



**ENVIRONMENTAL AND SOCIAL MANAGEMENT
PLAN
(ESMP)
(2ND DRAFT REPORT)
FOR
AGBAJA NGWO GULLY EROSION SITE, UDI LOCAL
GOVERNMENT AREA, ENUGU STATE**



By
Enugu State Project Management Unit (SPMU)
NIGERIA EROSION & WATERSHED MANAGEMENT
PROJECT
(NEWMAP)
WORLD BANK ASSISTED PROJECT

JULY 2016



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Table of Contents

Contents	Pages
Title page - - - - -	ii
Table of contents - - - - -	iii
List of tables - - - - -	v
List of figures - - - - -	vi
List of plates - - - - -	vii
List of Abbreviations - - - - -	viii
Executive summary- - - - -	x
1.0 Introduction - - - - -	1
1.1 Background of NEWMAP - - - - -	1
1.2 Description NEWMAP and Component- - - - -	1
1.3 Description of Proposed Intervention Site - - - - -	1
1.3.1 Geographical Location - - - - -	1
1.4 Current Situation at the Intervention Site - - - - -	2
1.5 The Proposed Intervention Civil Work - - - - -	3
1.5.1 Design Concept - - - - -	3
1.6 Rationale for the ESMP - - - - -	5
1.7 Objectives of the ESMP - - - - -	5
1.8 Scope of the ESMP Study - - - - -	5
1.9 Approach and Methodology - - - - -	5
1.9.1 Reconnaissance Survey - - - - -	5
1.9.2 Literature Review/Desktop Studies - - - - -	5
1.9.3 Public Consultation - - - - -	5
1.9.4 Field Studies - - - - -	6
1.9.5 Identification of Potential Impacts and Mitigation Measures - - - - -	6
1.9.10 Structure of ESMP - - - - -	6
2.0 Legal and Administrative Frame Work - - - - -	7
2.1 Introduction - - - - -	7
2.2 Administrative Framework - - - - -	7
2.3 Relevant National and State Policies - - - - -	7
2.4 International Treaties and Conventions on Environment to which Nigeria is a Party- - - - -	8
2.5 World Bank Safeguards Policies triggered by NEWMAP and the proposed activity- - - - -	8
3.0 Description of Baseline Conditions (Biophysical Environment) - - - - -	12
3.1 Introduction - - - - -	12
3.2 Study Approach Used in the Collection Primary Data - - - - -	12
3.2.1 Field Reconnaissance Surveys - - - - -	12
3.2.2 Quality Assurance - - - - -	13
3.2.2.1 Soil Sample Study - - - - -	13
3.2.2.2 Air Quality - - - - -	13
3.2.2.3 Water Quality Studies - - - - -	15
3.2.2.4 Plant and Animals - - - - -	16
3.2.2.5 Socio-economic Studies - - - - -	16
3.3 Results of Desktop Study - - - - -	16
3.3.1 Topography - - - - -	16
3.3.2 Geology and Hydrogeology - - - - -	16
3.4 Climate/Meteorology - - - - -	17
3.4.1 Climate - - - - -	17
3.5 Results of Biophysical Assessment - - - - -	18
3.5.1 Relative Humidity - - - - -	18
3.5.2 Wind Speed - - - - -	18
3.5.3 Air Quality Assessment - - - - -	19
3.5.4 Biodiversity - - - - -	20
3.5.5 Soil - - - - -	20
3.5.6 Water Quality - - - - -	21

