

The management of actions to mitigate risks of the the proposed project will be achieved through the ESMP and related plans. This will be monitored by regular reviews, updates, assessment of compliance and through the implementation of the ESMS. These plans include strategies to enable proactive resolutions of the environmental and social impacts expected, procedures for training, development of adequate capacity; plans for monitoring environmental, social, occupational and health issues as well as management of the effects of the impacts and minimization of the risks, parameters to be measured/monitored, frequency and location of monitoring.

The ESMP adopted at IEFCL is based on the best practices adopted in the same kind of industries globally. The systems and procedures practiced at IEFCL are in line with globally accepted international standards, like ISO 14001, OHSAS 18001 etc. The IEFCL-Train2 project is an expansion of IEFCL-Train1 and the same systems and procedures will be extended to new plants.

A monitoring plan for the ESMP and related actions is summarized in Table 2 below. The Table shows the physical, biological, workplace and social components identified as significant for the environmental and social assessments. For each component, specific key performance indicators to be monitored at critical locations have been identified. The specific corresponding standard values for monitor parameters in the relevant environmental components are as per the national and international standards and guidelines.

**Table 2: Monitoring of the ESMP and other action plans**

| Environmental Components                            | Indicator Parameters  | Period  | Frequency  | Location   | Responsibility  | Remarks/ Responsible Regulatory Agency   |
|---|---|---|--|--|---|--|
| Treated Waste water-2                               | <ul style="list-style-type: none"> <li>• PH , Ammonia</li> </ul>  | Operations  | <ul style="list-style-type: none"> <li>• Daily</li> </ul>  | <ul style="list-style-type: none"> <li>• Plant level from fertilizer plant</li> </ul>                              | <ul style="list-style-type: none"> <li>• IEFCL QAQC</li> </ul>  | <ul style="list-style-type: none"> <li>• Quarterly report to NESREA, FMEnv &amp; RSMENV</li> </ul> |
| Treated Waste water - 3                             | <ul style="list-style-type: none"> <li>• PH , Ammonia</li> </ul>  |   | <ul style="list-style-type: none"> <li>• Daily</li> </ul>  | <ul style="list-style-type: none"> <li>• Plant level entire fertilizer facility</li> </ul>                         | <ul style="list-style-type: none"> <li>• IEFCL QAQC</li> </ul>  | <ul style="list-style-type: none"> <li>• Quarterly report to NESREA, FMEnv &amp; RSMENV</li> </ul> |
| Treated Waste water - 1                             | pH, BOD, COD, Heavy metals, TSS, TDS, Oil and grease, NH <sub>3</sub> , Chloride, etc. as it relates to Fertilizer production specified in FMENV 1991   | Operations  | <ul style="list-style-type: none"> <li>• Monthly</li> </ul>  | <ul style="list-style-type: none"> <li>• Complex discharge point</li> </ul>  | <ul style="list-style-type: none"> <li>• Third Party (Environmental Consultants)</li> </ul>   | <ul style="list-style-type: none"> <li>• Quarterly report to NESREA, FMEnv &amp; RSMENV</li> </ul> |
| Air Quality (ground level pollutants concentration) | <ul style="list-style-type: none"> <li>• NH<sub>3</sub></li> <li>• SPM/PM<sub>10</sub>/PM<sub>2.5</sub></li> <li>• NO<sub>x</sub></li> <li>• SO<sub>x</sub></li> <li>• CO</li> <li>• Noise</li> </ul> | Construction (Impact Mitigation Monitoring (IMM) by Regulatory agency and operation | <ul style="list-style-type: none"> <li>• Monthly during operation</li> <li>• Quarterly during IMM</li> </ul> | <ul style="list-style-type: none"> <li>• Plant site and selected community based stations (total 4 no.)</li> </ul> | <ul style="list-style-type: none"> <li>• IEFCL Environment Department</li> <li>• Third Party (Environmental Consultants)</li> </ul> | <ul style="list-style-type: none"> <li>• Quarterly report to NESREA, FMEnv &amp; RSMENV</li> </ul> |

