

**INITIAL ENVIRONMENTAL EXAMINATION REPORT**

**Rural Water Supply and Sanitation Project,  
Water Supply and Sanitation Sector Reform Programme, Niger  
Delta Support Programme, Nigeria.**



**SUSTAINABLE ENVIRONMENT DEVELOPMENT INITIATIVE (SEDI)**

**AUGUST, 2013**

## TABLE OF CONTENTS

|  | <b>Page</b> |
|--|-------------|
| Acronymns .....  | 3           |
| List of Tables .....   | 4           |
| List of Figures .....  | 4           |
| List of Photographs .....  | 5           |
| List of Appendices .....   | 6           |
| <b>Executive Summary</b> .....   | <b>7</b>    |
| <b>A. Introduction</b> .....   | <b>8</b>    |
| I. Project Description .....   | 8           |
| II. Purpose of Initial Environmental Examination (IEE) Study .....     | 10          |
| III. Nigerian National Laws on Environment .....                       | 11          |
| IV. Approach and Methodology .....                                     | 20          |
| <b>B. Description of Environment</b> .....                             | <b>22</b>   |
| I. Physical resources .....  | 22          |
| II. Description of Study Locations .....                               | 26          |
| <b>C. Potential Environmental Impact and Mitigation Measures</b> ..... | <b>37</b>   |
| A. Screening Out Areas of No Significant Impact .....                  | 42          |
| B. Methodology .....   | 43          |
| C. Mitigation Measures .....   | 48          |
| <b>D. Environmental Management and Monitoring Plan</b> .....           | <b>56</b>   |
| A. Reporting .....   | 57          |
| B. Grievance Redress Mechanism .....                                   | 57          |
| <b>E. Public Consultation and Information Disclosure</b> .....         | <b>58</b>   |
| <b>F. Conclusion</b> .....   | <b>58</b>   |
| <b>Appendices</b> .....  | <b>59</b>   |

## List of Acronymns

|         |   |
|---------|---|
| DRR     | Disaster Risk Reduction                             |
| EA      | Executing Agency                                    |
| EDF     | European Development Fund                           |
| EIA     | Environmental Impact assessment                     |
| EMP     | Environmental Management Plan                       |
| EO      | Environment Officer                                 |
| EU      | European Union                                      |
| FGN     | Federal Government of Nigeria                       |
| IEE     | Initial Environmental Examination                   |
| LGA     | Local Government Area                               |
| M&E     | Monitoring and Evaluation                           |
| NDR     | Niger Delta Region                                  |
| NDSP    | Niger Delta Support Programme                       |
| NWRI    | National Water Resource Institute                   |
| RUWASSA | Rural Water Supply and Sanitation Agency            |
| RWSS    | Rural Water Supply and Sanitation                   |
| UNICEF  | United Nations Children's Fund                      |
| WASH    | Water, Sanitation and Hygiene                       |
| WASHCOM | Water, Sanitation and hygiene Committee             |
| WSS     | Water and Sanitation Sector                         |
| WSSSRP  | Water Supply and Sanitation Sector Reform Programme |

## List of Tables

|  |    |
|--|----|
| Table 1 - Community locations in Edo, Delta, Bayelsa, Rivers and Akwa Ibom States.....                               | 37 |
| Table 2 - School locations in Edo, Delta, Bayelsa, Rivers and Akwa Ibom States.....                                  | 38 |
| Table 3 - Summary of Environmental Checklist in Communities/States (Edo, Delta, Bayelsa, Rivers and Akwa Ibom) ..... | 39 |
| Table 4 - Environmental factors where Significant Impacts are Not Expected .....                                     | 42 |
| Table 5 - Summary of Environmental Impacts.....  | 47 |
| Table 6 - Environmental Management Plan .....  | 49 |

## List of Figures

|  |    |
|--|----|
| Figure 1 - The flow chart of the EMP process in Nigeria.....   | 17 |
| Figure 2 - Checklist for the Categorisation of EIA Projects .....  | 18 |
| Figure 3 - Map of Ovia North East LGA, Edo State .....   | 26 |
| Figure 4 - Map of Etsako West LGA, Edo State .....   | 27 |
| Figure 5 - Map of Ndokwa West LGA, Delta State .....   | 28 |
| Figure 6 - Map of Isoko South LGA, Delta State .....   | 29 |
| Figure 7 - Map of Kokokuma/Opokuma LGA, Bayelsa State .....  | 30 |
| Figure 8 - Map of Brass LGA, Bayelsa State .....   | 31 |
| Figure 9 - Map of Akuku-Toru LGA, Rivers State .....   | 33 |
| Figure 10 - Map of Opobo-Nkoro LGA, Rivers State .....   | 34 |
| Figure 11 - Map of Akwa Ibom showing Nsit Atai LGA, Akwa Ibom .....  | 35 |
| Figure 12 - Map of Obot Akara LGA, Akwa Ibom .....   | 36 |
| Figure 13 - Environmental Checklist Survey in Communities (Edo, Delta, Bayelsa, Rivers and Akwa Ibom States) ..... | 40 |
| Figure 14 - WASH Assessment in Selected Communities (Edo, Delta, Bayelsa, Rivers and Akwa Ibom States) .....       | 41 |

|  |    |
|--|----|
| Figure 15 - WASH Assessment in Selected Primary Schools (Edo, Delta, Bayelsa, Rivers and Akwa Ibom States) ..... | 41 |
| Figure 16 - Environmental Impacts due to Construction Activities .....   | 41 |
| Figure 17 - Impacts of Project Activities during Operation Phase .....   | 45 |
| <b>List of Photographs</b>   |    |
| Plate 1 - Interview with Okonkpon community ruler .....  | 26 |
| Plate 2 - Ikonkpon water supply scheme (Non-functional) .....  | 26 |
| Plate 3 - Interview with Mr. Festus Okhemukhokho (HOD Environment, Etsako West LGA, Edo State) .....             | 27 |
| Plate 4 - Imeke water supply project (recently constructed) .....  | 27 |
| Plate 5 - Interview with Mr. Samson, Umusam Community development chairman....                                   | 28 |
| Plate 6 - Iyashili primary school water supply tank (Not functional) .....                                       | 28 |
| Plate 7 - River Umeh (Flood prone community) .....   | 30 |
| Plate 8 - Teachers of Umeh primary school .....  | 30 |
| Plate 9 - Interview with Chief Jonathan Diri - Sampou community .....  | 31 |
| Plate 10 - Head teacher, Sampou primary school displaying non-functional hand Pump .....                         | 31 |
| Plate 11 - Interview with Chief Simeon Omeriowo, Kemmer Town .....   | 32 |
| Plate 12 - St. Barnabas primary school unused hand washing facility due to lack of water supply .....            | 32 |
| Plate 13 - Soku community water supply Project (uncompleted) .....   | 33 |
| Plate 14 - Interview with Mr Pius Sonny, Soku primary school head teacher .....                                  | 33 |
| Plate 15 - Interview with Chief G.P. Jack (Kalai Ibiama) .....   | 34 |
| Plate 16 - Kalai Ibiama uncompleted water supply project .....   | 34 |
| Plate 17 - Interview with Chief Idim Akpan Idim, Ikot Asua (Traditional ruler) .....                             | 35 |

|  |    |
|--|----|
| Plate 18 - Uncompleted State Government water project .....                    | 35 |
| Plate 19 - Interview with Chief Isido Jacob, Nto Nde (Traditional ruler) ..... | 36 |
| Plate 20 - Interview with teachers of Nto Nde primary school .....             | 36 |
| <b>List of Appendices</b>  |    |
| Appendix I – Terms of Reference .....  | 59 |
| Appendix II – Community environmental checklist .....                          | 66 |
| Appendix III – Community WASH assessment .....                                 | 78 |
| Appendix IV – Schools WASH assessment .....                                    | 81 |
| Appendix V – WASH assessment in communities .....                              | 84 |
| Appendix VI – WASH assessment in schools .....                                 | 85 |
| Appendix VII – List of Key Contacts .....                                      | 87 |
| Appendix VIII – Checklist of Some Flora Resources in Okomu National Park ..... | 90 |
| Appendix IX – Checklist of Some Fauna Resources in Okomu National Park .....   | 92 |

## **Executive Summary**

The Rural Water Supply and Sanitation Project have been designed to contribute to the rural water supply and sanitation sector's reform under the Niger Delta Support Programme (NDSP). The project will contribute to strengthening social bond and peace building among the beneficiaries in the project States through local capacity building and provision of access to improved sources of safe drinking water and basic sanitation in 10 self-selected Local Government Areas in the project States, namely: Akwa Ibom, Bayelsa Delta, Edo and Rivers. The purpose of this Initial Environmental Examination (IEE) is to provide environmental threshold determinations for the proposed Rural Water Supply and Sanitation Project (RWSSP) in the selected communities of 10 self-selected Local Government Areas (LGAs) of five European Union (EU) NDSP project States (Akwa-Ibom, Bayelsa, Delta, Edo, and Rivers) in Nigeria. The IEE covers all the activities that are proposed for the program, so as to ensure environmentally sound project design implementation. Field visits were conducted by the IEE consultant in two focal communities in each State. The visits were to collect environmental information about the proposed project and its potential impact areas. The methodology adopted for impact identification and prediction was checklists and questionnaire method. The impacts were classified in terms of level (low, moderate and significant). The likely impacts/issues of the proposed project construction as well as operation have been described covering both adverse and beneficial ones. In-depth interviews were conducted with traditional rulers and other key stakeholders (Youth and women leaders). In schools, interviews were conducted with head teachers. These served as key stakeholders where the project Water, Sanitation and Hygiene (WASH) facilities would be constructed. The data collected were analyzed to identify both the negative and positive impacts of the project on the environment. The project activity impacts on the environmental components indicate that the construction phase is relatively more severe than the operational phase impacts. During the construction phase, the worst affected environmental components are air, noise, soil and resource depletion. The operational phase is characterized by an overall positive impact on public health and safety due to augmentation in water supply, thus reducing the spread of disease vectors and unsafe water sources. An Environmental Management Plan (EMP) has been developed to address mitigation measures/actions to be taken during construction and operation phases of the project. The EMP proposes an institutional framework within the State RUWASSA's and the local government WASH units to carry out the environmental and social mitigation tasks and coordinate its implementation, monitoring and evaluation.

The IEE has assessed the environmental impacts of all infrastructure proposed by the project and has concluded that all negative impacts will be successfully mitigated and that the project is expected to deliver major benefits to the benefiting communities and schools.

## **Introduction**

### **Project Description**

The Rural Water Supply and Sanitation Project under the Niger Delta Support Programme have been designed to contribute to the rural water supply and sanitation sector's reform initiative started by the Federal Government of Nigeria since 2005. Taking off from the lessons learned under the 9<sup>th</sup> European Development Fund (EDF), the project will contribute to strengthening social bond and peace building among the beneficiaries in the project States through local capacity building and provision of access to improved sources of safe drinking water and basic sanitation in 10 self-selected Local Government Areas in the project States, namely: Akwa Ibom, Bayelsa Delta, Edo and Rivers.

Specifically, the RWSS project will advocate for the institutionalization of rural water supply and sanitation agencies in the States and LGAs. It will provide support to the WASH sector institutions in the five States to enable them to fulfill their mandates. Local capacities will be improved through mentoring mechanisms and training modules to sustain service delivery. In keeping with the principle of shared responsibilities, participation of local communities, especially women, in the development and operation and maintenance (O & M) of water and sanitation facilities, and in sustainable service delivery will be pursued through various capacity building initiatives.

Recent flooding across the country has triggered both federal and state governments and development partners to rethink their development interventions. The service delivery facilities have been observed not to withstand the adverse effect of flooding. The Rural Water Supply and Sanitation Project has incorporated lessons learnt from the flooding incidence, especially to locate water supply and sanitation facilities in such a manner to avoid flood prone areas. Disaster Risk Reduction (DRR) and Resilience associated with Climate Change has been incorporated in project design. Provisions, through well-defined activities for capacity building on DRR and Resilience, have been made in the project.

It is recognized that only Rivers State, out of the five project States has made effort to develop its water and sanitation sector policy and a strategy for the sector. Furthermore, users' or service charges for operation and maintenance is not always politically supported and there is much resistance from users in the Niger Delta region who see government interventions and subsidies as a legitimate form of fiscal transfer to them from the oil revenues. The challenge for the RWSSP is to work within the present challenging environment, and to successfully advocate changes for longer term development of the sector through policy reforms, State-level internal reforms and development at the organizational and human resource development levels.



LGA self-selection process, sanitation and hygiene promotion specifically CLTS approach and Hygiene Improvement Framework (HIF), concept of Environmental Health Club (EHC), community ownership and the cost sharing models will be adopted in the implementation of this project. These models have already been tested in the just concluded rural component of WSSSRP (9<sup>th</sup> EDF) as well as the small town component of WSSSRP and have also been, subsequently, adopted in the ongoing DFID supported UNICEF WASH projects in four States (Bauchi, Jigawa, Katsina and Benue).

It is reiterated that the rural water supply and sanitation project of the Niger Delta Support Programme will contribute directly and or indirectly to peace building and mitigate the impacts of conflict in the five project States in such a manner as mentioned below:

The program is designed based on strong community involvement in the selection of type and level of service of the water supply as well as in managing constructed facilities. Such an involvement could strengthen the links and synergy between local citizens and the elected community-level officials who will be accountable to the people. Project Coordination Committees will be formed at LGAs level to bring together stakeholders from different communities and interests.

Efficient, effective and sustainable delivery of basic water and sanitation services will improve the quality of life, contribute to increased economic productivity which may translate to more confidence in democracy, and possible increase in governments' effectiveness and legitimacy.

Women will have opportunities to be involved in decision making through their participation in water and sanitation committees (WASHCOMs). It has been demonstrated that WASH programmes contribute to creating opportunities to organize and build capacity of beneficiaries (particularly women) around WASH service facilities. Often, such interactions go a long way to strengthen social bonding.

Water is a driver of a new path of development in which economic growth is linked to social equity and environmental responsibility. Investment in WASH can reduce both the time and cost of treating waterborne disease, a burden that falls heavier on women and girls who spend hours collecting water from distant sources and caring for sick family members. Ultimately, it improves life of the rural poor and contributes to reducing poverty, discontentment and social strife.

Other Economic Growth entry points will include supporting distribution, maintenance and sales of WASH related hardware, including pipes, pumps, latrine construction materials, and safe water storage and treatment products which create opportunities for the livelihood and economic well-being.

Provision of neutral fora or opportunities for social dialogue, community decision making, participatory planning, and service delivery. These approaches gradually establish a social contact among citizens, water committees (WASHCOMs) and LGAs within the machinery of State administration. Consequently, it will enhance the presence of Government and build trust of local people with their governments.

Regular meetings between State project officials and LGAs will establish dialogue among stakeholders (LGAs, civil society organizations and communities/WASHCOMs) on ways to promote sustainable and demand responsive WASH service delivery. This will enhance the access of local communities to civil servants and will strengthen the relation between the two and ultimately, contribute to the social bonding.

The creation of a Federation of WASHCOMS will bring together water committees and members from diverse ethnic and social groupings.

## **II. Purpose of Initial Environmental Examination (IEE) Study**

In recent years, environmentally sustainable development has remained one of the major challenges facing development programming in most developing countries, including Nigeria. Accordingly, the Ministry of Environment has introduced a variety of instruments into the country's development planning. Initial Environmental Examination (IEE) is one of the tools used for environmentally sustainable development planning and intervention for small scale development projects.

Nigerian laws and regulations require that environmental impacts of development projects are identified and assessed as part of the planning and design process, and that action is taken to reduce those impacts to acceptable levels. This is done through the environmental assessment process, which has become an integral part of project development and implementation globally. The terms of reference is contained in appendix I.

The purpose of the IEE study is to:

The purpose of this IEE is to provide environmental threshold determinations for the proposed Rural Water Supply and Sanitation Project (RWSSP) in the selected communities of 10 self-selected Local Government Areas (LGAs) of five EU NDSP project States (Akwa-Ibom, Bayelsa, Delta, Edo, and Rivers) in Nigeria. The IEE covers all the activities that are proposed for the program, so as to ensure environmentally sound project design implementation.

The norms for this study will be guided by the National Environmental Impact Assessment Guidelines. The general objectives of this IEE would be:

(I) Identify and analyze the potential environmental impacts (whether positive or adverse) on physical, biological, socio-economic & cultural resources, from the location, design & construction of project structures & associated facilities in the project areas.

(II) Propose the suitable mitigation measures for minimizing the potential negative environmental impacts and to augment the positive ones to improve overall performance of the project.

(III) Define and prepare appropriate environmental monitoring and management plan.

(IV) Determine the potentials for the improvements to natural resources and environmental management and socio-economic benefits to the communities in the project areas and its surroundings.

(V) Receive public feedback for safeguarding the natural environment with least negative impact on its natural settings and also to adequately assess & document community requirements relating socio-economic & cultural aspects in the project areas.

### **III. Nigerian National Laws on Environment**

#### **National Legislations**

- Environmental Impact Assessment Act No. 86 of 10 December 1992
- Federal Environmental Protection Agency Act No 8 of 30 December 1988 : FEPA Act, cap 131 LFN, 1990
- National Environmental Protection (Pollution abatement in Industries and Facilities generating Waste) Regulations. 1991
- National Environmental Protection (Effluent Limitation) Regulations S.I.8 (FEPA, 1991).
- National Environmental Protection (Management of Solid and Hazardous Wastes) Regulation S.1. 15
- Federal Ministry of Environment Procedural Guidelines for EIA
- Harmful Waste Act No. 42 of 25 November 1988
- Federal National Parks Act August 1991
- Forestry Act. 1958
- Land Use Act 1978
- National Policy on the Environment
- Quarries Act 350 LFN of 1990
- Environmental Impact Assessment Sectoral Guideline for Infrastructure development projects (1995) of the Federal Ministry of Environment.

## **National Environmental Guidelines**

The introduction of guidelines and standards was part of the implementation of the National Policy on Environment and the environmental pollution abatement strategy.