4.0	Socio-Economic Characteristics and Consultations with Stakeholders	-	-	-	-	-	-	23
4.1	Introduction	-	-	-	-	-	-	23
4.2	Gender Distribution of Respondents	-	-	-	-	-	-	23
4.2.1	Marital Status of Respondents	-	-	-	-	-	-	23
4.2.2	Household Characteristics of respondents	-	-	-	-	-	-	23
4.2.3	Religion	-	-	-	-	-	-	24
4.2.4	Income Generation Capacity of Respondents	-	-	-	-	-	-	24
4.2.5	School	-	-	-	-	-	-	25
4.2.6	Education, Occupation and Livelihoods of Respondents	-	-	-	-	-	-	25
4.3	Public Utilities, Infrastructure and Social Facilities	-	-	-	-	-	-	25
4.3.1	Water	-	-	-	-	-	-	25
4.3.2	Common Health Ailments Suffered by Households	-	-	-	-	-	-	26
4.3.3	Health	-	-	-	-	-	-	26
4.3.4	Road	-	-	-	-	-	-	27
4.3.5	Transportation	-	-	-	-	-	-	27
4.3.6	Market	-	-	-	-	-	-	28
4.3.7	Recreational facilities	-	-	-	-	-	-	28
4.3.8	Waste Management and Disposal	-	-	-	-	-	-	29
4.4	Consultation and Public Participation	-	-	-	-	-	-	29
4.4.1	Objectives of Community Consultation	-	-	-	-	-	-	29
4.4.2	Stakeholders Consultation and Meetings	-	-	-	-	-	-	30
4.4.3	Grievance Redress Mechanism	-	-	-	-	-	-	31
5.0	Assessment of Potential Adverse Impacts and Analysis of Project Alternatives	-	-	-	-	-	-	32
5.1	Introduction	-	-	-	-	-	-	32
5.2	Methodology	-	-	-	-	-	-	32
5.3	Impact Identification and Assessment	-	-	-	-	-	-	32
5.3.1	Mobilization	-	-	-	-	-	-	32
5.3.2	Pre-construction	-	-	-	-	-	-	33
5.3.3	Construction phase	-	-	-	-	-	-	34
5.3.4	Operation phase	-	-	-	-	-	-	35
5.4	Significant Potential Impacts of the Proposed Project	-	-	-	-	-	-	36
5.5	Assessment of Implementation Options	-	-	-	-	-	-	36
5.5.1	Intervention Options	-	-	-	-	-	-	36
5.5.2	Technological Alternatives	-	-	-	-	-	-	36
6.0	Environmental and Social Management Plan	-	-	-	-	-	-	38
6.1	Introduction	-	-	-	-	-	-	38
6.2	Mitigation Measures	-	-	-	-	-	-	38
6.3	Consideration for Ensuring Effective Implementation of Mitigation Measures and Monitoring Programs	-	-	-	-	-	-	43
6.3.1	Pre-Implementation period	-	-	-	-	-	-	43
6.3.2	Project Implementation period (construction phase)	-	-	-	-	-	-	43
6.3.3	Post Implementation and Operational Phase	-	-	-	-	-	-	43
6.4	Monitoring Program and Responsibilities	-	-	-	-	-	-	44
6.5	Appropriate Reporting and Record Keeping	-	-	-	-	-	-	52
6.6	Institutional Arrangements and Responsibilities for Implementation of the ESMP	-	-	-	-	-	-	52
6.7	Environmental Risks and Emergency Response	-	-	-	-	-	-	54
6.7.1	Basic Emergency Requirements	-	-	-	-	-	-	54
6.8	Proposed Capacity Training Needs for the ESMP	-	-	-	-	-	-	55
6.9	Implementation Schedule	-	-	-	-	-	-	56
6.10	Cost of Implementation of the ESMP	-	-	-	-	-	-	56
7.0	Conclusion and Recommendations	-	-	-	-	-	-	57
References	-	-	-	-	-	-	-	58
Annexures	-	-	-	-	-	-	-	59