| <b>Environmental Components</b> | <b>Indicator Parameters</b>  | <b>Period</b>  | <b>Frequency</b>   | <b>Location</b>   | <b>Responsibility</b>   | <b>Remarks/ Responsible Regulatory Agency</b>   |
|---------------------------------|--|--|--|---|---|---|
| Surface Water Quality           | <ul style="list-style-type: none"> <li>• Dissolved Oxygen</li> <li>• Nutrient Content</li> <li>• Ammonia</li> <li>• Nitrate</li> <li>• PH, Oil &amp; Grease</li> <li>• Biological Oxygen Demand (BOD)</li> <li>• Chemical Oxygen Demand (COD)</li> <li>• Heavy metals concentration</li> </ul> | Construction (IMM) and operation   | <ul style="list-style-type: none"> <li>• Monthly during operation</li> <li>• Quarterly during IMM</li> </ul> | <ul style="list-style-type: none"> <li>• Surface water along Okulu stream upstream and downstream, Indorama complex discharge outfall</li> </ul>  | <ul style="list-style-type: none"> <li>• IEFCL Environment Department</li> <li>• Third Party (Environmental Consultants)</li> </ul> | <ul style="list-style-type: none"> <li>• Quarterly report to NESREA, FMEnv&amp; RSMENV</li> </ul> |
| Stack emission                  | <ul style="list-style-type: none"> <li>• SO<sub>x</sub>;</li> <li>• NO<sub>x</sub>;</li> <li>• PM;</li> <li>• NH<sub>3</sub>;</li> </ul>   | <ul style="list-style-type: none"> <li>• Operations</li> </ul>             | <ul style="list-style-type: none"> <li>• Quarterly</li> </ul>  | Point sources: <ul style="list-style-type: none"> <li>• Boiler stack: NO<sub>x</sub>,SO<sub>x</sub>;</li> <li>• Reformer stack: NO<sub>x</sub>,SO<sub>x</sub></li> <li>• Granulator stacks: PM, NH<sub>3</sub></li> </ul> | <ul style="list-style-type: none"> <li>• Third Party (Environmental Consultants)</li> </ul>   | <ul style="list-style-type: none"> <li>• Quarterly report to NESREA, FMEnv&amp; RSMENV</li> </ul> |
| Land Use                        | <ul style="list-style-type: none"> <li>• Waste production</li> </ul>   | <ul style="list-style-type: none"> <li>• Construction/operation</li> </ul> | <ul style="list-style-type: none"> <li>• Operation Yearly</li> <li>• Construction once</li> </ul>            | <ul style="list-style-type: none"> <li>• Project site</li> </ul>  | <ul style="list-style-type: none"> <li>• Third Party (Environmental Consultants)</li> </ul>   | <ul style="list-style-type: none"> <li>• Quarterly report to NESREA, FMEnv&amp; RSMENV</li> </ul> |
| Climate                         | <ul style="list-style-type: none"> <li>• Macro/micro climatic data</li> </ul>  | <ul style="list-style-type: none"> <li>• Operation</li> </ul>              | <ul style="list-style-type: none"> <li>• Monthly</li> </ul>  | <ul style="list-style-type: none"> <li>• Within project site</li> </ul>   | <ul style="list-style-type: none"> <li>• Third Party (Environmental Consultants)</li> </ul>   | <ul style="list-style-type: none"> <li>• Quarterly report to NESREA, FMEnv&amp; RSMENV</li> </ul> |
| Vegetation/wildlife             | Record of vegetation/wildlife status i.e. common species, dynamic species and endangered species   | <ul style="list-style-type: none"> <li>• Operations</li> </ul>             | <ul style="list-style-type: none"> <li>• Yearly</li> </ul>   | <ul style="list-style-type: none"> <li>• Around the project site</li> </ul>   | <ul style="list-style-type: none"> <li>• Third Party (Environmental Consultants)</li> </ul>   | <ul style="list-style-type: none"> <li>• Quarterly report to NESREA, FMEnv&amp; RSMENV</li> </ul> |