The guidelines and standards relate to six areas of environmental pollution control:

- Effluent limitations.
- Water quality for industrial water uses at point of intake.
- Industrial emission limitations.
- Management of solid and hazardous wastes.
- Pollution abatement in industries.

## **National Environmental Protection (Effluent Limitation) Regulation S.I.6 (1991)**

This regulation was issued in 1991. It provides national Guidelines and Standards for industrial effluents, gaseous emissions, noise, air quality and hazardous wastes management.

## **National Environmental Protection S.1 .9 (Pollution and Abatement in industries in Facilities Producing Waste) Regulations, 1991**

This provides general guidelines for the containment of pollution in industries that generate harmful-wastes.

## **National Environmental Protection (Management of Solid and Hazardous Wastes Regulation S.1. 15**

This provides general guidelines for the management of solid and hazardous wastes in Nigeria and emphasizes the followings:

**Waste Notification:** Industries are obliged to notify the FMENV of all toxic hazardous and radioactive wastes which are stored on site or which are generated as part of operations (Regulations 1991, Article 2).

**Waste Management:** With regard to waste management, a legal basis exists in Nigeria for the establishment and implementation of a 'cradle-to-grave' tracking system. Specifically the Solid and Hazardous Wastes Management Regulations 1991 provide for the

establishment of a documentation scheme to cover the generation, transport, treatment and disposal of hazardous-wastes.

### **Environmental Impact Assessment Act No. of 10 December 1992**

This Act provides the guideline for activities or development projects for which EIA/EMP is mandatory in Nigeria. Such developments include oil and gas fields, conversion of mangrove swamps covering area of 50 hectares or more for industrial use, Land/coastal reclamation projects involving an area of 50 hectares or more. Pursuant to this, the EIA Act No 86 of 1992 sets out the procedure for prior consideration of environmental and social issues in certain categories of public and private development projects.

### **Federal Ministry of Environment Sectoral Guidelines for EMP**

The FEPA Act cap 131. LFN, 1990 allocates powers of environment legislation making and enforcement to the Federal Environmental Protection Agency (FEPA), now Federal Ministry of Environment. (FMENV) In-line with its functions, FEPA has published the EIA/EMP Sectoral Guidelines (revised in September 1995). The guidelines cover major development projects and are intended to inform and assist proponents in conducting EIA/EMP studies.

### **Nigerian EMP Procedure**

The FMENV developed a National EMP Procedure (FEPA 1985) in response to the promulgation of the EIA Act No. 86 of 1992. The procedure indicates the steps to be followed from project conception to commissioning in order to ensure that the project is implemented with maximum consideration for the environment.

The procedure for EMP involves the project proposal stage where the project proponent notifies FMENV of the proposed project in writing. The project proposal is expected to contain all relevant information on the project, including a land-use map.

This stage is followed by the screening phase, during which the Ministry will carry out, an Initial Environmental Examination (IEE) and assign the project into a category based on the following criteria: Magnitude; Extent or scope; Duration and frequency; Risks; Significance and Mitigation measures available for associated and potential environmental impacts. The location of the project in Environmentally Sensitive Areas (ESAs) is also an important criterion in project categorization. The areas categorized as Environmentally Sensitive Areas (ESAs) include coral reefs, mangrove swamps, Small islands, and tropical rainforests, areas with erosion-prone soils, natural conservation areas, etc.

There are three categories (I, II, III) In FMENV's EIA/EMP Procedural Guideline. Category I projects are subjected to full-scale EIA/EMP. It consists of, among others, construction of Roads and Infrastructure projects like, Railways, Ports and Harbours. Airports, Electrification Projects-etc.

Projects listed in 'Category' II may not require a full-scale EIA/EMP except when such a

project is located in an Environmentally Sensitive Area (ESA) and in this case the project will be automatically assigned to Category I. The requirement for Category II projects is a partial EIA/EMP. Also, mitigative measures or changes in project design (depending on the nature and magnitude of the environmental impacts) as well as further actions may be required from the proponent. Category II projects include reforestation) afforestation projects, land and soil management, small-scale irrigation and drainage, mini hydro-power development small-scale development of petroleum or related activities, etc.

Category III projects are those expected to have essentially beneficial impacts on the environment. For projects in this category, the Ministry will issue an Environmental Impact Statement (EIS). Projects in this category include family planning programme institutional development, environmental awareness projects, etc.

Another stage of FMENV's EMP procedure, which comes up after the project proposal stage in the scoping stage, the main feature of which is that the proponent will be required to submit a Terms of Reference (TOR) for the proposed EMP study. In some cases, the Ministry may demand a Preliminary Assessment Report, and any additional information from the proponent to assist in vetting the scope and the TOR of the proposed EMP study. This stage is followed by actual implementation of the EMP study, preparation of Draft Final and Final EMP Reports, review process and approval/certification.

### **Other National Legislations**

Apart from the FMENV guidelines highlighted above, there are other legislations that have been put in place to serve as a check on the operators of oil and gas industries. Some of these are summarized below:

#### **Penal Code**

The Nigerian Penal code makes it an offence punishable with up to 6 months imprisonment for Any person who: Violates the atmosphere in any place so as to make it noxious to the health of persons in general dwelling or carrying on business in the neighborhoods or passing along a public way or does any act which is and which he knows or has reason to believe to be, likely to spread the infection of any disease dangerous to life, whether human or animal".

#### **The Explosives Act**

This Act was promulgated in 1964 and empowers the Minister of Mines & Power (now Solid Minerals) to make regulations on the importation, manufacture, storage and use and the ownership and possession of explosives.

### **Endangered Species Act (1985)**

The endangered species Act No. 11 of 1985 prohibits the hunting, capture and trade of endangered species.

### **Quarries Act Cap 385 Laws of Federation of Nigeria, 1990**

The act provides for and regulates quarrying activities in Nigeria. It prohibits unauthorized quarrying activities for industrial use and diversion of water course or impounding of water for that purpose. The Act gives the Minister for Mines and Power the power to make regulations for prevention of pollution of natural water supply.

### **Land Use Act 1978**

States that ... it is also in (he public interest that the rights of all Nigerians to use and enjoy land in Nigeria and the natural fruits thereof in sufficient quality to enable them to provide for the sustenance of themselves and their families should be assured, protected and preserved”.

### **National Inland Waterways Authority, Act (1997)**

Act 13 of 1997 establishing the National Inland Waterways Authority (NIWA) repeals the Navigable Waterways (Declaration) Act of 1988. The NIWA is managed by a governing board, whose functions, among others, include the following:

- Serve as the body providing regulations for all inland navigation;
- Ensure the development of infrastructural facilities for national inland waterways network connecting the creeks and the rivers to meet the challenges of modern inland waterways transportation;
- It is charged with undertaking capital and maintenance dredging. and hydrological and hydrographic surveys;
- Design of ferry routes and operate ferry services within the inland waterways systems: and
- Involved in the survey, removal and receipt of derelicts, wrecks and other obstructions from inland waterways and undertake the installation and maintenance of lights, buoys. and all navigational aids along water channels

## **State Legislations**

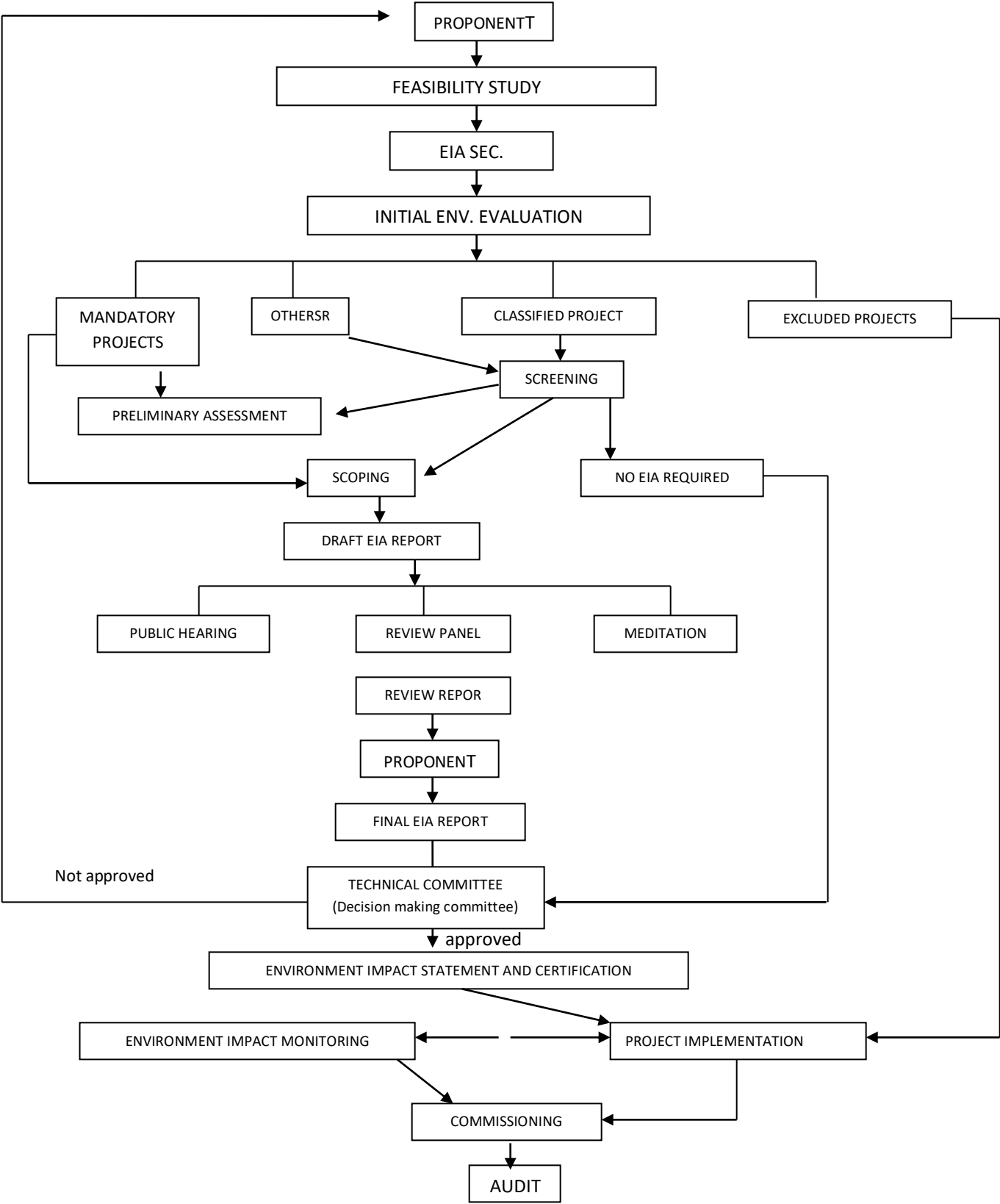
The Nigerian Constitution allows States to make legislations, laws and edicts on the Environment as environmental is listed under the concurrent schedule of (The 1999 Constitution).

The EIA Act No. 86 of 1992 also recommends the setting up of State Ministries of Environment (SMENV) and Environmental Protection Agencies (SEPA), to participate in regulating the consequences of project development on the environment in their area of jurisdiction. SMENVs thus have the responsibility for environmental protection at the state level within their states. The functions of the SM ENV/SEPA include:

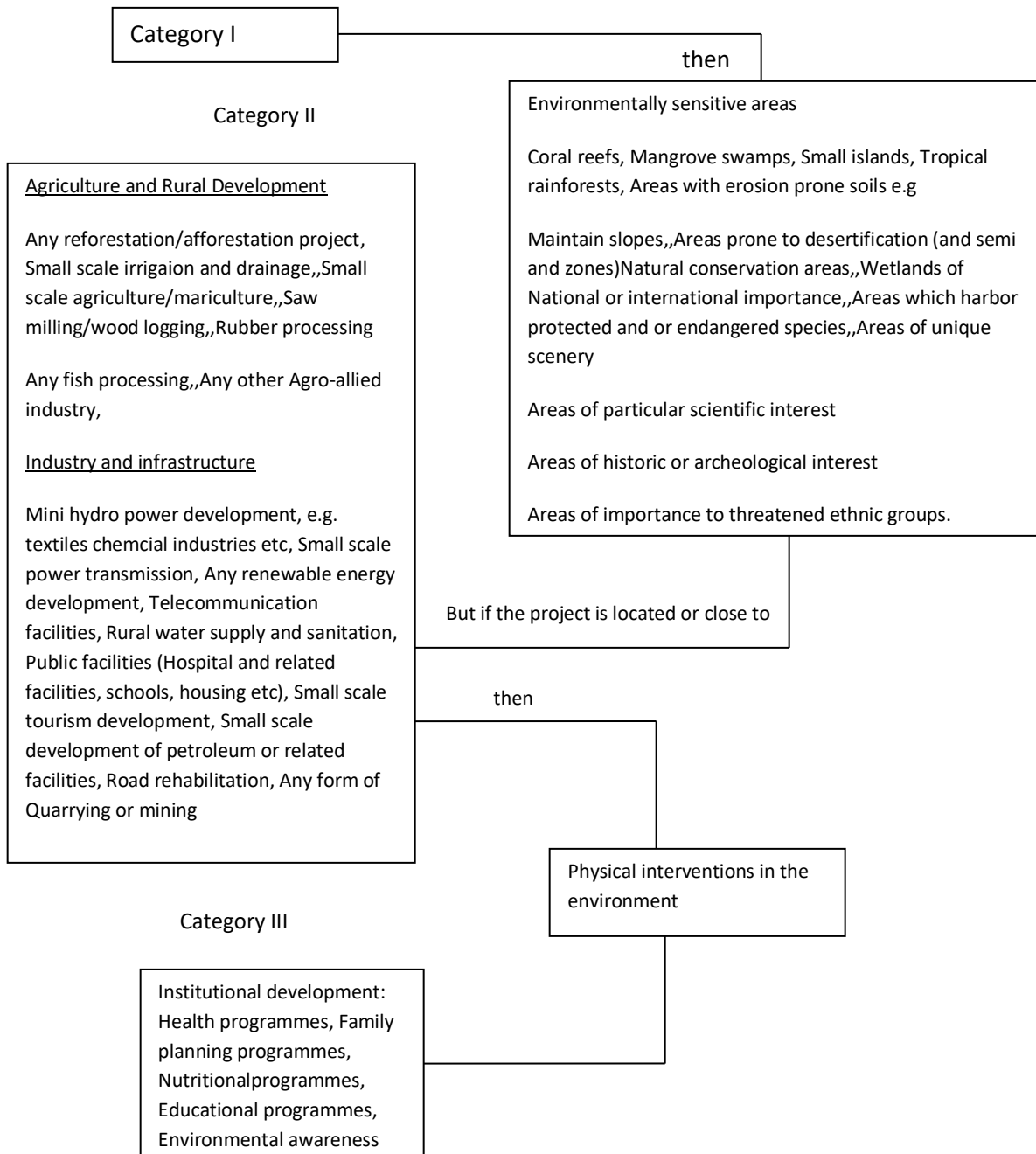
- Routine liaison and ensuring effective harmonization with the FMENV in order to achieve the objectives of the National Policy on the Environment;
- Co-operate with other relevant National Directorates/Agencies in the promotion of environmental education;
- Be responsible for monitoring compliance with waste management standards and;
- Monitor the implementation of the EMP and the Environmental Audit Report (EAR) guidelines and procedures on all developments policies and projects within the State.



**Figure 1: The flow chart of the EMP process in Nigeria**



**Figure 2: Checklist for the Categorisation of EIA Projects**



## **International Standards, Treaties and Conventions**

Global and Regional Treaties and Conventions are, in principle, binding in first instance on National Governments that accede to them. They are obliged to implement such arrangements through national legislation. At the international level, Nigeria is party to a number of Conventions that are relevant to the proposed development project. The more relevant ones are reviewed briefly below:

### Vienna Convention for the Protection of the Ozone Layer, including the Montreal Protocol and the London Amendment

The objectives of this Convention adopted in 1985 are to protect human health and the environment against adverse effects resulting or likely to result from human activities which modify or are likely to modify the Ozone Layer and to adopt agreed measures to control human activities found to have adverse effects on the Ozone Layer.

### Convention of the Conservation of Migratory Species of Wild Animals or Bonn Convention

The Bonn Convention's adopted in 1979 aims at the conservation and management of migratory species (including waterfowl and other wetland species) and promotion of measures for their conservation, including habitat conservation.

### Convention on Biological Diversity

The objectives of this Convention, which was opened for signature at the 1992 Rio Earth Summit and adopted in 1994, are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources by appropriate transfer of relevant technologies.

### Convention concerning the Protection of the World Cultural and Natural Heritage or World Heritage Convention

This Convention adopted in 1972 defines cultural and natural heritage. The latter is defined as areas with outstanding universal value from the aesthetic and conservation points of view.

In addition, Nigeria is a signatory to the following relevant international conventions:

- The African Convention on the Conservation of Nature and Natural Resources, The African Convention, 1968;
- The Convention Concerning the Protection of the World Cultural and Natural Heritage, The World Heritage Convention, 1972;
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora, CITES, 1973;
- Convention on Conservation of Migratory Species of World Animals, Bonn, 1979.
- The Basel Convention on the Control of Trans-boundary Movement of Hazardous Waste and Disposal, 1989;
- The Framework Convention on Climate Change, Kyoto Protocol, 1995;
- The Convention on Biological Diversity, 1992.

Further to the Federal Ministry of Environment EIA/EMP procedural guideline (Category II), rural water supply and sanitation projects do not require a formal EIA. Hence the national law on EIA is not applicable to the proposed project that this IEE addresses.

#### **IV. Approach and Methodology**

##### **1. Desk review**

This involved collection and review of secondary sources of information from various sources; Initial interaction and consultation with the local communities and LGA/State level stakeholders; and Delineation of geographical boundary of the influence area.

##### **Project specific checklists**

Environmental checklist and questionnaires were utilized. Community environmental checklist is presented in appendix II. Community and Schools WASH assessments are presented in appendix III and IV respectively.

##### **2. Field survey**

The field visits was conducted by the IEE consultant during June and July 2013, in 2 focal communities in each State. The visits were to collect environmental information about the proposed project and its potential impact areas.