List of Tables

Content	Page
2.1 International Treaties and Conventions on Environment to which Nigeria is a party-	08
2.2 Triggered World Bank Safeguard Policies - - - - -	09
2.3 National and State Environmental Legislations, Regulations and Guidelines -	10
3.1a GPS Coordinates of some Sample Points (Wind Speed, Air Quality, Noise, Soil)	12
3.1b GPS Coordinates of Sample Points (Water) - - - - -	13
3.2 Climate data for Enugu - - - - -	18
3.3 Relative Humidity, Wind Speed, Light and Air Temperature at AgbajaNgwo Gully Site - - - - -	18
3.4 Nigerian Ambient Air Quality Standards - - - - -	19
3.5 Ambient Level of Gaseous Compounds in the Project Areas- - - - -	19
3.6 Ambient Levels of Suspended Particulate Matter (SPM) in the Project Area -	19
3.7 Noise Level Assessment in the Project Area - - - - -	20
3.8 Laboratory Results of collected Soil Samples - - - - -	21
3.9 Summary Results of Water Analysis in the Project Area - - - - -	22
5.1 Impact magnitude and likelihood table - - - - -	32
5.2 Summary of the identified potential and associated Impacts during Mobilization phase-	33
5.3 Summary of the perceived potential during pre-construction phase - - - - -	33
5.4 Summary of the Perceived potential during construction phase - - - - -	34
5.5 Summary of the potential and associated impacts during operational - - - - -	35
5.6 Summary of Significant Potential Impacts of Proposed Project at Agbaja Ngwo -	37
6.1 Mitigation Measures - - - - -	39
6.2 Types of Monitoring and Responsibilities - - - - -	44
6.3 Checklist ESMP Tasks for the Implementation of Mitigation Measures - - - - -	44
6.4 Monitoring Program - - - - -	45
6.5 Role and Responsibilities for Implementation of ESMP - - - - -	53
6.6 Training Modules on Environment and Social Management Issues - - - - -	55
6.7 Summary of Responsibility for Implementation of the ESMP - - - - -	56
6.8 Estimated Budget for the Implementation of ESMP - - - - -	56

List of Figures

Content	Page
1.1 Map of Enugu State showing Udi Local Government Area - - - -	2
1.2 Location Map of Agbaja Ngwo showing catchment area of the Erosion Site - -	2
1.3 Engineering Design for Intervention work - - - -	4
1.4 USBR Type IX Baffled Apron - - - -	4
3.1 Map Showing GPS Locations for soil Samples collections - - - -	13
3.2a Map showing GPS locations for Air Quality Assessment - - - -	14
3.2b Map showing GPS Locations for Noise Assessment - - - -	14
3.2c Map showing GPS location for the Assessment of Wind Speed - - - -	15
3.3 Map showing GPS locations used for the collection of water samples - -	16
3.4 Geography of Ngwo - - - -	17
4.1 Gender Distribution of Respondents - - - -	23
4.2 Marital Status of Respondents - - - -	23
4.3 Family Size Distribution of Respondents - - - -	24
4.4 Religion Distribution of Respondents - - - -	24
4.5 Income Generation Capacity of Respondents - - - -	24
4.6 Educational Institutions attended by Children of Respondents - - - -	25
4.7 Occupation and source of livelihood of Respondents - - - -	25
4.8 Response on Availability of Water - - - -	26
4.9 Response on Ailments Suffered by Household - - - -	26
4.10 Response on Health Facilities- - - -	27
4.11 Assessment of the conditions of roads in the project area - - - -	27
4.12 Responses on Transportation - - - -	28
4.13 Availability of Market Trading Places - - - -	28
4.14 Response on Recreational Facilities - - - -	29
4.15 Response on Waste Management - - - -	29
4.16 Hierarchy of Authority at Agbaja Ngwo (Okwojo) - - - -	31

List of Plates

Content	Page
1.1 Agbaja Ngwo Gully Site in Google Map - - - - -	3
1.2 Water Reservoir - - - - -	3
1.3 Existing trapezoidal channel - - - - -	3
1.4 Farmland destroyed by the gully at Agbaja Ngwo in Udi LGA - - - - -	3
4.1 Stakeholders Consultations and Meetings - - - - -	30

List of Annexures

Annex 1	Terms of Reference (TOR) for the preparation of ESMP - - - - -	59
Annex 2	Sample Copy of Administered Questionnaire-- - - - - -	63
Annex 3	Minutes of the Meetings head- - - - -	71
Annex 4	List of Attendance during Consultation meetings - - - - -	74
Annex 5	Summary of World Bank Environmental and Social safe guard policies (10+2) - - - - -	82
Annex 6	General Environmental management Conditions for construction - - - - -	84
Annex 7	GPS Coordinates of some facilities around the study area - - - - -	89
Annex 8	Photographs taking during consultations - - - - -	90