| <b>Environmental Components</b> | <b>Indicator Parameters</b>   | <b>Period</b>  | <b>Frequency</b>  | <b>Location</b>   | <b>Responsibility</b>   | <b>Remarks/ Responsible Regulatory Agency</b>  |
|---------------------------------|---|--|---|---|---|--|
| Ground Water Quality            | <ul style="list-style-type: none"> <li>• Ammonia</li> <li>• Nitrate</li> <li>• pH</li> <li>• Biological Oxygen Demand (BOD)</li> <li>• Heavy metals concentration</li> <li>• Chemical Oxygen Demand (COD)</li> <li>• Oil and Grease</li> <li>• Consumption</li> </ul> | <ul style="list-style-type: none"> <li>• Operations</li> </ul> | <ul style="list-style-type: none"> <li>• Monthly</li> </ul>   | <ul style="list-style-type: none"> <li>• At least two (2) bore holes strategically located will be used as monitoring wells.</li> </ul> | <ul style="list-style-type: none"> <li>• IEFCL Environment Department</li> <li>• Third Party (Environmental Consultants)</li> </ul> | <ul style="list-style-type: none"> <li>• Yearly report to FMEnv, RSMENV&amp; NESREA</li> </ul> |
| Sediment Quality                | <ul style="list-style-type: none"> <li>• pH</li> <li>• Heavy metals concentration</li> <li>• TPH</li> </ul>   | <ul style="list-style-type: none"> <li>• Operations</li> </ul> | <ul style="list-style-type: none"> <li>• Quarterly</li> </ul> | <ul style="list-style-type: none"> <li>• Along Okulu stream Upstream, downstream and outfall</li> </ul>                                 | <ul style="list-style-type: none"> <li>• IEFCL Environment Department</li> <li>• Third Party (Environmental Consultants)</li> </ul> | <ul style="list-style-type: none"> <li>• Yearly report to FMEnv, RSMENV&amp; NESREA</li> </ul> |
| Hydrobiology                    | <ul style="list-style-type: none"> <li>• Diversity and abundance of organisms (benthos, fish, plankton)</li> </ul>  | <ul style="list-style-type: none"> <li>• Operations</li> </ul> | <ul style="list-style-type: none"> <li>• Yearly</li> </ul>    | <ul style="list-style-type: none"> <li>• Surface water along Okulu stream upstream, downstream and outfall</li> </ul>                   | <ul style="list-style-type: none"> <li>• IEFCL Environment Department</li> <li>• Third Party (Environmental Consultants)</li> </ul> | <ul style="list-style-type: none"> <li>• Yearly report to FMEnv, RSMENV&amp; NESREA</li> </ul> |