The criterion for community selection was underserved communities in each self selected local government area, as determined by the LGA WASH unit coordinator. For the collection of environmental features related to biophysical environment, maximum 100 meter distance observable from the structures was taken as an influence area. The

impacts were classified in terms of level (low, moderate and significant). The methodology adopted for impact identification and prediction was checklists and questionnaire method. The likely impacts/issues of the proposed project construction as well as operation are described in the following sections. The likely impacts/issues have been assessed covering both adverse and beneficial ones.

In-depth interviews were conducted with traditional rulers and other key stakeholders (Youth and women leaders). It was used to collect biological, socio-economic and cultural environment related information using a checklist. Community and Schools WASH assessments questionnaires were used to assess current situation and expected environmental impacts of construction, operation and maintenance on community and school environment. In schools, interviews were conducted with head teachers. These served as key stakeholders where the project WASH facilities would be constructed. Photographs were taken to show different environmental features.

The community and school locations were located within geographical coordinates in each State by the use of Geographical Positioning System (GPS) equipment. For each community and school, the latitude and longitude were recorded.

### **3. Data Analysis**

The data collected was analyzed to identify both the negative and positive impacts of the project on the environment.

### **4. Public consultation**

In order to ensure the public involvement, the following procedures were followed during IEE report preparation:

Interactions with local communities and related stakeholders were conducted to collect public concerns and suggestions. Discussions were conducted to solicit information regarding the bio-physical and socio-economic and cultural aspects of the proposed project, and also to collect their suggestions and acceptance of the project. The discussions were held at the different selected communities and a record of public consultations prepared.

The draft IEE report will be reviewed incorporating the suggestions from the concerned stakeholders. The final IEE report will be sent to State RUWASSA for approval. The approved IEE report will be accessible to interested parties and general public through the concerned RUWASSA.

## **5. Mitigation Measures and Monitoring Plan**

Based on the identified impacts; their nature, extent and magnitude, the mitigation and monitoring prescriptions has been developed. A realistic approach has been used for the application of the mitigation measures in the local context. Environmental Monitoring Plan (EMP) has been developed to assess the effectiveness of the mitigation measures and implementation status.

Assessment of institutional capacity of implementing agencies in the implementation of the proposed Environmental Management Plan (EMP) and a training proposal to enable the agencies to implement the EMP and monitoring plan have been developed.

## **6. Information Disclosure**

Information about the proposed project and IEE study has been disseminated through person to person contacts and interviews and group discussions during field study of IEE. Available institutions at the local level have been informed through notice distribution or posting at concerned LGAs. The approved IEE report will be accessible to interested parties and general public through following agencies:

- LGA WASH Department/Units
- RUWASSAs
- State Ministries of Water Resources and Equivalent

## **B. Description of Environment**

### **I. Physical resources**

#### **Topography of the Niger Delta Region**

The Niger Delta region includes all the five states under the WSSSRP II out of the nine oil-producing states in Nigeria (Akwa-Ibom, Bayelsa, Delta, Edo, and Rivers states) with a total land area of about 75,000 square kilometres and 185 local government areas.

The Niger Delta region is a vast sedimentary basin. The deltaic deposits comprise mainly medium to coarse unconsolidated sands, silt, clay, shale and peat. The delta is mostly a flat, low-lying swampy basin criss-crossed by a dense network of meandering rivers and creeks. There are four broad ecological zones in the region defined by both relief and hydrological characteristics. These are, from the coast inland, the coastal sandy barrier ridge zone, the mangrove swamp zone, the freshwater swamp zone and the lowland rainforest zone. The region contains the world's third largest wetland, with the most

extensive freshwater swamp forest and rich biological diversity. Over half of the area is criss-crossed with creeks and dotted with small islands, while the remainder is a lowland rainforest zone.

Difficult topography encourages people to gather in small communities of the estimated 13,329 settlements in the region, 94 per cent have populations of less than 5,000. These are rural communities, which offer very limited economic opportunities. Infrastructure and social services are generally deplorable, and vastly inadequate for an estimated regional population of nearly 30 million people.

### **Climate of the Niger Delta States**

The Niger Delta has a humid, semi-hot equatorial climate. The region experiences heavy rainfall, leading to floods in urban areas and communities along the rivers. Due to the heavy and frequent rainfalls, soils consisting mainly of silt and clay become saturated, reducing infiltration to the barest minimum and encouraging run-off.

Rainfall induced run-off is directed mainly to the back swamps in the upper and middle parts of the delta. In the coastal zone, there is an even smaller topographic gradient that makes run-off difficult. Precipitation frequently results in flooding. On average, about 10 per cent of the total annual rainfall occurs during the dry season months of November to March. Temperatures are high and fairly constant throughout the year. Average monthly temperatures for the warmest months (February to April) range from 28 degrees Celsius to 33 degrees Celsius, while the average monthly temperatures for the coolest months, June to September, range from 21 degrees Celsius to 23 degrees Celsius.

This region of Nigeria experiences heavy and abundant rainfall. These storms are usually convectional in nature due to the region's proximity to the equatorial belt. The annual rainfall received in this region is very high, usually above the 2,000 mm (78.7 in) rainfall totals giving for tropical rainforest climates worldwide. Over 4,000 mm (157.5 in) of rainfall is received in the coastal region of Nigeria around the Niger delta area. Bonny town found in the coastal region of the Niger delta area in southern Nigeria receives well over 4,000 mm (157.5 in) of rainfall annually. The rest of the southeast receives between 2,000 and 3,000 mm (118.1 in) of rain per year.

### **Geology and soil type of the Niger Delta States**

The Niger Delta region has a varied geology and terrain, but sedimentary rock formations, mostly sandstone with some shale and limestone, underlie most areas. The rock formations present a ridge and valley topography. In some areas of Akwalbom and Ondo states, the terrain is characterized by advanced gully erosion. In Edo, Cross River and

Ondo states, there are areas of old, crystalline basement complex rocks, mainly granites, gneisses and granodiorite. These areas are characterized by rugged, rocky terrain with massive rock domes and inselbergs.

### **Surface and Ground water of the Niger Delta States**

The region has relatively higher water in the coastal area indicating a reversed river bottom gradient and implies the presence of a sustained hydraulic head driving sea water and extending saline contamination to locations far upstream. Tidal fluctuation is accompanied by a cyclic diurnal change in water quality, due to the mixing in continuously varying proportions of original river water with seawater. In the lower reaches of the estuary, the water quality approaches that of seawater and at the farthest point inland, that of primary river water. The damming effect of seawater causes a freshwater tide in the upper reaches, where although the river stage responds to tidal effects, the quality remains essentially unaffected. This scenario is illustrated at Peremabiri where seasonal fluctuations occur in the hydrographs throughout the year, but water quality is essentially fresh with only a 4% increase in the conductivity of the wet season value.

However, there is a wide distribution of slightly acidic water in the region. Consistently high chloride content is also indicated in boreholes within coastal areas, especially mangrove swamps, sandy islands and estuaries. In Port Harcourt for example, chloride content in boreholes at the boundaries between the coastal plain sands and the mangrove swamps are above 35 mg l<sup>-1</sup> while those on mangrove swamp proper are in excess of 150 mg l<sup>-1</sup>. In the coastal islands, chloride content is variable depending on the depth of the borehole. In Bonny, a community less than 500 m from the Atlantic ocean, a shallow well was sampled with very low chloride content of 2.5 mg l<sup>-1</sup>. In contrast, chloride content in deeper boreholes at Ogbolomabiri in the mangrove swamp was 94 mg l<sup>-1</sup>. In Okrika and Buguma, both in the mangrove swamp sub-environment, chloride concentrations were intermediate.

### **The Fauna and Flora in the Niger Delta**

The Niger River swamp forests occupy the inner reaches of the expansive Niger Delta. The Niger Delta, though having played an important role in the global economy (through the slave trade, palm oil trade, and now fossil fuels) over the last 400 years, has escaped close biological scrutiny. The first systematic surveys of the delta's flora and fauna were conducted during the past decade, and revealed several species previously not known to occur in the delta, including the Niger Delta red colobus (*Procolobusbadiusepieni*) which was new to science. These surveys also indicate that the forests and animal populations of the delta are under severe threat. Nigeria's second most important timber species, abura (*Hallealedermannii*), once common in the delta, has been removed by extensive logging since the late 1950's. Pressure on the delta's remaining forests comes from a growing



native Nigerian population, and improving infrastructure that makes it easier to access remaining areas of swamp forest. There are no protected areas in the delta and the rapid rates of destruction paint a bleak picture for the future of its habitats and species. The coastal marine and brackish waters fall entirely within the Niger delta basin and its adjoining coastal waters. The numerous estuaries and long coastline provide for ecological and micro geographical heterogeneity of fish communities and opportunity for migration of species from one ecological zone to the other. The major exploited species are croakers, mudskipper, shrimps, brackish water catfish, marine catfish, silver fish, sardines, barracuda, tilapia, oysters and periwinkles etc. while in the rain forest; we have gorilla, monkeys, antelopes, and bush pigs etc.

### **Protected Areas**

The Edumanom Forest Reserve is an area in the Niger Delta region of southeast Nigeria that is home to some of the last chimpanzees in Nigeria. It covers part of the old Nembe Kingdom, now divided into the Nembe and Brass local government areas, in Bayelsa State. The reserve also shelters the endemic Sclater's guenon and other IUCN Red List species Olive Colobus and Niger Delta Red Colobus.

The Okomu Forest Reserve is a forest block covering an area of 1081 km<sup>2</sup> in Edo State, about 50 km west of Benin City, Nigeria. The Okomu National Park lies within the reserve. The park holds a small part of the forests that once covered the region, and is the last habitat for many endangered species. The vegetation is typical Guinea-Congo lowland rainforest and is characterized by a mosaic of swamp-forest, high forest, secondary forest, and open scrub. Common trees include *Ceibapentandra*, *celtiszenkeri*, *Triplochitonscleroxylon*, *Antiarisafricana*, *pycnanthusangolensis* and *Astoniacongoensis*. The soils are sandy loam and acidic. Mean annual rainfall is about 2,100mm and exposed soils are nutrient-poor as a result of leaching. The reserve's main drainage is the southerly flowing Osse River, which forms its western boundary. About 150 bird species have been recorded from the park including, in addition to *Ceratogymnaelata*, the nationally rare *Catrata*. All four Negrofinches (*Nigeria fusconata*, *N. bicolor*, *N. luteifrons* and *N. canicapilla*) occur commonly. The nationally rare *Telacanthuramelanopygia* has been recorded at Nikrowa, a settlement on the edge of the park. The mammal fauna is diverse (33 species) and includes *Loxodonta Africana cyclotis* and *Syncerus caffer*, while the site is a stronghold for *Cercopithecus Erythrogaster*.

## II. Description of Study Locations

### Edo State

Edo State is an inland state in central southern Nigeria. Its capital is Benin City. It is bounded in the north and east by Kogi State, in the south by Delta State and in the west by Ondo State.

### Ovia South West LGA, Edo State

Ovia South-West is a Local Government Area (LGA) of Edo State, Nigeria. Its headquarters are in the town of Iguobazuwa. It has an area of 2,803 km<sup>2</sup> and a population of 135,356 at the 2006 census. Figure 3 shows map of Ovia South West LGA.

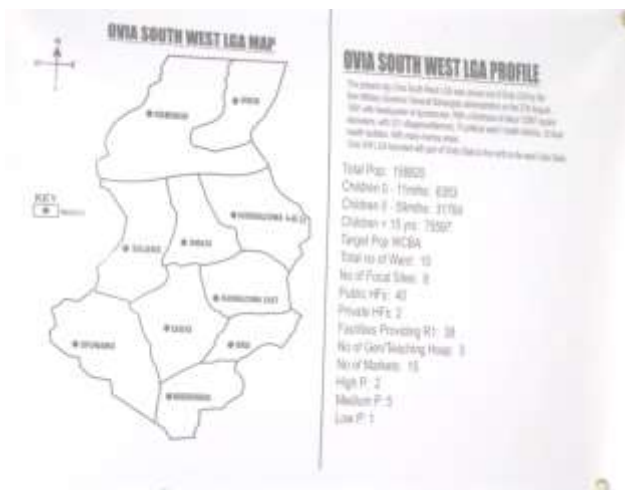


Fig. 3: Map of Ovia South West LGA, Edo State



Plate 1: Interview with Okonkpon community ruler



Plate 2: Okonkpon water supply scheme (Non-functional)

## Etsako West LGA, Edo State

Etsako West is a Local Government Area of Edo State, Nigeria. Its headquarters are in the town of Auchi. Etsako West is made up of four clans; Uzairue, Auchi, South Ibie, Awain clan and Agbede. The major towns in this LGA includes Auchi, Jattu, Agbede, Aviele, Jagbe and Awain clan (Ewora, Idegun, Ama, Ibhioaba). It has an area of 946 km<sup>2</sup> and a population of 197,609 at the 2006 census. Figure 4 shows map of Etsako West LGA.



Fig. 4: Map of Etsako West LGA, Edo State



Plate 3: Interview with Mr. Festus Okhemukhokho (HOD Environment, Etsako West LGA, Edo State)



Plate 4: Imeke water supply project (recently constructed)

## Delta State

Delta State is a state in Nigeria, comprising mainly Anioma, Urhobo, Isoko, Ijaw and Itsekiri. The whole ethnic-groups that comprise the Delta are administratively grouped into three senatorial districts namely Delta North, Delta South and Delta Central for administrative purposes. Delta is an oil producing state of Nigeria situated in the region known as the Niger Delta, South-South Geo-political zone with a population of 4,098,291 (Males: 2,674,306 Females: 2,024,085. The capital city is Asaba located at the northern end of the state with an estimated area of 762 km<sup>2</sup>, while Warri is economic nerve of the state and also the most populated located in the southern end of the state. The state has a total land area of 16,842 km<sup>2</sup>.

### Ndokwa West LGA, Delta State

Ndokwa West is a Local Government Area of Delta State, Nigeria. Its headquarters is in the town of Kwale. It has an area of 816 km<sup>2</sup> and a population of 149,325 at the 2006 census. Figure 5 shows map of Ndokwa West LGA.

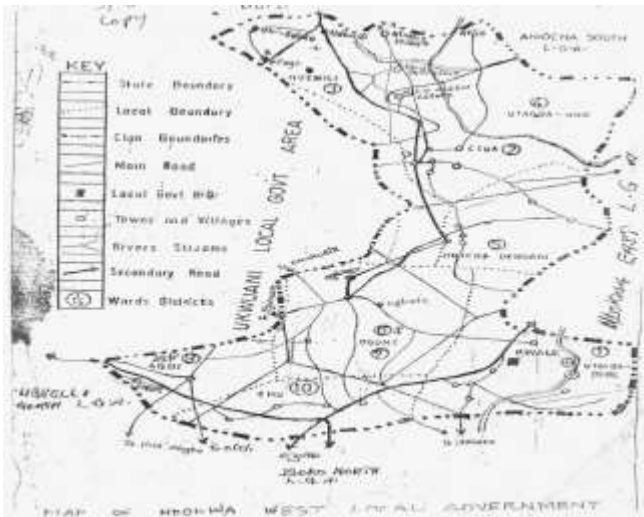


Fig. 5: Map of Ndokwa West LGA, Delta State



Plate 5: Interview with Mr. Samson, Umusam  
Community development chairman



Plate 6: Iyashili primary school water  
supply tank (Not functional)

### Isoko South LGA, Delta State

Isoko South is a Local Government Area (LGA) in the Isoko region of Delta State, Nigeria. With its headquarters at Oleh, Nigeria, it is one of the two local governments that make up the Isoko region. The other is Isoko North, which has its headquarters at Ozoro. Figure 6 shows map of Isoko South West LGA.



Fig. 6: Map of Isoko South LGA, Delta State



Plate 7: River Umeh (Flood prone community)



Plate 8: Teachers of Umeh primary school

**Bayelsa State**

**Bayelsa State** is a state in southern Nigeria in the core Niger Delta region, between Delta State and Rivers State. Its capital is Yenagoa. The four main languages spoken are Izon, Nembe, Epie-Atissa and Ogbia. Like the rest of Nigeria, English is the official language. The state was formed in 1996 from part of Rivers State and is thus one of the newest states of the Nigerian federation.

**Kokokuma/Opokuma LGA, Bayelsa State**

Kolokuma/Opokuma is a Local Government Area of Bayelsa State, Nigeria. Its headquarters are in the town of Kaiama. Much of the area of the LGA is occupied by the Bayelsa National Forest. It has an area of 361 km<sup>2</sup> and a population of 77,292 at the 2006 census. Figure 7 shows map of Kolokuma/Opokuma LGA.



Fig. 7: Map of Kokokuma/Opokuma LGA, Bayelsa State







Plate 11: Interview with Chief Simeon  
Omeriowo, Kemmer Town



Plate 12: St. Barnabas primary school  
unused hand washing facility due to  
lack of water supply

### **Rivers State**

Rivers State is one of the 36 states of Nigeria. Its capital is Port-Harcourt. It is bounded on the South by the Atlantic Ocean, to the North by Imo, Abia and Anambra States, to the East by Akwa Ibom State and to the West by Bayelsa and Delta states. Rivers state is home to many ethnic groups: Ikwerre, Igbo, Ijaw, Kalabari, Etche, Ogba, Ogoni and others. The inland part of Rivers state consists of tropical rainforest; towards the coast the typical Niger Delta environment features many mangrove swamps. Rivers state, named after the many rivers that border its territory, was part of the Oil Rivers protectorate from 1885 till 1893, when it became part of the Niger Coast Protectorate. In 1900 the region was merged with the chartered territories of the Royal Niger Company to form the colony of Southern Nigeria. The state was formed in 1967 with the split of the Eastern Region of Nigeria.

### **Akuku-Toru LGA , Rivers State**

Akuku-Toru is a Local Government Area in Rivers State, Nigeria. Its headquarters is in the town of Abonnema. It has an area of 1,443 km<sup>2</sup> and a population of 156,006 at the 2006 census. Figure 9 shows map of Akuku-Toru LGA.