LIST OF ABBREVIATIONS AND ACRONYMS	
BP	Bank Policy
BOD	Biochemical Oxygen Demand
CBOs	Community Based Organizations
CLO	Community Liaison Officer
DO	Dissolved Oxygen
DP	Displaced Persons
EA	Environmental Assessment
EC	Electrical Conductivity
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
ENMARD	Enugu State Ministry of Agriculture and Rural development
ENSWC	Enugu State Water Cooperation
ESA	Environmentally Sensitive Area
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESO	Environmental Safeguard Officer
ESWAMA	Enugu State Waste Management Authority
FEPA	Federal Environmental Protection Agency
FGD	Focus Group Discussion
FGN	Federal Government of Nigeria
FME_{env}	Federal Ministry of Environment
FMWR	Federal Ministry of Water Resources
FMANR	Federal Ministry of Agriculture and Natural Resources
GPS	Global Positioning System
GRM	Grievance Redress Mechanisms
GAP	Grievance and Appeals Procedure
GDP	Gross Domestic Product
GIS	Geographic Information System
IDA	International Development Association
HSE	Health Safety and Environment
IEC	International Electro technical Commission
ISDS	Integrated Safeguards Data Sheet
ISO	International Organisation for Standardization
L_{exp}	Exposure Levels
LGA	Local Government Area
L_{max}	Maximum Noise Levels
L_{min}	Minimum Noise Levels
MDAs	Ministries Departments and Agencies
MEAs	Multilateral Environmental Agreements
MFMP	Multilateral Fund for the Implementation of Montreal Protocol
MIGA	Multilateral Guarantee Agency
MoE	Ministry of Environment
M&E	Monitoring and Evaluation
MPN	Most Probable Number
NCFC	Nigerian Construction and Foundation Company
ND	Not Detected

LIST OF ABBREVIATIONS AND ACRONYMS	
NESREA	National Environmental Standards and Regulations Enforcement Agency
NEWMAP	Nigeria Erosion and Watershed Management Project
NGOs	Non-Governmental Organizations
NIHSA	Nigeria Hydrological Services Agency
NIMET	Nigeria Meteorological Agency (NIMET)
NIOSH	National Institute for Occupational Safety and Health
NIWRMC	Nigeria Integrated Water Resources Management Commission
NWRI	National Water Resources Institute
OD	Operational Directives
OM	Operational Manual
OP	Operational Policy
OSH	Occupational Safety and Urban Development
PAD	Project Appraisal Document
PAPs	Project Affected Persons
PC	Project Coordinator
PID	Project Information Documents
PIM	Project Implementation Manual
PMU	Project Management Unit
PPUD	Physical Planning and Urban Development
PWD	Public Works Department
RAP	Resettlement Action Plan
RIT	RAP Implementation Team
RP	Resettlement Plans
RPF	Resettlement Policy Framework
RBDAS	River Basin Development Agencies
SPMU	State Project Management Unit
STDs	Sexually Transmitted Diseases
ToR	Terms of Reference
WB	World Bank
WHO	World Health Organisation

ES EXECUTIVE SUMMARY

ES.01 Background of NEWMAP

The countries of Sub-saharan Africa are besieged by serious environmental degradation resulting from desert encroachment, drought and soil erosion due to dry wind impact and very high intensive rainfall resulting in heavy water runoff and soil loss. The problems have adversely affected agricultural productivity and thus casting doubt on food security in the sub-region. In Nigeria desertification and aridity are the major environmental problems in the northern part of the country while the high torrential rainfall in the southern Nigeria creates enabling environment for catastrophic soil erosion in the region. Gully erosion types are the most visible forms of erosion in Nigeria mainly because of the remarkable impression they leave on the surface of the earth. Also, more than 1.6% of the entire land area of Eastern Nigeria is occupied by gullies. This is very significant for an area that has the highest population density of 500 persons per km² in Nigeria. Before the 1980's the classical gully sites in the region were the Agulu, Nanka, Ozuitem, Oko in Aguata area, Isuikwuato and Orlu in Anambra, Abia and Imo States respectively. At the last count the Federal Government of Nigeria has started showing interest in ecological problems in the country including the control of gullies which have reached more than 600 active sites in the region.