| <b>Environmental Components</b>       | <b>Indicator Parameters</b>  | <b>Period</b>  | <b>Frequency</b>   | <b>Location</b>  | <b>Responsibility</b>   | <b>Remarks/ Responsible Regulatory Agency</b>   |
|---------------------------------------|--|--|--|--|---|---|
| Workplace Monitoring                  | <ul style="list-style-type: none"> <li>Noise</li> <li>Dust</li> <li>Vapors</li> </ul>  | <ul style="list-style-type: none"> <li>Operations</li> </ul>               | <ul style="list-style-type: none"> <li>Quarterly</li> </ul>                                    | <ul style="list-style-type: none"> <li>In-plant area</li> </ul>  | <ul style="list-style-type: none"> <li>IEFCL Environment Department</li> <li>Third Party (Environmental Consultants)</li> </ul>   | <ul style="list-style-type: none"> <li>Yearly report to FMEnv, RSMENV &amp; NESREA</li> </ul>   |
| Workers Grievances                    | <ul style="list-style-type: none"> <li>Workers complaints</li> </ul>   | <ul style="list-style-type: none"> <li>Construction/ Operations</li> </ul> | <ul style="list-style-type: none"> <li>Monthly</li> </ul>                                      | <ul style="list-style-type: none"> <li>Project Sites</li> </ul>  | <ul style="list-style-type: none"> <li>IEFCL HR/IR Department</li> </ul>  | <ul style="list-style-type: none"> <li>IEFCL will monitor the grievance redressal report</li> </ul>   |
| Socio-economics and Community Health  | <ul style="list-style-type: none"> <li>Population</li> <li>Health status</li> <li>Infrastructural and Community Development and Assisted Projects</li> <li>Number of Employed youths from the communities.</li> <li>Community Grievances</li> <li>Community engagement meetings</li> </ul> | <ul style="list-style-type: none"> <li>Construction/Operations</li> </ul>  | <ul style="list-style-type: none"> <li>Yearly</li> <li>Quarterly</li> <li>Quarterly</li> </ul> | <ul style="list-style-type: none"> <li>Host Communities</li> <li>Host Communities</li> <li>Host Communities</li> </ul> | <ul style="list-style-type: none"> <li>IEFCL Community Relation Department and Public Affairs Unit</li> <li>Third Party (Environmental &amp; Socio-economic Consultants)</li> </ul> | <ul style="list-style-type: none"> <li>IEFCL will regularly hold stakeholders Forum with the representatives of the communities</li> </ul>                            |
| <b>DECOMMISSIONING</b>                |  |  |  |  |   |   |
| All affected Environmental Components | <ul style="list-style-type: none"> <li>All agreed parameters</li> </ul>  | Not Applicable   | --   | --   | <ul style="list-style-type: none"> <li>IEFCL Environmental Department</li> </ul>  | <ul style="list-style-type: none"> <li>Decommissioning &amp; Closure plan will be executed after successful discussion with all affected Regulatory Agency</li> </ul> |

The sponsor estimates that it will cost about USD 8million (0.66% of the overall project cost) to implement and monitor actions to mitigate E&S risks. A detailed cost plan has been presented in Table 3 below:

**Table 3: ESMP-Budgetary Allocation**

|   | <b>Host Community Welfare (2018-2021)</b>   | <b>Amount in Naira</b>      | <b>Amount in US\$</b> |
|---|---|-----------------------------|-----------------------|
| 1 | Community Welfare Projects to be nominated by each community                                  | 450,000,000                 | 1,475,410             |
| 2 | Micro Credit (Grant) Scheme for women   | 18,750,000                  | 61,475                |
| 3 | Scholarship Programme   | 11,250,000                  | 36,885                |
| 4 | Support for Traditional Institutions  | 69,000,000                  | 226,230               |
|   | <b>Sub Total 549,000,000</b>  | <b>1,800,000</b>            |                       |
|   | <b>Skill Acquisition Programm for Eleme (period - 2018 - 2021)</b>                            |                             |                       |
| 1 | Renovation of Eleme Local Government Vocational Training Center                               | 12,200,000                  | 40,000                |
| 2 | Masonry, Welding & Fabrication, Grinding, Insulation, Iron bending, Fitter training for youth | 30,500,000                  | 100,000               |
| 3 | Hair Dressing for women ( start up package)   | 15,250,000                  | 50,000                |
| 4 | Special empowerment for Physically challenged   | 9,150,000                   | 30,000                |
|   | <b>Sub Total 67,100,000</b>   | <b>220,000</b>              |                       |
|   | <b>CSR Project for Pipeline Communities</b>   |                             |                       |
| 1 | Empower Programme for land owning families along the Right of Way                             | 12,200,000                  | 40,000                |
| 2 | CSR Projects  | 56,120,000                  | 184,000               |
| 3 | Skill Acquisition Training Programme & Start Package  | 7,015,000                   | 23,000                |
| 4 | University Scholarship  | 8,540,000                   | 28,000                |
|   | <b>Sub Total 83,875,000</b>   | <b>275,000</b>              |                       |
|   | <b>Others</b>   |                             |                       |
| 1 | Manpower Engagement Service Fees (Depends on Project timeline)                                | \$2.5mn to \$3.5mn          |                       |
| 2 | Indorama General Hospital & Dialysis Centre (50% of the Amount allocated to IEFCL)            | 610,000,000                 | 2,000,000             |
| 3 | Other Projects/CSR Activites  | 152,500,000                 | 500,000               |
|   | <b>Total ESMP Budgetary Allocation</b>  | <b>\$7.3 Mn to \$8.3 Mn</b> |                       |
|   | <b>Project Cost \$1.1 bn</b>  |                             |                       |
|   | <b>% of ESMP to Project Cost</b>  | <b>0.66</b>                 |                       |