**Fig. 9: Map of Akuku-Toru LGA, Rivers State**



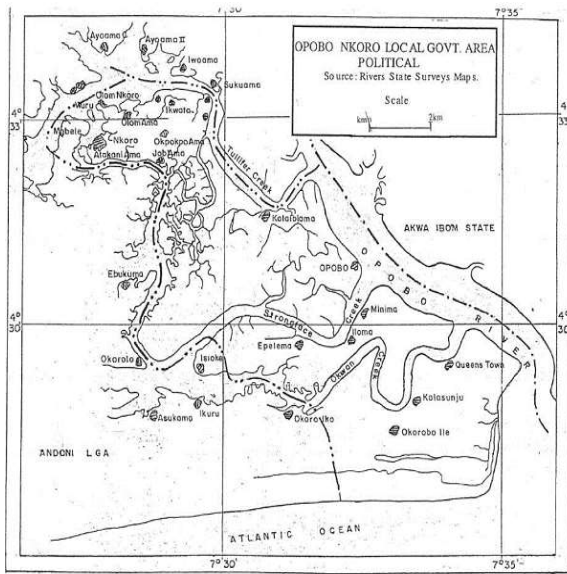
**Plate 13: Soku community water supply Project (uncompleted)**



**Plate 14: Interview with Mr Pius Sonny, Soku primary school head teacher**

**Opobo-Nkoro LGA, Rivers State**

Opobo/Nkoro is a Local Government Area in Rivers State, Nigeria. It is part of the Andoni/Opobo/nkoro constituency of the National Assembly. The capital is Opobo Town. The Opobo/Nkoro people are mainly farmers and fishermen. They are of Ijaw extraction. They also speak a creole Igbo language mixed with pidgin and Ibani (Ijaw) lexicon. Just like the neighbouring Bonny, the captured Igbo slaves from the hinterland during the slave trade era who could not be sold out when the Transatlantic Slave Trade was abolished settled there and the Igbo language was adopted. Figure 10 shows map of Opobo/Nkoro LGA.



**Fig. 10: Map of Opofo-Nkoro LGA, Rivers State**



**Plate 15: Interview with Chief G.P. Jack  
(Kalai Ibiama)**



**Plate 16: Kalai Ibiama uncompleted water  
supply project**

**Akwa Ibom State**

Akwa Ibom is a state in Nigeria named after the Qua Iboe river. It is located in the coastal South-Southern part of the country, lying between latitudes 4°32'1" and 5°33'1" North, and longitudes 7°25'1" and 8°25'1" East. The State is bordered on the east by Cross River State, on the west by Rivers State and Abia State, and on the South by the Atlantic Ocean and the southern-most tip of Cross River State. Akwa Ibom is one of Nigeria’s 36 states with a population of over 5 million people and more than 10 million people in diaspora. It was

created in 1987 from the former Cross River State. The state’s capital is Uyo with over 500,000 inhabitants . Akwa Ibom has an airport (Akwa Ibom International Airport) and two major sea ports on the Atlantic Ocean with a proposed construction of a world class seaport Ibaka Seaport at Oron. Along with English, the main spoken languages are Ibibio, Annang, Eket, and Oron languages.

**Nsit-Atai LGA, Akwa Ibom State**

Nsit-Atai is located in the south east of Nigeria and is a Local Government Area of Akwa Ibom State. Location: South East Akwa Ibom, approximately 50 kilometres from Uyo. It is bound in the North by Uruan, in the East by Okobo, in the West by Ibesikpo Asutan Local Government Area. Figure 11 shows map of Nsit-Atai LGA.



**Fig. 11: Map of Akwa Ibom showing Nsit Atai LGA, Akwa Ibom**



**Plate 17: Interview with Chief Idim Akpan Idim, Ikot Asua (Traditional ruler)**



**Plate 18: Uncompleted State Government water project**

## Obot-Akara LGA, Akwa Ibom State

Obot-Akara is located in the south east of Nigeria and is a Local Government Area of Akwa Ibom State. Figure 12 shows map of Obot/Akara LGA.



Fig. 12: Map of Obot Akara LGA, Akwa Ibom



Plate 19: Interview with Chief Isido Jacob, Nto Nde (Traditional ruler)



Plate 20: Interview with teachers of Nto Nde primary school

### C. Potential Environmental Impact and Mitigation Measures

A summary of community and primary school locations in the 10 self-selected Local Government Areas (LGAs) is presented in tables 1 and 2 respectively.

**Table 1: Community locations in Edo, Delta, Bayelsa, Rivers and Akwa Ibom States (NDSP)**

| S/N | Community          | LGA/State                       | Latitude (N) | Longitude (E) |
|-----|--------------------|---------------------------------|--------------|---------------|
| 1   | Okonkpon           | Ovia South West LGA, Edo State  | 6° 25'       | 3° 21'        |
| 2   | Imeke              | Etsako West LGA, Edo State      | 7° 5'        | 6° 17'        |
| 3   | Umusam Utagbe Ogbe | Ndokwa West LGA, Delta State    | 7° 7'        | 6° 15'        |
| 4   | Umeh               | Isoko South LGA, Delta State    | 5° 16'       | 6° 9'         |
| 5   | Sampou             | Kolga, Bayelsa State            | 5° 8'        | 6° 21'        |
| 6   | Kemmer Town        | Brass LGA, Bayelsa State        | 4° 18'       | 6° 14'        |
| 7   | Soku               | Akuku-Toru LGA, Rivers State    | 4° 40'       | 6° 40'        |
| 8   | Kalai Ibiama       | Opobo/Nkoro LGA, Rivers State   | 4° 31'       | 7° 32'        |
| 9   | Ikot Asua          | Nsit Atai LGA, Awa Ibom State   | 4° 51'       | 8° 3'         |
| 10  | Nto Ide Ikot Eme   | Obot Akara LGA, Akwa Ibom State | 5° 14'       | 7° 35'        |



**Table 2: School locations in Edo, Delta, Bayelsa, Rivers and Akwa Ibom States**

| S/N | School                               | LGA/State                       | Latitude (N) | Longitude (E) |
|-----|--------------------------------------|---------------------------------|--------------|---------------|
| 1   | Okonkpon primary school              | Ovia South West LGA, Edo State  | 6° 38'       | 3° 19'        |
| 2   | Imeke primary school                 | Etsako West LGA, Edo State      | 7° 7'        | 6° 15'        |
| 3   | Iyashili primary school              | Ndokwa West LGA, Delta State    | 5° 41'       | 6° 24'        |
| 4   | Umeh primary school                  | Isoko South LGA, Delta State    | 5° 15'       | 6° 9'         |
| 5   | Okoro primary school                 | Kolga, Bayelsa State            | 5° 10'       | 6° 18'        |
| 6   | St Barnabas primary school           | Brass LGA, Bayelsa State        | 4° 18'       | 6° 15'        |
| 7   | Holy trinity primary school          | Akuku-Toru LGA, Rivers State    | 4° 40'       | 6° 40'        |
| 8   | Kalai Ibiama primary school          | Opobo/Nkoro LGA, Rivers State   | 4° 31'       | 7° 30'        |
| 9   | Holy Child primary school            | Nsit Atai LGA, Awa Ibom State   | 4° 52'       | 8° 3'         |
| 10  | St Patrick's Catholic primary school | Obot Akara LGA, Akwa Ibom State | 5° 14'       | 7° 34'        |

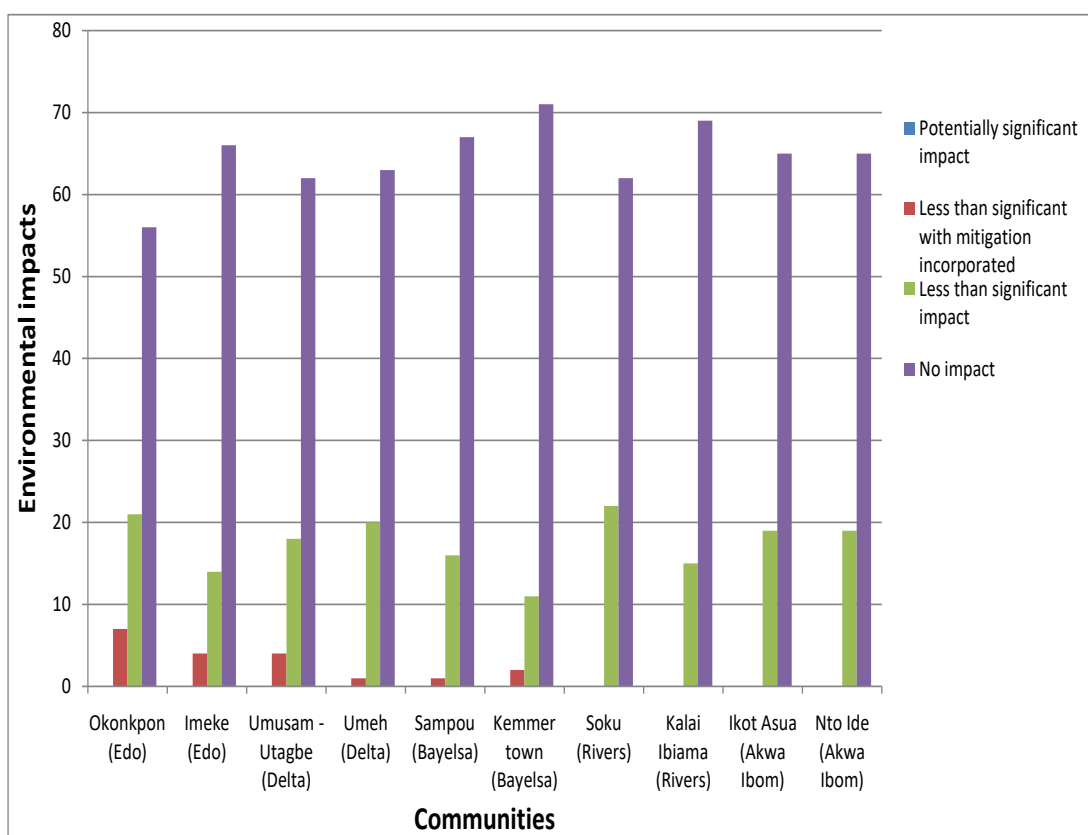
A summary of the environmental checklist in the selected communities is presented in table 3. The environmental factors evaluated show the following statistical percentages: Potentially significant impact (0%); Less than significant with mitigation incorporated

(2.26%); Less than significant impact (20.83%); and No impact (76.90%). This indicates that most of the environmental factors evaluated had ‘Less than significant’ and ‘No impact’ respectively (Table 3).

**Table 3: Summary of Environmental Checklist in Communities/States (Edo, Delta, Bayelsa, Rivers and Akwa Ibom)**

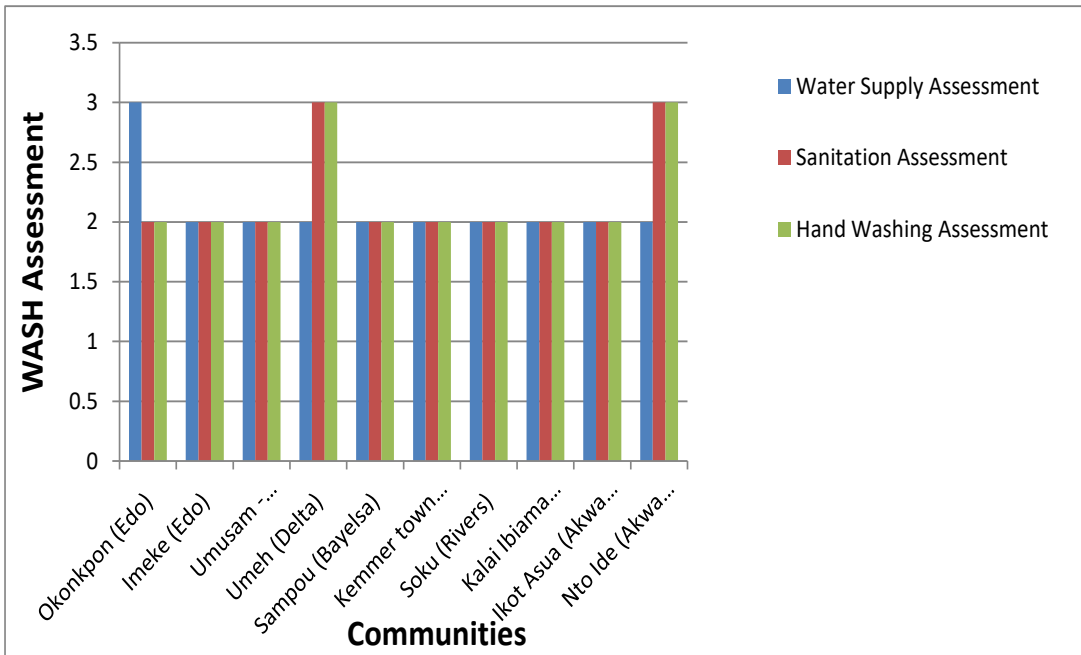
| S/N | Community Location/State | Potentially significant impact | Less than significant with mitigation incorporated | Less than significant impact | No impact |
|-----|--------------------------|--------------------------------|--|------------------------------|-----------|
| 1   | Okonkpon (Edo)           | 0                              | 7  | 21                           | 56        |
| 2   | Imeke (Edo)              | 0                              | 4  | 14                           | 66        |
| 3   | Umusam –Utagbe (Delta)   | 0                              | 4  | 18                           | 62        |
| 4   | Umeh (Delta)             | 0                              | 1  | 20                           | 63        |
| 5   | Sampou (Bayelsa)         | 0                              | 1  | 16                           | 67        |
| 6   | Kemmer town (Bayelsa)    | 0                              | 2  | 11                           | 71        |
| 7   | Soku (Rivers)            | 0                              | 0  | 22                           | 62        |
| 8   | Kalai Ibiama (Rivers)    | 0                              | 0  | 15                           | 69        |
| 9   | Ikot Asua (Akwa Ibom)    | 0                              | 0  | 19                           | 65        |
| 10  | Nto Ide (Akwa Ibom)      | 0                              | 0  | 19                           | 65        |
|     | Sum                      | 0                              | 19   | 175                          | 646       |
|     | Mean                     | 0                              | 1.9  | 17.5                         | 64.6      |
|     | Percentage (%)           | 0                              | 2.26   | 20.83                        | 76.9      |

Environmental checklist survey in the selected communities indicates that most of the evaluated environmental factors would have no major impact on the proposed project (Fig. 13). WASH assessment in communities indicates a high demand for water supply, sanitation and hand washing facilities (Fig. 14). WASH assessment in primary schools indicates a higher demand for water supply, sanitation and hand washing facilities than in the communities (Fig. 15). WASH assessments in communities and schools are presented in appendix V and VI respectively. A list of key contacts is presented in appendix VII. Flora and fauna resources present in the Okomu national park is presented in appendix VIII and IX.

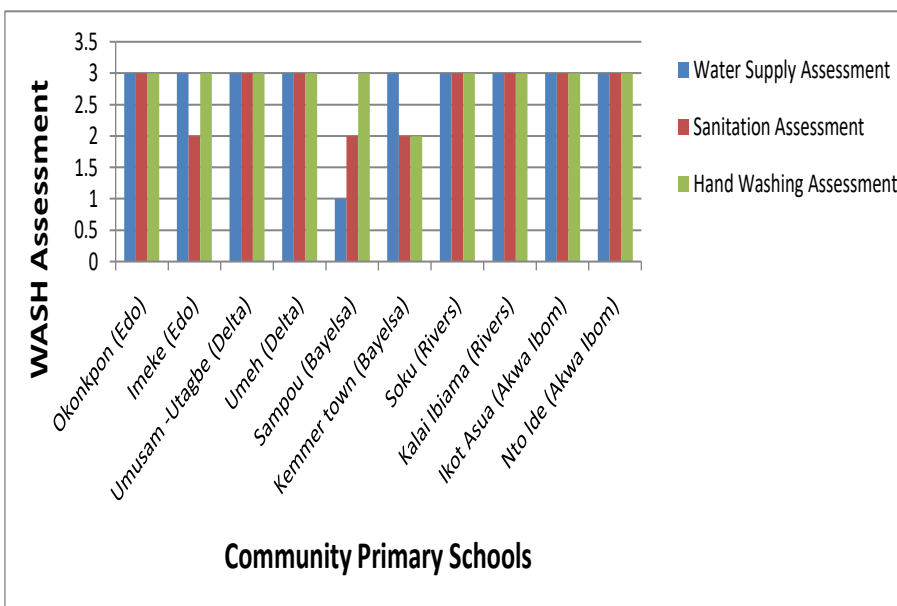


**Fig. 13: Environmental Checklist Survey in Communities (Edo, Delta, Bayelsa, Rivers and Akwa Ibom States)**





**Fig. 14: WASH Assessment in Selected Communities (Edo, Delta, Bayelsa, Rivers and Akwa Ibom States)**



**Fig. 15: WASH Assessment in Selected Primary Schools (Edo, Delta, Bayelsa, Rivers and Akwa Ibom States)**

### A. Screening out Areas of No Significant Impact

The implementation of project construction, operation and maintenance will affect land where the boreholes, water reticulation, latrines and hand washing facilities will be constructed in the community and schools. However, the construction work is not expected to cause major negative impacts on some environmental components and these can be screened out at this stage. Environmental factors where significant impacts are not expected are presented in table 4.

**Table 4: Environmental factors where Significant Impacts are Not Expected**

| <b>Environmental Components</b> | <b>Rationale</b>  |
|---------------------------------|---|
| Aesthetics                      | Proposed project will not degrade the existing site quality and its surroundings  |
| Biological resources            | The project does not traverse through critical habitats and legally protected areas. The project also does not involve activities that would introduce invasive alien species |
| Cultural resources              | No cultural resources or site would be affected as a result of the project  |
| Geology and soils               | Excavation activity would not be significant enough to affect these features  |
| Land use and planning           | There will be no major change in land use or conflict with any applicable land use plan   |
| Mineral resources               | There will be no loss in availability of a known mineral resource as a result of the project  |
| Population and Housing          | No substantial population growth will be induced as a result of the project   |
| Public services                 | The project would not result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities                         |
| Recreation                      | No construction or expansion of recreational facilities is required   |

These environmental factors have not been included in further assessment of the impacts due to the construction phase.