It is against this background that the Federal Government of Nigeria (FGN) deemed it expedient to seek the assistance of the World Bank and has received a credit to tackle the worsening problems of soil erosion and degraded watersheds in seven states of Nigeria comprising Abia, Anambra, Cross Rivers, Ebonyi, Edo, Enugu and Imo through an eight-year project titled "The Nigeria Erosion and Watershed Management Project (NEWMAP)". The multi-sectoral Nigeria Erosion and Watershed Management Project (NEWMAP) is financed by the World Bank, Global Environment Facility, the Special Climate Change Fund and the Government of Nigeria. The project initially kicked off with 7 states, namely Anambra, Abia, Cross River, Edo, Enugu, Abia, and Imo and currently 7 additional states had joined in the program and these include Kogi, Gombe, Kano, Delta, Oyo, Sokoto and Kebbi States. The lead agency at the Federal level is the Federal Ministry of Environment (FMENV), Department of Erosion, Flood and Coastal Zone Management. State and local governments, local communities and CSOs are or will be involved in the project, given that the project is a multi-sector operation involving MDAs concerned with water resources management, public works, agriculture, regional and town planning, earth and natural resources information and disaster risk management.

The development objective of NEWMAP is: *to rehabilitate degraded lands and reduce longer-term erosion vulnerability in targeted areas*. The Enugu State Government as one of the participating States represented by the State Project Management Unit (SPMU) has selected Agbaja Ngwo gully erosion as one of the priority sites for intervention.

ES.02 Description of Proposed Intervention Site

Geographical Location

Agbaja Ngwo Gully Erosion Site is located in Okwojo in Imeama autonomous community in Udi Local Government Area of Enugu State on Latitude 06° 26' 15"N and Longitude 07° 26' 19" E six miles north of Enugu Capital City. It is currently posing a threat to the water reservoir that receives water from Ajali and Oji River water schemes. The water reservoir serves as the main source of water supply to Enugu City, as 50% of Enugu Urban population depends on the reservoir for water supply for different uses.

Current Situation at the Intervention Site

Agbaja Ngwo gully emanated as a result of abrupt termination of an existing concrete trapezoidal channel that conveys the outwash from a reservoir that receives water from Ajali and Oji River Water Schemes. The gully continued to expand rapidly due to continuous increase in rainfall. The erosion has destroyed large expanse of farmland and vegetation thereby depriving the community of their sources of livelihood, particularly peasant farmers who depend primarily on the farm produce and fruits to feed their families. The erosion has destroyed large expanse of cashew and palm plantations and it is aggressively encroaching into the water reservoir.

ES.03 The Proposed Intervention Civil Works

Design Concept

The Agbaja Ngwo Gully has two fingers, one of which has healed naturally and therefore does not require intervention. The gully for intervention has a total length of approximately 0.509km. Observations during the site visit indicates that gully erosion from the gully heads are still very active and if left unchecked, these gullies would continue to advance and would result in damages to adjacent infrastructure and building structures. It could also lead to loss of soil productivity, and probably loss of lives. The proposed intervention works therefore comprise four district sub-project activities.

Gully Head Stabilization

To halt gully head advancement especially with high volume of runoff, installation of hard engineering structures has been proposed. Hard structures would be constructed on the deep steep slopes and deep cuts which varies between 10m to as high as 18m. The aim of these hard structures is to ensure that run offs are safely conveyed downstream into the gully bed without causing excessive erosion.

Gully Bed Stabilization

In order to stabilize the gully bed that is expected to receive storm runoffs from the steep slopes of the gully a number of check dams are proposed to be constructed at intermediate locations along the stretch of the gully. These check dams will minimize velocity of the flow and reduce the erosive force of the flowing water, and trap sediments which will partially fill the gully bed. Once this is achieved then vegetation can be applied.