## 8 Public Consultations and Disclosure

### 8.1 Consultation

Meaningful public and stakeholder participation and engagement is the cornerstone of any successful environmental assessment of a project. Not only the public and stakeholder consultation required as part of Nigerian environmental impact assessment (EIA) legislation and IFC Environmental Guideline, an open and meaningful public engagement program

undertaken as part of the EIA of a project contributes to building positive community relations, and generally assists in the acceptance of, or co-existence with, a development proposal.

In Nigeria, all EIA legislations require that the proponent of a project demonstrate that the potentially affected public and other stakeholders have been given a meaningful opportunity to provide comment and raise any concerns they may have about the project, as part of the EIA process. In addition, the proponent must incorporate the relevant feedback received from such stakeholders into the EIA report, and must demonstrate how it has considered or addressed (or how it intends to consider or address), as appropriate, the issues raised by the public into the EIA and subsequent development of the project.

The primary objectives of the consultation were to:

- Identify stakeholders for the proposed IEFCL-Train2 project;
- Explain to host communities and other stakeholders about the proposed project activities/operations and ensure exchange of information that will facilitate good working relations;
- Identify and address issues and concerns of stakeholders early;
- Incorporate the relevant feedback obtained from the public, stakeholders, and regulatory agencies into the EIA Report for the Project, as well as in the business decision-making process for the Project;
- Meet statutory requirement.

The project team held series of stakeholder consultation sessions. Initial discussions and consultation were initiated with the stakeholders, including the business community, government, community groups and neighbours, to obtain information on any initial concerns that these and other stakeholders may have about the Project. The consultation sessions culminated in a scoping workshop. The stakeholders identified for the project and who participated in the various consultation sessions included communities within the project area and the regulators, and where adequately engaged through:

- scoping workshop,
- baseline data gathering,
- focal group discussion,
- questionnaire administration
- Public forum etc.

The consultation sessions with FMEnv officials were held on 25<sup>th</sup> August'2017; 06<sup>th</sup> September and 29<sup>th</sup> Septemeb'2017. Likewise first consulting session with RSMENV officials was held on 29<sup>th</sup> August'2017. The RSMENV officials were the part of team with FMEnv officials during subsequent two consulting sessions.

The consultation sessions with communities were held on 29 & 30<sup>th</sup> September; 14 to 17<sup>th</sup> October'2017 by consulting team of M/s Environmental & Chemical services Limited. The

stakeholder engagement/consultation program was conducted on 17<sup>th</sup> November'2017 in which regulators were also present as observers. Total 148 participants were observed in this event. The consultation sessions/meetings with project advisory committee (PAC) and community representative is ongoing event.