## **B. Methodology**

### **1. Identification of Impacting Project Activities**

On the whole, once the installation works are completed there will be a significant net positive social and environmental benefit to the benefiting communities and schools. However, limited negative environmental and social impacts will occur for brief periods during construction phase. Some impacts can also occur in operation phase and during operation and maintenance. Appropriate planning by the firms contracted to undertake the works; all the negative impacts can be mitigated. The impact assessment has been based on a generic assumption of typical impacts based on activities involved. The project related activities are divided into two phases: the construction and the operational phase. Under each phase, specific project activities have been identified. They include:

#### **I - Construction Phase**

- (i) Site preparation – vegetation clearance
- (ii) Construction activity – excavation/trenching
- (iii) Storage of debris/stockpiles generated from excavation and trenching (Construction activities)
- (iv) Material transportation and haulage
- (v) Construction vehicles
- (vi) Labour camps
- (vii) Repair of existing water supply

#### **II – Operation Phase**

- (i) Leakage from pipes
- (ii) Systems' malfunction/repair of elements

The significant impacts are as a result of the construction process rather than design or location, as they would occur if this did not involve trenching or ground disturbance.

## **2. Identification of Major Environmental Factors**

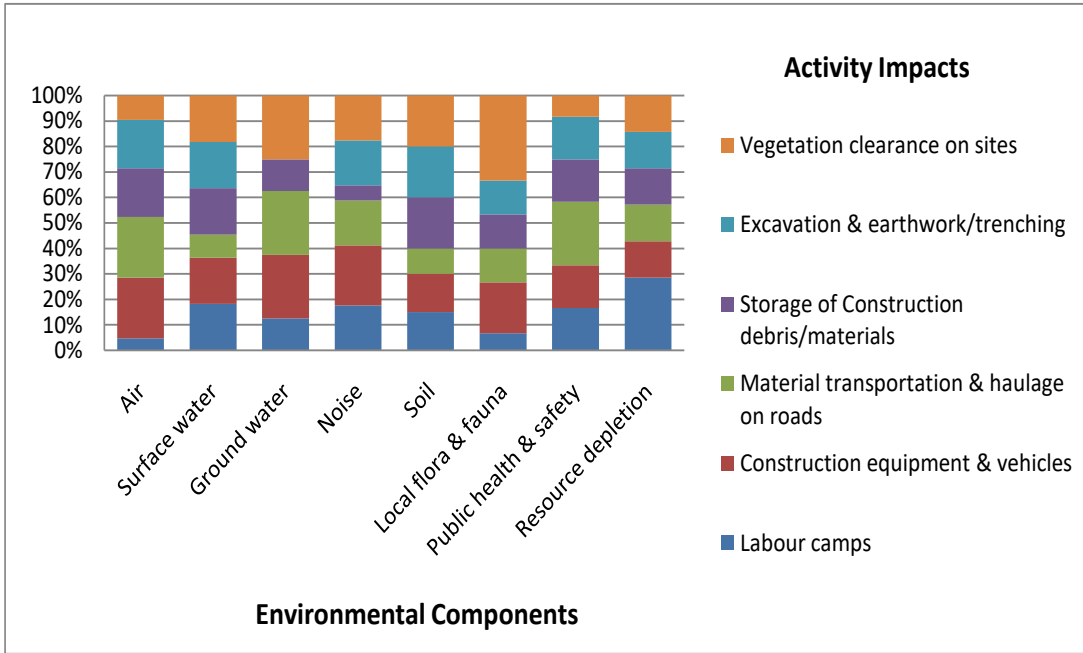
- (i) Air quality
- (ii) Noise quality
- (iii) Surface water quality
- (iv) Ground water quality
- (v) Soil quality
- (vi) Flora and fauna
- (vii) Resource depletion
- (viii) Occupational and public health safety

## **3. Developing the Impact Identification and Assessment Matrix**

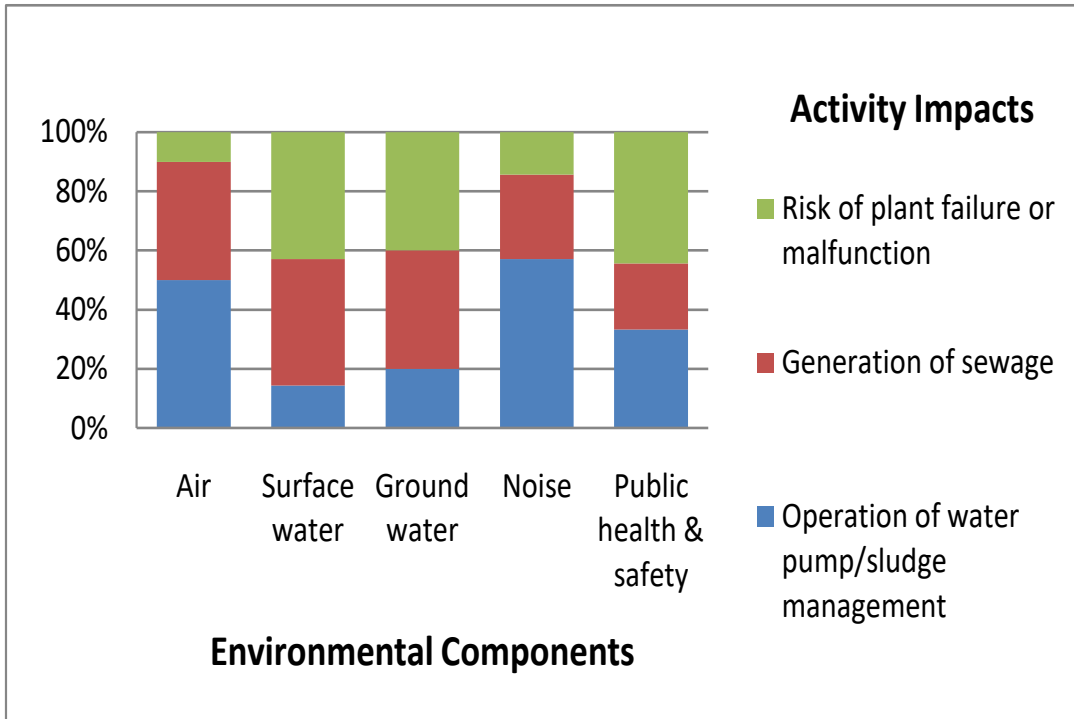
Environmental matrices identify interactions between various activities and environmental components. An interaction matrix comprises of the project activities on one axis and the environmental components along the other. The effects of the project activity on the environmental component were assessed based on the following criteria:

- 1 – Very low
- 2 – Low
- 3 - Moderate
- 4 - High
- 5 – Very high

In order to identify the overall impacts on the environmental components, during the construction and operation phases, an analysis of the overall impact on each environmental component is presented in figures 16 and 17 respectively.



**Fig. 16: Environmental Impacts due to Construction Activities**



**Fig. 17: Impacts of Project Activities during Operation Phase**

The charts above indicate that the activity impacts on the environmental components are relatively more severe than the operational phase impacts. During the construction phase, the worst affected environmental components are air, noise, soil and resource depletion. The operational phase is characterized by an overall positive impact on public health and safety due to augmentation in water supply, thus reducing the spread of disease vectors and unsafe water sources.

#### 4. Summary of Environmental Impacts

A summary of environmental impacts is presented in table 5.

**Table 5: Summary of Environmental Impacts**

| Activity   | Adverse Impacts   |
|--|---|
| Site acquisition, clearance and preparation  | Loss of flora and fauna in the project sites<br>(Communities and Schools)               |
| Excavation, other preparatory construction activity and pipe laying                        | Generation of large amount of soil spoil, stones and debris                             |
|  | Loss of top soil  |
| Construction activity and operation of construction equipment in the community and schools | Generation of dust and other air emissions  |
|  | Generation of wastewater and pollution of nearby areas                                  |
|  | Generation of polluted wastes (solid and liquid)  |
|  | Generation of noise and vibrations  |
| Establishment and operation labour camps   | Generation of emissions to air, noise, water, land and depletion of resources           |
| Pumping stations   | Noise pollution due to pumps  |
| Preventive maintenance of project infrastructure   | Health and safety of workers, teachers, pupils and community residents could be at risk |

### **C. Mitigation Measures**

Based on the above mentioned Environment Impacts, an Environmental Management Plan (EMP) is suggested which discusses the impacts during the construction Phase followed by the operational phase and the mitigation measures provided at each stage for each environmental component. The EMP is proactive in nature and should be updated if facilities are being upgraded or existing facilities modified in future. The EMP has been developed to address mitigation measures/actions to be taken during construction and operation phases of the project for the significant environmental impacts previously identified. The monitoring requirements as well as primary responsibilities have been mapped for each of these mitigation measures. The EMP proposes an institutional framework within the State RUWASSA and the local government WASH unit to carry out the environmental and social mitigation tasks and coordinate its implementation. A summary of mitigation plans is presented in table 6.



**Table 6: Environmental Management Plan**

| <b>Activity</b>   | <b>Adverse Impacts</b>   | <b>Mitigation Measures</b>  | <b>Monitoring Parameters &amp; Frequency</b>  | <b>Responsibility Implementation (Supervision)</b> |
|---|--|---|---|--|
| Site Acquisition, Clearance & Preparation                             | Loss of flora and fauna in the project site (Communities and Schools)          | Avoid removal of trees wherever practically possible<br><br>Some of the large girth/ecologically important trees should be transplanted or nurseries of native species should be established                      | Number of trees to be Removed   | Contractor   |
| Excavation, other preparatory construction activity and pipe laying   | Generation of large amount of soil spoil, stones and debris                    | Proper disposal of such soil at nearby low lying areas to reuse the soil  | Volume / Weight of Soil Spoil   | Contractor   |
|   | Loss of Top Soil   | Top soil to relevant depth should be suitably stored till pipe laying activity is completed and then either replaced or reused in other cultivable lands.   | Depth of top soil to be removed by location   | Contractor   |
|   | Disruption / Congestion of traffic through the communities and adjoining areas | Ensure proper traffic diversions<br><br>Inform commuters well in advance of proposed works across roads<br><br>Ensure air, noise and wastewater impacts are minimized by following suitable operational practices | Traffic patterns to ensure that diversion mechanism is appropriate and working as desired | State RUWASSA's, WASH unit, Contractor             |
| Storage, and transportation of soil spoil generated due to excavation | Soil / Dust emission or spillage   | Storage:<br><br>Minimizing on-site storage time of removed soil,<br><br>Stockpiles (to be used for  | Quarterly Audits  | Contractor   |

|  |   |   |   |  |
|--|---|---|---|--|
|  |   | <p>backfilling) greater than 20 m<sup>3</sup> volume should be adequately enclosed on three sides with walls extending above stockpiles</p> <p>Transport:</p> <p>Spray water on material to be transported and cover the truck tops to reduce dust re-suspension;</p>   |   |  |
| <b>Activity</b>  | <b>Adverse Impacts</b>                          | <b>Mitigation Measures</b>  | <b>Monitoring Parameters &amp; Frequency</b>        | <b>Responsibility Implementation (Supervision)</b> |
|  |   | <p>Use of Water Sprays or Dust suppressants to suppress dust on site due to vehicle movement</p> <p>Restrict vehicular speed</p>  |   |  |
| <p>Transportation of Construction Materials / Debris</p> | <p>Generation of emissions to air and noise</p> | <p>Select transport routes that reduce disturbance to regular traffic or diversions</p> <p>No transportation allowed during heavy traffic periods</p> <p>Keep soil, vehicles, and machinery off roads where possible</p> <p>Vehicles used for transporting soil and sand to be covered on top</p> <p>Regular inspection and corrective actions on material loading / unloading practices</p> <p>Regular preventive maintenance of</p> | <p>Quarterly Audits –</p> <p>Monthly monitoring</p> | <p>State RUWASSA's, LGA WASH unit, Contractor</p>  |

|   |   |  |  |  |
|---|---|--|--|--|
|   |   | <p>vehicles to be carried out by transporter</p> <p>Vehicle transporter to minimize use of horn</p> <p>Use of noise mufflers on vehicle exhaust</p> <p>Ensure that a proper signage system is followed in case of traffic diversions</p>   |  |  |
| <p>Construction Activity and Operation of Construction Equipment in communities and schools</p> | <p>Generation of dust and other air emissions</p> | <p>Comply with relevant legal regulation on equipment</p> <p>Keep soil, vehicles, and machinery off Roads where possible</p>   | <p>Quarterly Audits</p>                      | <p>State RUWASSA's, LGA WASH unit, Contractor</p>  |
| <b>Activity</b>   | <b>Adverse Impacts</b>                            | <b>Mitigation Measures</b>   | <b>Monitoring Parameters &amp; Frequency</b> | <b>Responsibility Implementation (Supervision)</b> |
|   |   | <p>Regular preventive maintenance of equipment to be carried out by contractor</p> <p>Use of Water (check availability of water) Sprays or Dust suppressants to suppress dust on site due to construction activities</p> <p>Construction in schools should be scheduled during holidays</p> <p>In case of Blasting in rock (Etsako West LGA, Edo State): Ensure proper blasting techniques</p> |  |  |

|                 |  |  |  |  |
|-----------------|--|--|--|--|
|                 |  | (techniques such as wet blasting could be explored to minimize dust and noise generation etc.)   |  |  |
|                 | Generation of wastewater and pollution of nearby areas | <p>Avoid excavation activities in rainy season</p> <p>Natural water courses should be opened</p> <p>In areas of shallow groundwater tables, discharge of pumped out water during excavation should be properly planned to avoid flooding / runoff to adjoining agricultural fields or stockpile areas</p> <p>At the same time reuse of such water in adjoining fields for irrigation or washing purposes should be explored and maximised</p> <p>Material stockpiles (to be used for backfilling) to be covered with waterproof covers</p> |  | Contractor   |
| <b>Activity</b> | <b>Adverse Impacts</b>                                 | <b>Mitigation Measures</b>   | <b>Monitoring Parameters &amp; Frequency</b> | <b>Responsibility Implementation (Supervision)</b> |
|                 | Generation of polluted wastes (solid and liquid)       | Wastes (oily, greasy wastes, waste or used oil, washwaters) from vehicle and equipment maintenance activities should be carefully stored and disposed off in a safe manner   | Quarterly Audits                             | Contractor   |
|                 | Generation of Noise and                                | Comply with relevant legal regulation on   | Quarterly Audits                             | Contractor   |

|   |   |  |                  |  |
|---|---|--|------------------|--|
|   | Vibrations                                  | <p>equipment</p> <p>Construction during night hours should not be allowed (2200 to 0600 hours) particularly near residential areas</p> <p>Installation of temporary sound barriers/ acoustic enclosures</p> <p>around equipment such as stone crushers, concrete mixers</p> <p>Adequate personal protective equipment to be provided to workers / labour in the construction area depending on the noise level exposure</p> <p>In case of blasting: neighbourhood residents to be informed in advance and evacuated if found necessary</p> |                  |  |
| Establishment and Operation of Labour Camps | Generation of wastewater and Land Pollution | <p>Provision of adequate number of temporary mobile sanitation facilities and / or septic tanks and soak pits for fixed facilities</p> <p>Disposal of collected sewage / wastewater to existing treatment plants</p>   | Quarterly Audits | State RUWASSA's, LGA WASH unit, Contractor |

| Activity         | Adverse Impacts  | Mitigation Measures  | Monitoring Parameters & Frequency | Responsibility Implementation (Supervision) |
|------------------|--|--|-----------------------------------|---|
|                  | Generation and Disposal of Solid Waste                   | <p>Raise worker awareness on minimizing solid waste generation</p> <p>Provide adequate solid waste collection facilities and ensure proper disposal</p> <p>Discourage / disallow burning of solid waste</p>  | Quarterly Audits                  | Contractor                                  |
|                  | Emissions to air from fuel burning for domestic purposes | <p>Arrangements should be made to provide a ration of a suitable clean fuel for domestic purposes to the labour</p> <p>Discourage / disallow use of biomass or local firewood for such purposes</p>  | Quarterly Audits                  | Contractor                                  |
|                  | Generation of employment                                 | <p>Maximize use of local labor (at least 70%) for unskilled positions, in part to minimize the need for temporary camps, and also to ensure socioeconomic equity for the local population.</p> <p>Use of local skilled and unskilled labor could be one of the important contractor proposal evaluation criteria</p> | Quarterly Audits                  | Contractor                                  |
| Pumping Stations | Noise Pollution due to pumps                             | <p>Select low noise machinery; putting high noise equipment indoors;</p> <p>Install noise enclosures or buffers</p> <p>Wherever possible pump stations should be underground except flood</p>  | Quarterly Audits                  | Contractor                                  |

|   |  |   |  |   |
|---|--|---|--|---|
|   |  | prone areas<br><br>Establishing a suitable greenbelt buffer in the plant area   |  |   |
| <b>Activity</b>   | <b>Adverse Impacts</b>   | <b>Mitigation Measures</b>  | <b>Monitoring Parameters &amp; Frequency</b> | <b>Responsibility Implementation (Supervision)</b>            |
| Infrastructure not well maintained and systems malfunction (eg. Leakage of pipes) | Effect health and safety of residents  | Adequate design of the pipes,<br><br>choice of proper piping materials.<br><br>WASH unit to develop a procedure/ mechanism to address citizens' complaints and respond to emergency leakage situations in the shortest possible time. Prepare detailed Operation & Maintenance (O&M) procedures for all infrastructure<br><br>Inspect and maintain all systems as in O&M procedures<br><br>Replace all parts and conduct repairs when necessary | Quarterly Audits                             | State RUWASSA's, LGA WASH unit, Maintenance<br><br>Contractor |
| Water supply shut down for long periods for maintenance or due to emergency       | People will be inconvenienced and their health may be at risk if water supply system is shut down for long periods | Plan work carefully to keep shutdown to a minimum<br><br>Provide alternative water supply to affected residents and schools<br><br>Inform communities and schools of any shutdown well in advance   | Quarterly Audits                             | State RUWASSA's, LGA WASH unit, Maintenance<br><br>Contractor |
| Repair of elements of Infrastructure  | Health and safety of workers and the public could be at risk   | Prepare and operate Health &<br><br>Safety plan for all works   | Quarterly Audits                             | State RUWASSA's, LGA WASH unit, Maintenance<br><br>Contractor |

## **D. Environmental Management and Monitoring Plan**

The Environmental Management Plan (EMP) is developed to ensure that the Project is implemented in an environmentally sustainable manner where all stakeholders including the Project proponents, contractors and subcontractors, including consultants, understand the potential environmental risks arising from the proposed Project and take appropriate actions to properly manage the risk. The prime responsibility of EMP implementation and monitoring lies with the State Rural Water Supply and Sanitation Agencies (RUWASSA) in Edo, Delta, Bayelsa, Rivers and Akwa Ibom States and its contractors. Most of the implementation of the EMP during the construction phase will be the responsibility of the Project contractors. To ensure that the Contractor complies with the EMP requirements effectively, it should be made part of the special conditions of contract given by the State RUWASSA and the Contractor must include adherence to the specifications in their bid (the cost of mitigation is therefore assumed under the contractor's price proposal).