Gully Bank Stabilization

Diversion of runoff flows above the gully banks is very important in stabilizing the banks although it would require a stable discharge point or inflow point in order to be effective. In the absence of these stable inflow points a confinement system (geocell) which is a method of a gully bank reshaping reinforced with soil is being proposed to minimize excessive cutting of slopes and hence stabilize them through bioengineering techniques.

Watershed Management

It has been proven that proper management of the watershed is a very effective and less expensive approach to erosion control. The approach which is predicated on the conservation of soil and water by controlling the effect of damaging runoffs and soil degradation is expected to improve the sustainability and productivity of existing farmlands within the watersheds.

Specific Project Activities proposed to be implemented in the Erosion Site

Summary of specific project activities for Agbaja Ngwo gully erosion site rehabilitation and stabilization intervention works include:

- a) Extension of existing trapezoidal channel deep into the gully head;
- b) Design of transitional channel to join the chute channel;
- c) Design of chute channel to collect the flow from the transitional channel into the stilling basin;
- d) Design of stilling basin with its baffle blocks, weep holes and drainage of the apron;
- e) Filling and compaction of fill to reclaim part of the gully head and its finger gully;
- f) Flat gabion mattress lying on geotextile material;
- g) Reno/gabion mattresses where necessary to protect the base from scouring;
- h) Check dams placed at appropriate intervals along the gully bed; and
- i) Re-vegetation with local grass and trees within the distance of the gully.

ES.04 Rationale for the ESMP

The rationale for the preparation of the ESMP is to develop a site specific management framework that will ensure the likely environmental and social concerns that will arise from the proposed AgbajaNgwo intervention works are translated into specific costed, measurable and monitorable mitigation activities.

Objectives of the ESMP

The overall objective of the ESMP is to identify the likely potential environmental and social impacts of the proposed project activities as well as proffer appropriate mitigation and ameliorating measures to be integrated

into project implementation and operational phases in order to promote environmental and social sustainability in the project area.

The specific objectives of this ESMP as derived from the Terms of Reference (ToR) includes

- To examine the project in terms of its major activities and identify the aspects of project construction that may trigger environmental impacts;
- Identify the environmental issues associated with the major activities;
- Develop mitigation measures for the aspects identified as having adverse environmental impacts;
- Incorporate environmental mitigation measures into activities and develop corrective actions and ensure monitoring;
- Define the specific actions required, roles and responsibilities for these actions, and associated costs; and
- Define a proposed institutional structure to govern the implementation of the ESMP and its monitoring.

ES.05 Scope of the ESMP Study

The scope of activities to be pursued in the ESMP are:

- To work in close collaboration with the engineering design consultants and ENUGU-NEWMAP Safeguard team;
- Visit the full sub-watershed as delineated in the given gully stabilization design;
- Receive the draft technical/feasibility studies in order to take into account the technical variant of the proposed activities;
- Inform the technical design consultants of any major constraint that may arise due the social and environmental situation on ground;
- Take into account the proposed civil engineering designs, vegetative land management measures and other activities aimed at reducing or managing runoff that would be carried out within the sub-watershed;
- Assess natural resources and infrastructure potentially affected during project implementation and operation and select the management strategies needed to ensure that environmental risks are appropriately mitigated; and
- Develop an ESMP as an integral part of the overall project planning, design, budget, and implementation, vis-vis a template for managing and monitoring environmental concerns as they relate to the proposed activities.

ES.06 Approach and Methodology

The methodology adopted for the preparation of the ESMP is consistent with the World Bank Safeguard Policies-Operational Policy on Environmental Assessment (OP/BP 4.01) as well as the Nigerian Environmental Assessment guidelines and procedures. The methodology for the preparation of the ESMP involves reconnaissance survey; desktop studies/literature review; field work; laboratory analysis; public consultation; and preparation of the ESMP report.

ES.07 Legal and Administrative Framework

The relevant legal and administrative frame work for the project were reviewed. These include national, state, international and World Bank Triggered Safeguard Polices as outlined below.