Communities concerns that were apparent in the community stakeholder engagement are summarized below:

- Can two fertilizer plants be sited in a particular place?
- Traffic congestion and pollution as a result of heavy traffic.
- Environmental impact of proposed project to human health
- The capacity of Okulu stream to handle effluent from the proposed Train2 project
- How will the project consider Women?
- Will the project give employment to Eleme people
- The benefit of the project to host community
- Migrants from other regions may take most jobs and dominate most of the business as it is already visible in the area.
- The other major concern of the host communities is the lack of good potable water, basic social amenities like road infrastructure, and steady electricity in the area.
- Another important concern of the communities was the dilapidated nature of some schools in the area and prayed that Indorama through corporate social responsibility should continue to give support in this area.
- Most people mention the possibility that migrant workers might bring diseases that are not common in the area.
- Safety problems from the increasing numbers of big trucks to be used during construction work and operation in form of product lifting.
- Transportation of finished products from the factory will cause congestion on the already stretched public road.

## **8.2 Community expectations**

Views on expectation of what the proposed project should bring to the people were unanimous and the people ranked them in the following order of priority.

- Employment/scholarship and contract opportunity to host communities
- Improved basic social amenities such as good boreholes in each community
- Improved health care facility.
- Build a training center to enable new skill development
- Consider host community first in terms of employment opportunities

The briefing document for the Stakeholder Engagement/Public Forum, Attendance Sheet, and the complete proceedings of stakeholder's engagement carried on the 17<sup>th</sup> November 2017 is form part of ESIA.

The Stakeholder Engagement Plan developed in line with outcome of public forum/consultation is also a part of ESIA.



### **8.3 Grievance Management**

A grievance is a concern or complaint raised by an individual or group affected by the Project activities. Both concerns and complaints can result from either real or perceived impacts of the Company's operations. Grievance is not a question, a suggestion, an appeal or a request for assistance. In accordance with the AfDB's OS1, a grievance mechanism needs to be developed. The aim of the grievance mechanism is to ensure that all grievances by the affected communities concerning the project are examined and appropriate corrective measures are implemented.

The grievance mechanism procedures implemented by IEFCL ensures that all stakeholder complaints and grievances throughout the project life cycle gets captured and addressed in a systematic and structured manner. This grievance procedure sets out the steps to be taken to resolve grievances, role players involved in the process and timeframes to resolve grievances. The flowchart for handling the grievances are described below:

*Grievance Register*

All stakeholder (Individuals or groups) can submit written grievances using the form or by email. The template of the grievance recording and redressal forms are given in Tables 4 and 5 below below.

**Table 4. Grievance Form**

|  |   |
|--|---|
| Company Reference No:  |   |
| Applicant's name: .....  |   |
| Contact Information<br>Please mark how the applicant should be contacted ( telephone, e-mail or post).                                   | By Post: <i>(Please provide correspondence address)</i><br>.....<br>.....<br>.....<br>Telephone:<br>.....<br>By E-mail:<br>.....              |
| Preferred Language for communication   | English   |
| Description of Incident or Grievance:  | When did the case occur? Where did it happen? Who did it happen to? What is the result of the problem?<br><i>Please provide location/area</i> |
| One time incident/grievance (date .....)<br>Happened more than once (how many times? .....)<br>On-going (currently experiencing problem) |   |
| What would you like to see happen to resolve the problem?  |   |
| -----<br>Applicant Signature & Date  |   |

**Table 5 Greivance Reddresal Form**

|   |                       |
|---|-----------------------|
| Grievance Reference No:   |                       |
| Applicant's name: .....   |                       |
| Acceptance of Grievance by the Company  | Accepted/Non-Accepted |
| Evaluation of Grievance on based on importance from 1-5)<br>1-low importance and 5 indicates very high importance | Between 1-5           |
| Category of Grievance   |                       |
| Responsible person  |                       |
| Grievance Reddresal Mechanism Adopted:  |                       |
| Resolution/Close out of Grievance by the Company  |                       |
| Employee feedback/satisfaction on the grievance reddresal   |                       |
| -----<br>Company's Representative Signature & Date  |                       |
| *All grievance forms should be closed within 60 days of receipt   |                       |

***Investigation:***

The grievance will be evaluated by the relevant staff and management to identify what actions need to be taken. This evaluation will be completed after assessing the impact severity.