The State RUWASSA's will be the Executing Agency (EA) of the Project. Project Management Consultants (PMC) will provide project management support, and assure the technical quality of design and construction, and supervise the construction process.

An Environmental unit (EnvU), or its equivalent will be established within the State RUWASSA's, to supervise the implementation and monitoring of Environment Management Plan both in Construction and Operation Phase. To ensure long-term and effective institutional capacity building, the EnvU will comprise an Environment Officer (EO), and a Social Development Officer. Along with RUWASSA-wide functions, the EO will be responsible for the following tasks related to the environmental management plan (EMP) Project:

- Supervise and ensure implementation of the IEE/EMP by the contractor and other agencies involved in Project implementation;
- Coordinate mainstreaming environmental considerations in Project planning, design and execution;
- Identify and update regulatory and statutory requirements on environment applicable to the Project and other RUWASSA operations, and liaison with the relevant authorities for approvals and any other documents as required; and
- Liaise with external regulatory agencies such as the National Water Resource Institute (NWRI) and coordinate joint monitoring of the environmental performance according to government regulations and Federal Ministry of Environment environmental monitoring guidelines.
- Coordinate and supervise environmental monitoring/site compliance audits, as outlined in the EMP, collate and analyse data;
- Prepare and submit quarterly reports to regulatory authorities based on the monitoring and compliance evaluation; and



- Coordinate with all stakeholders and provide inputs to the RUWASSA Public Relations Officer for external communication on environmental issues as required/requested.

Some technical assistance may be required to build internal capacity to carry out the above tasks and strengthen the State RUWASSA's and LGA WASH units. Local technical Institutes like the National Water Research Institute (NWRI) Kaduna, or consulting organizations could be approached for such support from time to time in the form of:

- providing training to officials of the State RUWASSA's and LGA WASH units in order to build technical expertise and capacity in the environmental and social aspects of Project development and implementation
- environmental monitoring and external auditing

The Project performance, monitoring, and evaluation will be done in accordance with construction and environmental standards as well as Federal Ministry of Environment guidelines.

#### **A. Reporting**

During the construction period, quarterly reporting on status of environmental and social issues is recommended on the basis of monitoring and inspections carried out on a monthly basis. In the operation phase a six monthly monitoring and reporting is recommended. These reports will be prepared by the State RUWASSA's and submitted to relevant local authorities for review and feedback.

The State RUWASSA's should also build capacity and preparedness on handling environmental emergency situations during construction and operating period and prepare a plan of action for responding to such situations. The State RUWASSA's will also house a grievance desk to accept and address grievances from interested parties related to the environmental and social issues in the Project implementation.

#### **B. Grievance Redress Mechanism**

The EO will address the grievances regarding environmental performance put forth by the affected persons. A register will be maintained to record the complaints with respect to environmental performance of the project. This will mainly be applicable in the construction phase during which most of the impacts have been anticipated. The grievances will be addressed within seven days and a maximum of fifteen days depending on the severity of the grievance.

## **E. Public Consultation and Information Disclosure**

Public consultations were carried out to identify perceptions on environmental factors due to the Project. Discussions were held with State RUWASSA Officials, local community representatives, school heads and individuals in the Project area.

During the consultation with the Project affected people, it was found that there was a general lack of awareness on environmental issues due to the Project. There is a need to formulate and create awareness programmes about the environment among local people, particularly on impacts during the construction stage.

## **F. Conclusion**

The IEE identified impacts as a result of construction and operation phases, shows that none are expected to be highly significant, and all can be mitigated by relatively straightforward measures. The mitigation measures proposed should reduce all impacts to the level of no significance.

Thus the findings of the IEE are that, provided mitigation measures are implemented and monitored, the negative impacts from constructing or operating the Project should be mitigable.

The overall impact of the Project is highly beneficial, as once the infrastructure is in operation, the peoples of Edo, Delta, Bayelsa, Rivers and Akwa Ibom will be provided with a constant supply of better quality water, which will serve a greater proportion of the population. This should improve the quality of life of the people and benefit individual and public health by improving hygiene and reducing the incidence of water-borne diseases.

The IEE has assessed the environmental impacts of all infrastructure proposed by the Project and has concluded that all negative impacts will be successfully mitigated and that the Project is expected to deliver major benefits to the benefiting communities and schools.

## **APPENDIX 1: TERMS OF REFERENCE**

### **NATIONAL WASH CONSULTANT – INITIAL ENVIRONMENTAL EXAMINATION (IEE) FOR RURAL WATER SUPPLY AND SANITATION PROGRAMMES IN 14 FOCUS STATES**

#### **SECTION: WASH**

##### **Background**

The Water Supply and Sanitation Sector Reform Programmes (WSSSRP II and III) and the Water Supply and Sanitation Components of the Niger Delta Support Programme (NDSP) under the 10<sup>th</sup> EDF are part of the overall efforts in consolidating the on-going reforms in the WASH Sector. These Programmes aim at consolidating the achievements of the predecessor programme with a view to addressing most of the remaining fundamental issues of the Nigerian Water and Sanitation Sector; including the lack of or inadequate legal and institutional framework at both the Federal and State levels. These Programmes are across 14 States of the Country (WSSSRP\_II – Anambra, Cross River, Osun, Jigawa, Kano and Yobe; WSSSRP\_III – Adamawa, Plateau and Ekiti; NDSP – Akwa Ibom, Delta, Edo, Bayelsa and Rivers). These Programmes are designed to sustain the improvements on water governance made under WSSSRP\_I. UNICEF manages the implementation of the Rural Water Supply and Sanitation Programmes (RWSS-rural components) of these Programmes through a joint management agreement with the EU. These efforts cover support for capacity building of State and LGA rural water supply and sanitation institutions and as well provide support for the delivery of WASH services within rural communities in the project LGAs. In addition, there is need to address critical environmental issues associated with the project implementation, while supporting the government's priorities to provide WASH services.

In recent years, environmentally sustainable development has remained one of the major challenges facing development programming in most developing countries, including Nigeria. Accordingly, the Ministry of Environment has introduced a variety of instruments into the country's development planning. Initial Environmental Examination (IEE) is one of the tools used for environmentally sustainable development planning and intervention for small scale development projects. Within the implementation of these EU/UNICEF supported Programmes; IEE has been proposed to foresee the possible positive and negative impacts of the project as one of the measures for promoting sustainable development. Indeed it is the requirement of EU to ensure that the adverse effects of development interventions are minimum and can be mitigated cost effectively.

This Terms of Reference is hence prepared for the engagement of WASH Consultant for the conduct of Initial Environmental Examination (IEE) prior to the construction of water supply and sanitation facilities in 28 project LGAs under three Programmes. Considering the scope of this work and concentration of the project States in the South, the Consultant will be a National Consultant but will be based in Edo State RUWASSA. This Consultant will be involved in field assessments, public presentations as well provide technical support to the project States in integrating the outcomes of this study into

programme implementation design as indicated in the programmed description of action documents.

## **Purpose**

The aim of this consultancy is to engage a Consultant who will, under the overall guidance of the WASH Specialist, carry out Initial Environmental Examination (IEE) for Rural Water Supply and Sanitation Projects (RWSSP) under the WSSSRP\_II, WSSSRP\_III and NDSP. Further to identify and analyse the potential environmental impacts (both positive or adverse) on physical, biological, socio-economic & cultural environments of the project and propose Environmental Management Plan (EMP) .

The objectives are:

1. To conduct IEE for RWSSP in 28 Project LGAs of 14 Focus States and
2. To propose Environmental Management Plan which will mitigate the adverse impacts and enhance the positive impacts of the project. The main components of an EMP should contain the following:
  - summary of the potential impacts of the proposal;
  - description of the recommended mitigation measures;
  - statement of their compliance with relevant standards;
  - allocation of resources and responsibilities for plan implementation;
  - schedule of the actions to be taken;
  - programme for surveillance, monitoring and auditing; and
  - contingency plan when impacts are greater than expected.

## **Scope**

The consultant will be managed through a third party contractor who will provide administrative support to ensure effective implementation of all the planned activities as indicated in the terms of reference. The IEE will cover the 28 project LGAs under the programmes and will assess all the activities that are proposed for the programmes, so as to ensure environmentally-sound project design and implementation.

As a key component of the study, the consultancy will provide clear recommendations centering on the environmental externalities associated with projects implementation involving infrastructure development such as boreholes construction, latrines, sewage systems, etc. The Consultant shall, in line with statutory requirement for managing the environment, facilitate, in collaboration with the State RUWASSAs, the following activities as part of IEE study:

## **Sanitation**

1. Conduct a site assessment of at least proposed sanitation installations (public/school latrines if any) to confirm
  - Potential contamination of waterways;
  - Potential contamination of underground aquifers.

2. Analyze the role of vegetation surrounding sanitation installations to limit surface run off into latrine or sanitation pits;
3. The consultant will conduct a brief comparative analysis of different sanitation technologies, including an estimation of the environmental impact of each, the unit cost of adequate management measures and the long-term sustainability.
4. The consultant will analyze the expected intensity of use of latrines or other proposed solutions, determining the necessary management measures to ensure that sanitation services are maintained in good conditions of use.
5. An analysis will be conducted of the alternative final disposal and treatment methods of excreta from pits, septic tanks or wetlands, taking into account the need for cost effective and sustainable solutions.

### **Water Supply**

The results to be achieved of the IEE under water supply services will include the following:

1. Consultant will analyze the potential environmental impact on water source sustainability of each proposed system.
2. Confirm the suitability of siting of proposed deep and shallow wells as to ensure minimum surface environmental damage;
3. Analyze the potential impact of selected deep wells on aquifer stability and the expected hydrological balance over the medium and long term;
4. Develop appropriate environmental mitigation measures to ensure that water sources developed under the programme are sustainable over the long term;
5. Analyze the environmental awareness among LGAs, urban and rural dwellers;
6. Identify appropriate interventions for the education component (WASH in School) of this project to promote environmental awareness;
7. Develop a brief analysis of other major initiatives within the State urban water resource authorities to enhance understanding of the need for appropriate environmental and integrated water resource management;
8. Develop environmental management plans and the outline of key targets to ensure the sustainability of water sources for the life of project (LOP).
9. If possible, identify appropriate policy and advocacy strategies that would have a positive impact on environmental awareness

### **Specific Tasks**

1. The consultant will be responsible for carrying out IEE and prepare IEE report using all the prevalent guidelines, acts, policies and rules. Project Implementation Agency (RUWASSAs) will coordinate the IEE.
2. Identify and analyse the potential environmental impacts (whether positive or adverse) on physical, biological, socio-economic & cultural resources, from the location, design & construction of project structures & associated facilities in the project areas.
3. Propose the suitable mitigation measures for minimizing the potential negative environmental impacts and to augment the positive ones to improve overall performance of the project.
4. Define and prepare appropriate environmental monitoring and management plan.

5. Determine the potentials for the improvements to natural resources and environmental management and socio-economic benefits to the communities in the project areas and its surroundings.
6. Collate public feedback for safeguarding the natural environment with least negative impact on its natural settings and also to adequately assess & document community requirements relating socio-economic & cultural aspects in the project areas.
7. Prepare IEE report as per approved format
8. Support and assist the sector promoting and supporting training and capacity building initiatives for the project state and communities.
9. Organize a consultative forum for key sector players to share finding of the study and integrate feedbacks into the final report
10. Compile and provide periodic progress reports as well as summary of studies/ assessment and their findings, as required.
11. Liaise with UNICEF Field Offices (WASH POs) during the study..

**The Consultant will follow the following Procedure**

**1) Desk Review**

The following steps will be followed during the desk review:

**Collection and review of secondary sources of information from various sources**

**Initial interaction and consultation with the local community and LGA/State level stakeholders**

**Delineation of geographical boundary of the influence area on the topo-map**

It is necessary to specify area that shall be covered for assessment of environmental impacts so as to avoid future confusion. Depending upon nature and extent of expected impact area the geographical area is categories into Direct Impact Area (DIA) and Indirect Impact Area (IIA).

For the collection of environmental features related to biophysical environment, maximum 100 meter distance observable from the structures will be taken as an influence area. The impacts shall be classified in terms of extent (site specific, local and regional), magnitude (low, medium and high) and duration (short term, medium term and long term) as well as nature (reversible, irreversible), level (low, moderate and significant). The methodology adopted for impact identification and prediction will be checklists and matrix method. The likely impacts/issues of the proposed project construction as well as operation are described in the following sections. The likely impacts/issues shall be assessed covering both adverse and beneficial ones.

**Preparation of project specific checklist**

The consultant will prepare the Environmental checklist and Questionnaire Survey in order to conduct the detail field study and to collect baseline environmental information of the project area.

**2) Field survey**

- Focus group discussion (FGD) - To conduct consultation with the local communities at different settlements, FGD will be organized with key informants and other knowledgeable persons. It was done to collect biological, socio-economic and cultural environment related information using a checklist.
- Topographical map - It was used to show environmental features on the map during walkthrough survey.
- Photographs - Necessary photographs were taken to show different environmental features.

### **3) Public consultation**

In order to ensure the public involvement, the following procedures were followed during IEE report preparation:

- IEE Consultant will also carry out interaction with local communities and related stakeholders during field survey to collect the public concerns and suggestions. Moreover, focus group discussions (FGDs) will be conducted to collect and solicit information regarding the bio-physical and socio-economic and cultural aspects of the proposed project. The FGDs will be held at different sample communities.
- After reviewing draft IEE report and incorporating the suggestions from the concerned stakeholders, final IEE report will be prepared and sent to State RUWASSA for approval.
- The approved IEE report will be accessible to interested parties and general public through the concerned RUWASSA.

### **4) Mitigation Measures and Monitoring Plan**

Based on the identified impacts their nature, extent and magnitude, the mitigation and monitoring prescriptions will be developed. A realistic approach will be applied for the application of the mitigation measures in the local context. Environmental monitoring plan will be developed to assess the effectiveness of the mitigation measures and implementation status.

### **5) The Final Report**

The IEE report will be prepared by Consultant and submitted to UNICEF for review. After reviewing the final IEE report according to ToR, it will be submitted to respective 14 Rural Water Supply and Sanitation Agencies.

### **6) Information Disclosure**

Information about the proposed project and IEE study will be disseminated through person to person contacts and interviews and group discussions during field study of IEE. Available institutions at the local level will be informed through notice distribution or posting at concerned

LGAs, The approved IEE report will be accessible to interested parties and general public through following agencies:

1. LGA WASH Department/Units
2. RUWASSAs
3. State Ministries of Water Resources and Equivalent

**Programme ID & Specific Project Involved:**Grant SC/120422 & SC120815 (WASH)

**Duty Station:**Edo State (Nigeria)

**Supervisor:** Bishnu Timilsina

***Deliverables***

The Consultant shall submit fifteen copies of the final IEE report of this project to the concerned Ministry (State) through UNICEF in accordance with Rule 10 of the Environmental Protection Rules.

**Qualifications or specialized knowledge/experience required:**

- University degree in social and behavioral sciences, international development or statistics. Sanitary Engineering, Geology, Hydrology will be an asset and considered together with relevant experience in EIA, IEE, etc.
- The consultant should have at least 5 years of experience in environmental management and assessment experience in Rural, Peri-urban and urban areas of Nigeria or similar.
- The consultant should also have experience in the fields of water source contamination studies; similar studies or EIAs and evaluation of the environmental impact of different potential technologies for water supply and sanitation will be essential.
- Analytical skills and report writing ability are essential together with IT skills, including experience of MIS development and implementation and use of statistical software.
- Experience in networking amongst government agencies, NGOs, the private sector and development partners are essential.
- Fluency in written and spoken English is essential. Knowledge of local languages would be an advantage.
- Communication, presentation and training skills (including ability to explain data analysis to the stakeholders)
- Computer knowledge (MS Windows systems, email communication, other relevant IT skills)
- Analytical skills and ability to formulate strategies and concepts
- Effectively work as part of a team in difficult circumstances and manage relationships with government officials and other UNICEF partners.
- Judgement and networking skills as well as drive for results.
- Demonstrated ability to work in a multi-cultural environment and establish harmonious



and effective working relationships both within and outside the organization.

**Duration:**

This initial engagement will be for 6months (1<sup>st</sup> June to 30<sup>th</sup> November).