Administrative Framework

In Nigeria, the power to regulate all environmental matters is vested in the Federal Ministry of Environment (FMENV) since 1999. Hitherto, the now defunct Federal Environmental Protection Agency (FEPA) which was set up by Act 88, of 1988 exercised this power. The Federal Ministry of Environment has the responsibility of ensuring that all development and industry activities, operations and emissions are conducted within the limits prescribed by various national environmental guidelines, policies, regulations as well as other relevant regulations for environmental management in Nigeria. However in the Part III of the Act, State Governments are encouraged to set up “their own Environmental Protection Agencies for the purpose of maintaining good environmental quality”.

Relevant National and State Policies

The most relevant national policy on managing the Environment in Nigeria is the National Policy on the Environment. There are, however, other various environmental legislations, regulations and guidelines at both national and state levels of government. A comparison of the various environmental legislations, regulations and guidelines at both national and state levels, as well as relevant regulatory instruments that have been derived from the ESMF and other documents was made with a view to identifying ameliorable need gaps.

State MDAs

The State ministry that has the responsibility for the general protection and development of the environment, conservation of biodiversity, natural resources and sustainable development is the Enugu State Ministry of Environment and Mineral Resources. The Ministry is in charge of the Enugu State Waste Management Authority (ENSWAMA). Other state MDAs relevant to the project includes Enugu State Ministry of Agriculture and Rural Development (ENMARD), Enugu State Ministry of Water Resources (ENSMWR) and its agency – the Enugu State Water Corporation (ENSWC).

International Treaties and Conventions on Environment to which Nigeria is a Party

Some of the International Treaties and Conventions on Environment to which Nigeria is a party considered relevant to the ESMP are summarized in Table ES.1 below

S/N	Treaties and Conventions	Year	Agreement
1.	The United Nations Environmental Guidance Principles	1972	Provide guidelines for protecting the integrity of the global environment and the development system
2.	Montreal Protocol on Substances that deplete the Ozone Layer	1987	An international treaty to eliminate Ozone depleting chemical production and consumption.
3.	United Nations Convention on Biological Diversity	1992	Places general obligations on countries to observe sustainable use and equitably share the plants and animals of the earth
4.	United Nations Framework Convention on Climate Change	1994	It calls on developed countries and economies to limit her emissions of the greenhouse gases which cause global warming
5.	Convention on International Trade in Endangered Species of Wild Fauna and Flora	1973	Restricts the trade of fauna and flora species termed as endangered species
6.	Convention on Conservation of Migratory species of Wild animals (Bonn Convention)	1979	Stipulates actions for the conservation and management of migratory species including habitat conservation
7.	Vienna Convention for the Protection of the Ozone Layer	1985	Places general obligation on countries to make appropriate measures to protect human health and the environment against adverse effects resulting from human activities which tend to modify the ozone layer

World Bank Safeguards Policies triggered by NEWMAP and the proposed activity

The World Bank has 10+ 2 Environmental and Social Safeguard Policies formulated to reduce or eliminate the adverse effects of development projects, and improve decision making which are summarized in Appendix 3. Of these Safeguard Policies, the intervention work at the proposed site triggers Environmental Assessment (OP/BP 4.01), Natural Habitat (OP/BP 4.09), Indigenous People (OP/BP 4.10) and Involuntary Resettlement (OP/BP 4.12).

ES.08 Existing Environmental Conditions on the proposed project area

Result of desktop and field work studies revealed that existing baseline environmental conditions are generally pristine with no significant sources of pollution from the various human activities in the area.

Climate and Air Quality

The relative humidity of the project area recorded a lowest value of 66.8% and highest value of 69.3%. The high value indicates that the data were collected during the period of rainy season. Wind speed measurement in the

project area recorded a lowest value of 2.3m/s and highest value of 2.5m/s. The results of air quality analysis revealed that the parameters were within FMENV emission limit. The results of Suspended Particulate Matter (SPM) around the project site ranges from 1.727 to 2.701 mg/m³. Noise level within and around the proposed project site was assessed using Digital Extech 407732 sound meter calibrated in decibel dBA. The results revealed that noise level varies between 46.4 to 66.3 dBA with a mean value of 58.4dBA. Noise level as revealed is below the permissible limits of 90dBA set by the Federal Ministry of Environment.