***Resolution / close-out:***

Interaction with the complainant is undertaken if needed to confirm that the proposed corrective action taken is satisfactory. With completion of the investigation, the details thereof will be explained to the complainant's and a course of action will be proposed. If the complainant is satisfied with the outcomes the grievance will be closed formally. If proposed outcome is not acceptable, then the grievance will go into mediation. The aim of the company is to resolve the grievance with in thirty (30) days.

***Mediation:***

Grievances that could not be resolved gets investigated by a grievance committee which will include members of senior management. IEFCL will provide for independent mediator if grievances cannot be resolved internally.

***Worker's Grievances***

For the operations phase, IEFCL has established grievance procedure to deal with the grievances of Company's employees. More details of the process can be obtained in the IEFCL Dossier on HR & IR Practices. The security related grievances also follows the philosophy as mentioned above.

**9 Complementary Initiatives**

As part of the company's community outreach, Indorama has signed a Memorandum of Understanding with the six communities to implement social programs.

**9.1 The Company's Philosophy of Corporate Social Responsibility (CSR)**

- Indorama-Nigeria Group strongly believes in being socially responsible and responsive, especially as it related to health, safety and environment, as well as community development and empowerment.
- The Company firmly believes in the concept of Corporate Social Responsibility (CSR) or Corporate Social Investment (CSI) as a major integral part of business operations.
- In this regard, the company makes conscious or deliberate effort to protect peoples and environment from the potential impacts of the project as well as includes public interest and sustainability in corporate decisions involving people, plant and profit.

- Consequently, the Company considers the welfare, wellbeing, healthcare and socio-cultural issues of the host communities, surrounding or neighboring communities and the larger society.
- The Company firmly believes in giving back to society part of its fortunes in appreciation of good neighborliness and good corporate citizenship.
- Areas of community interventions include providing employment opportunities, youth empowerment programs, micro-credit for vulnerable groups such as widows, construction of roads, and providing social amenities such as building of schools, rural electrification, water supply, healthcare; etc.
- The Company strongly believes in the sustainability of its CSR programmes through needs analysis and community participation in all corporate interventions and executions.

## **9.2 Sustainable CSR Programmes for Host Communities**

In the past ten years, the INDORAMA have executed many community development programmes such as building of schools, construction of roads and drainages, rehabilitation of hospitals and supply of medical equipment and electrification projects.

Others includes award of scholarships to indigent undergraduates from Eleme and Elemenwo, employment opportunities for indigenes, sponsorship of worthy events, donation of drugs and food items to some charity organizations in the area and youth empowerment programmes.

In specific terms, the companies have achieved the following CSR millstones in the following areas:

### ***Socio-economic Financial Empowerment***

- The biggest of Indorama's CSR programmes is the allotment of 7.5% shares of the company to six host communities of Akpajo, Aleto, Agbonchia, Elemenwo, Njuru and Okerewa as a successful example of private - public partnership.
- This has created tremendous value and engendered significant economic activities in the communities. More than N20 Billion has accrued to the host communities through this intervention since 2012.
- The company has created over 3,500 direct and indirect employment opportunities to indigenes of the six host communities, the pipeline communities and neighboring communities. This has significantly increased their socio-economic wellbeing of the workers and their families and other dependents.
- The company's micro-credit scheme has been able to empower many widows and other vulnerable groups in the six host communities who are into micro businesses.
- Indorama has created a pool of entrepreneurs from the host communities. Capacity of a people to earn income and generate employment has been developed.
- Lots of contract jobs have been given to host community contractors ranging from civil, electrical, logistics, labour supplies, car hire, equipment leasing, asphaltting of roads in the complex, security on the company pipelines, etc.