**Budgeted cost of consultancy:**

Remunerations and payments will be in line with approved AWD third party contract arrangement for National WASH Consultants

**Requesting Officer:** Bishnu Timilsina

Signature

Date:

**14. Approval of activity by Chief - WASH Section:**Kannan Nadar

Remarks:

Signature:

Date:

**15. Approval of Terms of Reference by Deputy Rep : Jacques Boyer (Dep. Rep)**

Remarks:

Signature

Date:

**APPENDIX II: COMMUNITY ENVIRONMENTAL CHECKLIST**

STATE:

LGA:

COMMUNITY:

DATE:

|  | <b>Potentially<br/>Significant<br/>Impact</b> | <b>Less Than<br/>Significant<br/>with<br/>Mitigation<br/>Incorporated</b> | <b>Less Than<br/>Significant<br/>Impact</b> | <b>No<br/>Impact</b>     |
|--|---|---|---|--------------------------|
| <b>I. AESTHETICS -- Would the project:</b>   |   |   |   |                          |
| a) Have a substantial adverse effect on a scenic vista?  | <input type="checkbox"/>                      | <input type="checkbox"/>  | <input type="checkbox"/>                    | <input type="checkbox"/> |
| b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway? | <input type="checkbox"/>                      | <input type="checkbox"/>  | <input type="checkbox"/>                    | <input type="checkbox"/> |
| c) Substantially degrade the existing visual character or quality of the site and its surroundings?  | <input type="checkbox"/>                      | <input type="checkbox"/>  | <input type="checkbox"/>                    | <input type="checkbox"/> |
| d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?                                    | <input type="checkbox"/>                      | <input type="checkbox"/>  | <input type="checkbox"/>                    | <input type="checkbox"/> |

|  | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact                |
|--|--------------------------------|--|------------------------------|--------------------------|
| <b>II. AIR QUALITY -- Would the project:</b>   |                                |  |                              |                          |
| a) Conflict with or obstruct implementation of the applicable air quality plan?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?   | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| c) Result in a cumulatively considerable net increase of any criteria pollutant (including ozone depleting emissions)?   | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| d) Expose sensitive receptors to substantial pollutant concentrations?   | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| e) Create objectionable odors affecting a substantial number of people?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| <b>III. BIOLOGICAL RESOURCES -- Would the project:</b>   |                                |  |                              |                          |
| a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations? | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| c) Have a substantial adverse effect on federally protected wetlands (including, but not limited to, marsh, coastal areas, etc.) through direct removal,   | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |

|  | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact                |
|--|--------------------------------|--|------------------------------|--------------------------|
| filling, hydrological interruption, or other means?  |                                |  |                              |                          |
| d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?   | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| <b>IV. CULTURAL RESOURCES -- Would the project:</b>  |                                |  |                              |                          |
| a) Cause a substantial adverse change in the significance of a historical resource?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| b) Cause a substantial adverse change in the significance of an archaeological resource?   | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| d) Disturb any human remains, including those interred outside of formal cemeteries?   | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| <b>V. GEOLOGY AND SOILS -- Would the project:</b>  |                                |  |                              |                          |
| a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:   | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| i) Rupture of a known earthquake fault?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |

|  | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact                |
|--|--------------------------------|--|------------------------------|--------------------------|
| ii) Strong seismic ground shaking?   | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| iii) Seismic-related ground failure, including liquefaction?   | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| iv) Landslides?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| b) Result in substantial soil erosion or the loss of topsoil?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse? |                                |  |                              |                          |
| d) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?   | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| <b>VI. HAZARDS AND HAZARDOUS MATERIALS -- Would the project:</b>   |                                |  |                              |                          |
| a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?                                    | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |

|  | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact                |
|--|--------------------------------|--|------------------------------|--------------------------|
| d) Be located on a site which is included on a list of hazardous materials sites and, as a result, would it create a significant hazard to the public or the environment?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area? | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?   | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| VII. HYDROLOGY AND WATER QUALITY -<br>- Would the project:   | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| a) Violate any water quality standards or waste discharge requirements?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |

|   | Potentially Significant Impact | Less Than Significant With Mitigation Incorporation | Less Than Significant Impact | No Impact                |
|---|--------------------------------|---|------------------------------|--------------------------|
| river, in a manner which would result in substantial erosion or siltation on- or off-site?  |                                |   |                              |                          |
| d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site? | <input type="checkbox"/>       | <input type="checkbox"/>                            | <input type="checkbox"/>     | <input type="checkbox"/> |
| e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?   | <input type="checkbox"/>       | <input type="checkbox"/>                            | <input type="checkbox"/>     | <input type="checkbox"/> |
| f) Otherwise substantially degrade water quality?   | <input type="checkbox"/>       | <input type="checkbox"/>                            | <input type="checkbox"/>     | <input type="checkbox"/> |
| g) Place housing within a flood hazard area?  | <input type="checkbox"/>       | <input type="checkbox"/>                            | <input type="checkbox"/>     | <input type="checkbox"/> |
| h) Place structures within a flood hazard area which would impede or redirect flood flows?  | <input type="checkbox"/>       | <input type="checkbox"/>                            | <input type="checkbox"/>     | <input type="checkbox"/> |
| i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?  | <input type="checkbox"/>       | <input type="checkbox"/>                            | <input type="checkbox"/>     | <input type="checkbox"/> |
| j) Inundation by tsunamis, or mudflow?  | <input type="checkbox"/>       | <input type="checkbox"/>                            | <input type="checkbox"/>     | <input type="checkbox"/> |
| <b>VIII. LAND USE AND PLANNING - Would the project:</b>   |                                |   |                              |                          |
| a) Physically divide an established community?  | <input type="checkbox"/>       | <input type="checkbox"/>                            | <input type="checkbox"/>     | <input type="checkbox"/> |
| b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan or specific plan) adopted for the purpose of avoiding or mitigating an environmental effect?         | <input type="checkbox"/>       | <input type="checkbox"/>                            | <input type="checkbox"/>     | <input type="checkbox"/> |
| c) Conflict with any applicable habitat conservation plan or natural community conservation plan?   | <input type="checkbox"/>       | <input type="checkbox"/>                            | <input type="checkbox"/>     | <input type="checkbox"/> |

| Potentially<br>Significant<br>Impact | Less Than<br>Significant<br>with<br>Mitigation<br>Incorporated | Less Than<br>Significant<br>Impact | No<br>Impact |
|--------------------------------------|--|------------------------------------|--------------|
|--------------------------------------|--|------------------------------------|--------------|

IX. MINERAL RESOURCES -- Would the project:

|   |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| a) Result in the loss of availability of a known mineral resource that would be of value to the community and the residents of the state? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|--------------------------|--------------------------|--------------------------|--------------------------|

|   |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|--------------------------|--------------------------|--------------------------|--------------------------|

X. NOISE -- Would the project result in:

|  |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan, or applicable standards of other agencies? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|--------------------------|--------------------------|--------------------------|--------------------------|

|   |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|--------------------------|--------------------------|--------------------------|--------------------------|

|  |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|--------------------------|--------------------------|--------------------------|--------------------------|

|  |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|--------------------------|--------------------------|--------------------------|--------------------------|

|   |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|--------------------------|--------------------------|--------------------------|--------------------------|

|  |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|--------------------------|--------------------------|--------------------------|--------------------------|



|   | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact                |
|---|--------------------------------|--|------------------------------|--------------------------|
| <b>XI. POPULATION AND HOUSING -- Would the project:</b>   |                                |  |                              |                          |
| a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?   | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?   | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?   | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| <b>XII. PUBLIC SERVICES</b>   |                                |  |                              |                          |
| a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| Fire protection?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| Police protection?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| Schools?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| Parks?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| Other facilities  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| <b>XIII. RECREATION</b>   |                                |  |                              |                          |
| a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |

|   | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact                |
|---|--------------------------------|--|------------------------------|--------------------------|
| b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment? | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |

**XIV. TRANSPORTATION/TRAFFIC --**  
Would the project:

|  |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b) Exceed, either individually or cumulatively, a level of service standard established by the management agency for designated roads or highways?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| e) Result in inadequate emergency access?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| f) Result in inadequate parking capacity?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| g) Conflict with adopted policies, plans, or programs supporting alternative transportation?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**XV. UTILITIES AND SERVICE SYSTEMS --**  
Would the project:

|   |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| a) Exceed wastewater treatment requirements of the Water Quality Control Board? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---|--------------------------|--------------------------|--------------------------|--------------------------|

|   | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact                |
|---|--------------------------------|--|------------------------------|--------------------------|
| b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?   | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?   | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| g) Comply with federal, state, and local statutes and regulations related to solid waste?   | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| <b>XVI. MANDATORY FINDINGS OF SIGNIFICANCE</b>  |                                |  |                              |                          |
| a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of community history or prehistory? | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |
| b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental  | <input type="checkbox"/>       | <input type="checkbox"/>                           | <input type="checkbox"/>     | <input type="checkbox"/> |

|  | <b>Potentially<br/>Significant<br/>Impact</b> | <b>Less Than<br/>Significant<br/>with<br/>Mitigation<br/>Incorporated</b> | <b>Less Than<br/>Significant<br/>Impact</b> | <b>No<br/>Impact</b> |
|--|---|---|---|----------------------|
|--|---|---|---|----------------------|

effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

## **Evaluation of Environmental Impacts**

### **Potentially Significant Impact**

‘Potentially Significant Impact’ is appropriate if there is substantial evidence that an effect may be significant.

### **Less than Significant With Mitigation Incorporated**

‘Less than Significant With Mitigation Incorporated’ applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact".

### **Less than Significant Impact**

‘Less than Significant Impact’ is appropriate if there is substantial evidence that an impact may be insignificant.

### **No Impact**

A ‘No Impact’ answer is adequately supported if the information sources show that the impact simply does not apply to the project.

**APPENDIX III: COMMUNITY WASH ASSESSMENT**

**Community Name –**

Traditional Ruler:

Community location:

Population:

Number of houses:

Primary school (Y/N):

Secondary School (Y/N):

Health centre (Y/N):

Water supply project:

Water supply source:

**Water, Sanitation and Hand washing Facilities Assessment in Community**

**WASH ASSESSMENT**

**SCORES**

|                                | 0 | 1 | 2 | 3 | Score |
|--------------------------------|---|---|---|---|-------|
| <b>Water Supply Assessment</b> |   |   |   |   |       |
| <b>Sanitation Assessment</b>   |   |   |   |   |       |
| <b>Hand washing Assessment</b> |   |   |   |   |       |

## **Scores**

0 – The existing situation and facilities are acceptable. No improvement is necessary.

1 - The existing situation and facilities are reasonable, but would benefit from improvement. Action is not necessarily a priority.

2 - The existing situation and facilities are very poor. Improvement is urgently required.

3 - There are no facilities. Provision is the highest priority.

## **Environmental Impacts on Community Environment**

(1) Impact of borehole construction, operation and maintenance on community environment:

i)

ii)

iii)

(2) Impact of latrine construction, operation and maintenance on community environment:

i)

ii)

iii)

(3) Impact of dug well construction, operation and maintenance on community environment:

i)

ii)

iii)

(4) Impact of Hand pump operation and maintenance on community environment:

i)

ii)

iii)

(5) Impact of diesel powered motorised pump operation and maintenance on community environment:

i)

ii)

iii)

Observation:



## APPENDIX IV: SCHOOLS WASH ASSESSMENT

**School name –**

Head teacher:

School location:

Primary school (Pop):

Sec. School (Pop):

Water supply source:

### Water, Sanitation and Hand washing Facilities Assessment in School

#### WASH ASSESSMENT

#### SCORES

|                                | 0 | 1 | 2 | 3 | Score |
|--------------------------------|---|---|---|---|-------|
| <b>Water Supply Assessment</b> |   |   |   |   |       |
| <b>Sanitation Assessment</b>   |   |   |   |   |       |
| <b>Hand washing Assessment</b> |   |   |   |   |       |

#### Scores

0 – The existing situation and facilities are acceptable. No improvement is necessary.

1 - The existing situation and facilities are reasonable, but would benefit from improvement. Action is not necessarily a priority.

2 - The existing situation and facilities are very poor. Improvement is urgently required.

3. There are no facilities. Provision is the highest priority.

#### Environmental Impacts on School Environment

(1) Impact of borehole construction, operation and maintenance on school environment:

i)

ii)

iii)

(2) Impact of latrine construction, operation and maintenance on school environment:

i)

ii)

iii)

(3) Impact of dug well construction, operation and maintenance on school environment:

i)

ii)

iii)

(4) Impact of Hand pump operation and maintenance on school environment:

i)

ii)

iii)

(5) Impact of diesel powered motorised pump operation and maintenance on school environment:

i)

ii)

iii)

Observation:

## APPENDIX V: WASH ASSESSMENT IN COMMUNITIES

| Community/LGA/State                               | Water Supply Assessment | Sanitation Assessment | Hand Washing Assessment |
|---|-------------------------|-----------------------|-------------------------|
| Okonkpon, Ovia South West LGA, Edo State          | 3                       | 2                     | 2                       |
| Imeke, Etsako West LGA, Edo State                 | 2                       | 2                     | 2                       |
| Umusam Utagbe Ogbe, Ndokwa West LGA, Delta State  | 2                       | 2                     | 2                       |
| Umeh, Isoko South LGA, Delta State                | 2                       | 3                     | 3                       |
| Sampou, Kolga, Bayelsa State                      | 2                       | 2                     | 2                       |
| Kemmer Town, Brass LGA, Bayelsa State             | 2                       | 2                     | 2                       |
| Soku, Akuku-Toru LGA, Rivers State                | 2                       | 2                     | 2                       |
| Kalai Ibiama, Opobo/Nkoro LGA, Rivers State       | 2                       | 2                     | 2                       |
| Ikot Asua, Nsit Atai LGA, Awa Ibom State          | 2                       | 2                     | 2                       |
| Nto Ide Ikot Eme, Obot Akara LGA, Akwa Ibom State | 2                       | 3                     | 3                       |

### Scores

0 – The existing situation and facilities are acceptable. No improvement is necessary.

1 - The existing situation and facilities are reasonable, but would benefit from improvement. Action is not necessarily a priority.

2 - The existing situation and facilities are very poor. Improvement is urgently required.

3. There are no facilities. Provision is the highest priority.

## APPENDIX VI: WASH ASSESSMENT IN SCHOOLS

| School name/LGA/State   | Water Supply Assessment | Sanitation Assessment | Hand Washing Assessment |
|---|-------------------------|-----------------------|-------------------------|
| Okonkpon primary school, Ovia South West LGA, Edo State               | 3                       | 3                     | 3                       |
| Imeke primary school, Etsako West LGA, Edo State                      | 3                       | 2                     | 3                       |
| Iyashili primary school, Ndokwa West LGA, Delta State                 | 3                       | 3                     | 3                       |
| Umeh primary school, Isoko South LGA, Delta State                     | 3                       | 3                     | 3                       |
| Okoro primary school, Kolga, Bayelsa State                            | 1                       | 2                     | 3                       |
| St Barnabas primary school, Brass LGA, Bayelsa State                  | 3                       | 2                     | 2                       |
| Holy trinity primary school, Akuku-Toru LGA, Rivers State             | 3                       | 3                     | 3                       |
| Kalai Ibiama primary school, Opobo/Nkoro LGA, Rivers State            | 3                       | 3                     | 3                       |
| Holy Child primary school, Nsit Atai LGA, Awa Ibom State              | 3                       | 3                     | 3                       |
| St Patrick's Catholic primary school, Obot Akara LGA, Akwa Ibom State | 3                       | 3                     | 3                       |

## **Scores**

0 – The existing situation and facilities are acceptable. No improvement is necessary.

1 - The existing situation and facilities are reasonable, but would benefit from improvement. Action is not necessarily a priority.

2 - The existing situation and facilities are very poor. Improvement is urgently required.

3. There are no facilities. Provision is the highest priority.

## Appendix VII: LIST OF KEY CONTACTS

### A. Government Officials

| S/N | Name                    | Organization                                   | Position                   |
|-----|-------------------------|--|----------------------------|
| 1.  | Engr. Orobor            | Ministry of Energy & Water Resource, Edo State | Permanent Secretary        |
| 2.  | Engr. W. Asemota        | Ministry of Energy & Water Resource, Edo State | Director, Water            |
| 3.  | Mr. M. Amenaghawon      | Ministry of Energy & Water Resource, Edo State | PME, Officer               |
| 4.  | Mr. Tony Eboigbodin     | Ovia Southwest LGA, Edo State                  | HOD, Environment           |
| 5.  | Mr. Edigin              | Ovia Southwest LGA, Edo State                  | Officer, Environment Dept. |
| 6.  | Mr. Festus Okhemukhokho | Etsako West LGA, Edo State                     | HOD, Environment           |
| 7.  | Barr. Hassan Kadiri     | Etsako West LGA, Edo State                     | Chairman                   |
| 8.  | Mr. Olise Famous        | Ndokwa West LGA, Delta State                   | WASH Coordinator           |
| 9.  | Mrs. E. O. Ibobo        | Iyashili Primary School, Umusam, Delta State   | Head Teacher               |
| 10. | Mr. Collins Enigheno    | Isoko South LGA, Delta State                   | HOD, Environment           |
| 11. | Mr. Matthew Afahokor    | Umeh Primary School, Umeh, Delta State         | Head Teacher               |
| 12. | Mr. Igbogi Pulemote     | Brass LGA, Bayelsa State                       | WASH Coordinator           |
| 13. | Mrs. Celina Emelina     | St. Barnabas School, Twon-Brass, Bayelsa State | Head Teacher               |
| 14. | Mr. Michael Apreze      | Kokokuma/Opokuma LGA, Bayelsa state            | WASH Coordinator           |
| 15. | Mr. Samuel Oruakain     | Okoro Primary School, Sampou, Bayelsa State    | Head Teacher               |
| 16. | Mr. F. O. Odungweru     | RUWASSA, Rivers State                          | Programme Manager          |
| 17. | Mr. George Kaisu        | Akuku-Toro LGA, Rivers State                   | WASH Coordinator           |

|     |                          |   |                      |
|-----|--------------------------|---|----------------------|
| 18. | Mr. Pius Sonny           | Holy Trinity Primary School,<br>Soku, Rivers State                    | Head Teacher         |
| 19. | Mr. Braide               | Akuku-Toro LGA, Rivers State  | Chief of Staff       |
| 20. | Mr. Peter Thomson        | Opobo-Nkoro LGA, Rivers<br>State                                      | Water Supply Officer |
| 21. | Mrs. Gloria Dappa        | Kalai-Ibiama Primary School,<br>Kalai-Ibiama, Rivers State            | Head Teacher         |
| 22. | Mrs. Leggjack Madauchi   | Kalai-Ibiama Primary School,<br>Kalai-Ibiama, Rivers State            | Teacher              |
| 23. | Mr. Essien               | RUWATSAN, Akwa Ibom<br>State  | GM                   |
| 24. | Mrs. Nsebong Victor Ekpo | Nsit Atai LGA, Akwa Ibom<br>State                                     | WASH Coordinator     |
| 25. | Pastor Okoyo Obot        | Holy Child Primary School,<br>Ikot Asua, Akwa Ibom State              | Head Teacher         |
| 26. | Mr. Monday Udo           | Obot Akara LGA, Akwa Ibom<br>State                                    | WASH Coordinator     |
| 27. | Mr. Francis Umoh         | St. Patrick's Catholic Primary<br>School, Nto Nde, Akwa Ibom<br>State | Head Teacher         |

### B. Community Members

| S/N | Name                 | Community/LGA/State                        | Position           |
|-----|----------------------|--|--------------------|
| 1.  | Chief Samson Omokaro | Okonkpon, Ovia Southwest LGA,<br>Edo state | Traditional Ruler  |
| 2.  | Mrs. Mercy Agheto    | Okonkpon, Ovia Southwest LGA,<br>Edo state | Women Leader       |
| 3.  | Chief J. O. Ushafi   | Imeke, Etsako West LGA, Edo<br>State       | Traditional Leader |
| 4.  | Mr. Justus           | Imeke, Etsako West LGA, Edo<br>State       | Youth Leader       |
| 5.  | Mrs. Aromemi         | Imeke, Etsako West LGA, Edo                | Women Leader       |



|     |                         | State   |                                |
|-----|-------------------------|---|--------------------------------|
| 6.  | HRH Benjamin Oghene     | Umusam Utagbe Ogbe, Ndokwa West LGA, Delta State  | Traditional Ruler              |
| 7.  | Mr. Samson              | Umusam Utagbe Ogbe, Ndokwa West LGA, Delta State  | Community Development Chairman |
| 8.  | HRH Ambrose Owhe        | Umeh, Isoko South LGA, Delta State                | Traditional Ruler              |
| 9.  | Mr. Deacon Peter        | Umeh, Isoko South LGA, Delta State                | Community Development Chairman |
| 10. | HRH F.C.O. Usukoromogha | Sampou, LGA, Bayelsa State                        | Traditional Ruler              |
| 11. | Chief Jothan Diri       | Sampou, LGA, Bayelsa State                        | Chief                          |
| 12. | Chief Simeon Omeriowo   | Kemmer Town, Brass LGA, Bayelsa State             | Traditional Ruler              |
| 13. | Mr. Kuro Edgar          | Kemmer Town, Brass LGA, Bayelsa State             | Youth Leader                   |
| 14. | Chief Telema Imoh       | Suko, Akuku-Toru LGA, Rivers State                | Traditional Ruler              |
| 15. | Chief G. P. Jack (JP)   | Kalai Ibiama, Opobo/Nkoro LGA, Rivers State       | Traditional Ruler              |
| 16. | Chief Idim Akpan Idim   | Ikot Sua, Nsit Atai LGA, Akwa Ibom State          | Traditional Ruler              |
| 17. | Mr. Alphonsus Inin      | Ikot Sua, Nsit Atai LGA, Akwa Ibom State          | Community Development Chairman |
| 18. | Chief Isido Jacob       | Nto Ide Ikot Eme, Obot Akara LGA, Akwa Ibom State | Traditional Ruler              |

## APPENDIX VIII: CHECKLIST OF SOME FLORA RESOURCES IN OKOMU NATIONAL PARK

1. *AFZELIA AFRICANA* (APA)
2. *ALBIZIA FIRRHUGINEA* (UWOWE)
3. *ALBIZIA ZYGIA* (EKPAGHUDO)
4. *ALBIZIA GUMMIFERA* (UNOWE-NABAFUN)
5. *ALSTONIA BOONEI* (UKHU)
6. *AMPHIMAS PTEROCARPIODES* (ARWO)
7. *ANTIARIS AFRICANA* (OGIOVU)
8. *ALLANBLACKIA FLORIBUNDA* (IZENI)
9. *ANCHORMIS DIFFORMIS* (ONIKORO)
10. *ANCISTROPHYLLUM SPP* (OKANKAN)
11. *ANTHONOTHA MACROPHYLLA* (EKPOGHOE)
12. *ANELEMA BENNEENSE* (OHIOVBU)
13. *BAPHIA NITIDA* (OTUA)
14. *BARTERIA NIGRITIANA* (OKGENE)
15. *BLIGHIA SAPIDA* (UKPE)
16. *BOMBAX COSTATUS* (UGBOHA)
17. *BOSQUEIA ANGOLENSIS* (UKPUTU)
18. *BAISEA AZILLARIS* (UNYUMWAN – NIRI)
19. *BAPHIA PUBESCENS* (EMILEN – FUOHAE)
20. *BERLINEA AURICULATA* (EKPGHOG – EZE)
21. *BRIDELIA FERRUGINEA* (OGANGAN)
22. *CANARIUM SCKWEOEURTHII* (EKPAKPOGHO)
23. *CEIBA PENTANDRA* (OKHA)
24. *CARAPA PROCERA* (EBE – GOGO)
25. *CELTIS ZENKERI* (OHIA)
26. *CHRYSOPHYIHEM AFRICANUM* (EKPIRO)
27. *CLEISTOPHOLIS PATENS* (OUT)
28. *COMBRETODENDRON AFRICANUM* (OWEWE)
29. *CORDIA MILLEI* (OMA)
30. *CYLOCODISCUS GABUNESIS* (OKAN)
31. *DANIELLA OGEA* (AGBA-OLIYA)
32. *DIOSPYROUS CRASSIFOLIA* (ABOKPO)
33. *DRYPETES GOSSWELERRI* (OKHUABA)
34. *DISTEMONATHUS BENTHAMIANIES* (AYARAN)
35. *CAPOLOBIA LUTEA* (ASUEN)
36. *CHLORIS GAYANA* (IGIAWE – GBOTO)
37. *CLAOXYLON HEXADRUM* (IDEMI)
38. *CANTHIUM GLAIIFOLIUM* (ERAN – EZE)
39. *DRACAENA LAZISSIMA* (UDI – ELIMI)
40. *DESMODIUM ADSCENDENS* (EBE – IZAWE)
41. *DIALIUM QUINEESE* (OHIONMEN)
42. *COSTUS AFER* (CUKHURE – OHA)
43. *ENANTIA CHLORANTHIA* (EHRANBEIBOGO)
44. *ETHANDROPHRAGMA CYLINDRICUM* (UVBILESAN)
45. *ERYTHROPHLEM GUINEENSIS* (OVINYIN)
46. *FUNTUMIA ELASTICA* (ARYON)
47. *GARCINA KOLA* (EDIM)
48. *GIAREA CEDRATA* (OBOBO – NOFWA)
49. *GUAREA THOMSONII* (OBOBO 0 NEKWI)
50. *GEOPHILLA AFZELII* (AVBAVBOTOR)
51. *GREINIA CORIACEAE* (UWEN – RIOTEGBO)
52. *HANNOA KLAINIANA* (UGUEKPOKIN)
53. *HOMALIUM LETESTUI* (AKPORO)
54. *IRVINGIA GABONENSIS* (OGWI)
55. *KHAYA IVORENSIS* (OGWANGO)
56. *LOPHIRA ALATA* (EBA)
57. *LANDOLPHIA DXLAS* (UBO)
58. *LECANIODESCUS CUPANOIDES* (UTANTAN)

59. *LOVOA TRICHOLODIES* (APOPO)
60. *MITRAGYNA CILIATA* (OKPULENYI)
61. *MIMUSOPS HECKEILI* (AGHANOKPE)
62. *MUSANGA CECROPIOIDES* (UGHOHEN)
63. *MYRIANTHUS ARBOREUS* (IHIEGHE)
64. *MICRODESMIS PUBERULA* (AKPATA)
65. *MARGARITARIA DESCOIDEA* (ASIVIN)
66. *MANNIPHYTON FULVUM* (EBE – UMEN)
67. *MOMORDICA CHARANTIA* (EBE – ISIUGWU)
68. *MASULARIA ACUMINATA* (UKPAKON)
69. *MONODORA MYRISTICA* (UKPOISA)
70. *OMPHALOCARPUM PROCEURUM* (IKASSA)
71. *ONCOLAMUS ACONTHOENEMIS* (IKAN)
72. *PAUSINYISTALIA JOHIMBE* (ADAGBAN)
73. *PENTACLETHRA MACROPHLLA* (OKPAGHA)
74. *PIPTANDENIASTRUM AFRICANUM* (EKLIMI)
75. *PYCNATHUS ANGOLENSIS* (UMOGHAN)
76. *PARINARI EXCELSA* (ESAGHO)
77. *PTEROCARPUS OSUM* (ERHAN – UMEN)
78. *PALISOTA AMBIGUA* (LHIGUEWE)
79. *PHYLLANTHUS MUELLERIANUS* (ORURU – IVEBIAHIANMHEN)
80. *PORTARANDA CLANDANTHA* (UGHOLOKO – OSA)
81. *RAPHIA VEMIFERA* (OGORO)
82. *RAUWOIFIA VOMIFORIA* (AKATA)
83. *RAPHIDIO CYSTIC MAMIC* (OGUOMILE)
84. *POTHMANIA WHITEFIELDII* (ASUN)
85. *RINOA POGGEI* (IOKHO – EZE)
86. *STAUDTIA STIPITATA* (UMAZA)
87. *STROMBOSIA PUSTULATA* (UBELU)
88. *STERCULIA OBLONGA* (OKOKO)
89. *SPONDIA MOBIN* (OGHEGHE)
90. *STMPHONIA GLOBULIFERA* (OVIN – EDUM – EZE)
91. *SCOPARA DULCIS* (IYKE – EBENZUKPE)
92. *COLANUM TORVUM* (ORHIWO – AZEN)
93. *TERMINLIA SUPERBA* (EYHOIN – NOFWA)
94. *TERMINLIA IVORENSIS* (EGHIN – NEKWI)
95. *TETROCHIDOUM DIDYMOSTEMUM* (IHENI)
96. *TREMA ORIENTALIS* (EHUGO)
97. *TRIPLO CHITON SCLEROXYLM* (OVBIAKHE)
98. *UAPACA GLLIUEENSE* (ONYEN)
99. *URERA REPENS* (EWAI)
100. *URERA RIGIDA* (IHUENHUE)
101. *XYLOPIA AETHIOPICA* (UNIEN)
102. *STERCULIA TRAGACANTHA* (UDUOGHOGHO)
103. *HYLODENDRON GABUNENSE* (AKESI)

## APPENDIX IX: CHECKLIST OF SOME FAUNA RESOURCES IN OKOMU NATIONAL PARK

### HOMINIDAE

1. West African chimpanzee *Pan troglodytes verus*

### COLOBIDAE

2. Olive colobus *Colobus verus*  
3. Western pied colobus *C. polykomos*  
4. Pennant's red colobus *Poliocolobus pennanti*

### CERCOPITHECIDAE

5. Red-capped managbey *Cercocebus torquatus*  
6. Mona monkey *Cercopithecus mona*  
7. Putty-nosed monkey *C. nictitans*  
8. Sclater's monkey *C. sclateri*  
9. Nigerian White-throated monkey *C. erythogaster*

### LORIDAE

10. Potto *Perodicticus potto*

### GALAGONIDAE

11. Demidoff's galago *Galagoides demidoff*

### PTEROPODIDAE

12. Straw-coloured fruit bat *Eidolon gelvum*  
13. Egyptian (Rousette) fruit bat *Rousettus acgytiacus*  
14. Angola fruit bat *Lissonycteris angolensis*  
15. Collared fruit bat *Myonycteris sp.*  
16. Hammer bat *Hypsignathus monstrosus*  
17. Singing fruit bat *Epomops sp.*  
18. Bear-drop fruit bat *Scotoonycteris sp*  
19. Flying calf *Nanonycteris veldkampi*  
20. Nectar bat *Megaloglossu woermanni*

### EMBALLONURIDAE

21. African sheath-tailed bat *Coleura afra*  
22. Tomb bat *Taphozorus sp.*  
23. Blach hawk bat *Saccolaimus peli*

### NYCTERIDAE

24. Slit faced bat *Nycteris sp.*

### MEGADAMATIDAE

25. Yellow winged bat *Lavia frons*  
26. Horsehoe bat *Rhinolophus sp.*  
27. Leaf nosed bat *Hopposiderus sp.*

### VESPERTILIONDAE

28. Hairy bat *Myotis sp.*  
29. Woolly bat *Kerivoula sp.*  
30. Butterfly bat *Chalinologus sp.*  
31. Serontine bat *Eptesotus sp.*  
32. Moloney's bat-headed bat *Minnetillus moloneyi*  
33. Schietten twilight bat *Nycteciusschieffeni*  
34. Pipistrelles *Pipistrellus spp.*  
35. Evening bat *Scotoccus spp.*  
36. Long figured bats *Miniopterus spp.*

### MOLOSSIDAE

37. "Winged rat" free-tailed bat *Myopterus spp.*

|                                 |                                  |
|---------------------------------|----------------------------------|
| ERINACEIDAE                     |                                  |
| 38. African hedgehog            | <i>Atelerix albiventis</i>       |
| SORICIDAE                       |                                  |
| 39. Climbing shrew              | <i>Sylvisorex granti</i>         |
| 40. White-toothed shrew         | <i>Crosidura sp.</i>             |
| LEPORIDEA                       |                                  |
| 41. Scrub hare                  | <i>Lepus saxatilis</i>           |
| SCIURIDAE                       |                                  |
| 42. Striped grouped squirrel    | <i>Euxerus crythropus</i>        |
| 43. Thomas rope squirrel        | <i>Funisciurus ancyrothrus</i>   |
| 44. Red-checked rope squirrel   | <i>F. leucogenys</i>             |
| 45. Red-legged sun squirrel     | <i>Heliosciurus rufobrachium</i> |
| 46. African giant squirrel      | <i>Protoxcrus strangeri</i>      |
| HYSTRICIDAE                     |                                  |
| 47. Crested porcupine           | <i>Hystrix cristata</i>          |
| 48. Brush-tailed porcupine      | <i>Artherurus africanus</i>      |
| THRYONOMYIDAE                   |                                  |
| 49. Marsh cane-rat              | <i>Thryonomys swinderianus</i>   |
| DENDROMURINAE                   |                                  |
| 50. Climbing mice               | <i>Dendromus spp.</i>            |
| CRICETOMYINDAE                  |                                  |
| 51. Giant pouched rat           | <i>Crycetomy gambianus</i>       |
| MURIDAE                         |                                  |
| 52. Brush-furred mice           | <i>Lephuromys spp.</i>           |
| 53. Uranomys mouse              | <i>Uranomys ruddi</i>            |
| 54. Velvet rat                  | <i>Colomys goslingi</i>          |
| 55. African wood mice           | <i>Hylomyscus spp.</i>           |
| 56. Multimammate rat            | <i>Mastomys spp.</i>             |
| 57. Common mice                 | <i>Muss spp.</i>                 |
| 58. Narrow-footed woodland mice | <i>Grammomys spp.</i>            |
| 59. Shaggy swamp rat            | <i>Dasymys spp.</i>              |
| 60. Bush rat                    | <i>Aethomys spp.</i>             |
| 61. Hump-nosed mice             | <i>Hybomys spp.</i>              |
| 62. Zebra mice                  | <i>Lemmiscomys spp.</i>          |
| 63. Unstriped grass rat         | <i>Arvicanthis spp.</i>          |
| 64. Mill rat                    | <i>Mylomys spp.</i>              |
| HERPESTIDAE                     |                                  |
| 65. Ichneumon mongoose          | <i>Herpsectes ichneumon</i>      |
| 66. Long-snouted mongoose       | <i>H. naso</i>                   |
| 67. Slender mongoose            | <i>H. sanguinea</i>              |
| 68. Gambian mongoose            | <i>Mungos gambianus</i>          |
| 69. Cusimanse mongoose          | <i>Crossarchus obscurus</i>      |
| 70. Marsh mongoose              | <i>Atilax paludinosus</i>        |
| 71. White-tailed mongoose       | <i>Ichneumon albicauda</i>       |
| VIVERPRIDAE                     |                                  |
| 72. Blotched genet              | <i>Genetta tigrina</i>           |
| 73. African civet               | <i>Civettictis civetta</i>       |
| 74. African palm civet          | <i>Nandinia binotata</i>         |

|                               |                                    |
|-------------------------------|------------------------------------|
| FELIDAE                       |                                    |
| 75. Wild cat                  | <i>Felis sylvestris</i>            |
| 76. Serval cat                | <i>F. serval</i>                   |
| 77. Golden cat                | <i>F. aurata</i>                   |
| 78. Leopard                   | <i>Panthera pardus</i>             |
| MANIDAE                       |                                    |
| 79. Long-tailed pangolin      | <i>Uromanis tetradactyla</i>       |
| 80. Tree pangolin             | <i>Phataginus tricuspis</i>        |
| ORYCTEROPODIDAE               |                                    |
| 81. Armadillo                 | <i>Orycteropus afer</i>            |
| PROCAVIDAE                    |                                    |
| 82. Tree hyrax                | <i>Dendrohyrax dorsalis</i>        |
| EL EPHANTIDAE                 |                                    |
| 83. African (forest) elephant | <i>Loxodonta Africana cyclotis</i> |
| HIPPOPOTAMIDAE                |                                    |
| 84. Hippopotamus              | <i>Hippopotamus amphibious</i>     |
| 85. Pigmy hippotamus          | <i>Hexaprotunda liberiensis</i>    |
| SUIDAE                        |                                    |
| 86. Red river hog             | <i>Potamochoerus porus</i>         |
| BOVIDAE                       |                                    |
| 87. African (forest) bulfalo  | <i>Syncerus cafer nanus</i>        |
| 88. Harnessed bushbuck        | <i>Tagelaphus criptus scriptus</i> |
| 89. Bongo                     | <i>T. curuceros</i>                |
| 90. Sitatunga                 | <i>T. spekei</i>                   |
| 91. Maxwell's duiker          | <i>Cephalophus maxwelli</i>        |
| 92. Blue duiker               | <i>C. monticola</i>                |
| 93. Black duiker              | <i>C. niger</i>                    |
| 94. Yellow-backed duiker      | <i>C. sylvicultor</i>              |