### ***Education:***

- Building of a massive secondary school complex (boys and girls) for Aleto community (one of the host communities). The school comprising 12 classrooms, Principal's office, staff offices, science laboratories, sick bay, etc. was commissioned and handed over to the community leaders on 11<sup>th</sup> January 2017.
- Donation of 79 sets of solid high quality seat-fitted tables to the Nigerian Navy Basic Training School, Onne, Rivers State;
- Has awarded scholarships to 30 indigent students of Eleme/Elelenwo extraction doing engineering and other science related courses in universities and polytechnics. For Engineering Courses are for five years while others are for four 4 years.
- In 2008, the company organized a graduate training program for host community engineering students with zero experience and later absorbed them as staff. The company shall consider it again as personnel requirement improves.
- Purchased a plot of land in Aleto community and constructed ICT and Skill Acquisition Center, which is operational and functional now.
- Indorama donated N10 million to the University of Port Harcourt Centre of Gas, Refining & Petrochemicals to sponsor an international conference to add value to the education and knowledge sharing for national development.

### ***Healthcare:***

- Indorama carried out a full renovation of the Nchia General Hospital Eleme and donated drugs and medical equipment worth Eighty Million Naira (N80,000,000) to the hospital.
- To make the hospital fully functional, Indorama embarked on building of doctors' and nurses' quarters, and building of a major emergency entrance/exit road in the hospital. All these have been commissioned.
- As a follow up to the hospital renovation, Indorama organized a two-day Free Eye Camp in which about 500 persons with eye diseases were diagnosed and treated free of charge.
- At various times, Indorama has donated drugs and food items to Daughters of Charity, a Catholic charity organization, which takes care of the poor and needy in the Eleme and environs.
- Indorama healthcare interventions also are extended to the larger society. In March 2013, the company donated various sets of medical equipment to the University of Port Harcourt Teaching Hospital.
- Another donation of medical equipment worth millions of naira was also made to the Braithwaite Specialists Memorial Hospital (BSMH), Port Harcourt (owned by the Rivers state Government) in August 2017.

### ***Infrastructure***

- In July 2015, Indorama donated N530 million in an initiative of the Rivers state Government to rehabilitate the Eleme – Onne axis of the Federal highway which had become impassable and causing terrible hardship for motorists and workers.

- The company has done quite enormous number of developmental projects in the host communities including
  - (a) Building of roads in Elemenwo and Agbonchia communities,
  - (b) Electrification project in Njuru and Akpajo communities,
  - (c) Building of modern secondary school in Aleto community.
  - (d) In each Community the company has expended N26M (N52M for 2 Communities).
  - (e) Each community has 600 MTR road and Electrification project consisting of erection of 36 High Tension Poles, 22 Low Tension Poles to cover 1KM, Installation of 1KM long HT and LT Cables and procurement & installation of 500KVA Transformer to power the HT/LT Cables.
- Indorama Eleme Petrochemicals Ltd and its sister companies have made lives better to its host and transit community as well as the larger society through its numerous corporate social responsibility (CRS) initiatives.

Conclusively, the CSR projects to the host communities are an ongoing phenomena. However as a part of IEFCL-Train2, IEFCL has already initiated the process with due discussion with community representatives and project advisory committee.

## **10 Conclusion**

The project has been extensively researched with all factors considered. The project has been meticulously strategized with tangible benefits with little or no effect on environmental aspects. Besides opening direct and indirect employment opportunities for indigenes, the project will add increased revenue to national exchequer. This has been aptly proved during the previous project (IEFCL-Train 1 fertilizer) that was commissioned in record 36 months. This has strengthened the Bankers' belief and creates everlasting impression and reason to invest the IEFCL Train-2 fertilizer project.

Evaluation of ESIA data, found that the project is environmentally feasible and will not cause serious effect to the environment, considering that the existing and proposed mitigation measures are implemented. Residual issues associated with the project are expected to be minor and not likely to have long-term significance on the environment.

Mitigation and compensation measures are to be addressed according to the proposed action plan. All its monitoring programs are to be religiously implemented and periodically reviewed and revised as necessary to take into consideration changes made to the project during its operation. Vibrant and dynamic company-community relations need to be maintained to ensure sustainability of the project.

## Contacts

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