Flora and Fauna

The flora pattern in the project area is closely related to the soil structure, which has been largely influenced over time by geological formation/changes erosion and prevailing climatic conditions. Flora within the study area are luxuriant and consist of shrubs, grass and tree components. Major economic trees are palms, mangoes, cashews while arable crops include cassava, yam, maize and pepper. On the other hand fauna composition found in the project area include: *Hyperiodrilus*(Earth worm), *Pachybolus* (Millipede), *Acraeasp* (Butterflies), *Precissp* (Moths), *Papilioisp* (Caterpillars), *Zonocerussp* (Grasshopper), *Apis* (Bee), *Oecophylla* (Ants), *Bradinyoga* (Dragon flies) and other related species.

Soil and Water Quality

Soil in the project area is made up of loosely clay silty fine sand, ferrallitic (also called Red Earth or Acidic) sands and hydromorphic soils. Soil in the area is acidic and ranges 4.2 to 5.5 with mean value of 4.75. The result of water samples collected shows that the tested parameters were all within FMENV acceptable limits except pH which recorded 5.73 and 5.3 at Nnadiri Spring upstream and Bore hole respectively as against 6-9. Total Suspended Solids recorded value is 52.47mg/l at Nnadiri downstream as against FMENV limit of 30mg/l. Mercury and Cadmium were not detected.

ES.09 Socio-Economic Characteristics and Consultations with Stakeholders

The existing socio-economic conditions in the project area, that is, Agbaja–Ngwo gully erosion site was revealed by the result of data and information generated primarily from questionnaire, oral interview and field observations, as well as some demographic information collected from National Population Commission, census reports and other relevant materials.

Demographic Characteristics of Respondents

The findings indicate 54.0% of the respondents are males while 46.0% are females with 20.70% of them are singles, 55.20% married, 1.1% divorced, 1.7% separated while 21.3% are widowed. Household size distribution of the respondents ranged from 1 person to 15 persons per household. 64.40% of the respondents have family size of 1-5 persons, 33.30% have household sizes of 6-10 persons, while 2.30% have household sizes of 11-15 persons. 99% of the respondents are Christians. With respect to monthly income, majority of the respondents (64.7%) earn less than ₦40,000.00. The high level of poverty of residents of the project communities underscore the need to effectively control erosion menace and increase land holdings available for farming activities.

Physical and Social Facilities

The major tarred arterial road leading from Enugu metropolis to the project communities is presently in a dilapidated condition. Due to the hilly topography of the area, the few earth roads that are motorable are fraught with gullies and sharp potholes. The type, number and quality of educational institutions in an area reveal the quality of human capital development. The survey showed that 31.60%, 87.40%, 81.60%, 18.40%, 4.60% and 6.90% of the respondents send their wards to existing nursery, primary, secondary, vocational/technical and tertiary at Agbaja Ngwo respectively. Although majority of respondents (95.2%) interviewed are holders of either SSCE, ND/HND, NCE, and BSc/MSc certificates, many of the people engage in farming (43.7%) or business (trading) (29.30) as their main occupation. The results of analysis of collected data from the socio-economic study reveal that 8.60%, 33.30%, 52.30%, 18.40%, 34.50%, 40.80% and 17.80% of the respondents source water for domestic purposes from public taps, boreholes, rain water, stream, spring water, water vendors and hand dug wells respectively. It is not surprising that the Common ailments suffered by individuals in the village- Agbaja Ngwo are malaria, cholera, dysentery and typhoid fever. The high incidence of typhoid fever among the respondents is not unconnected with the poor access to portable water supply. Health facilities patronized for treatment of various diseases in the area include hospitals (25.2%), private clinics (20.7%), dispensaries (72.4%), traditional healing homes (17.8%) and maternity homes (15.50%).

Waste Management and Disposal

A common environmental sanitation feature in the various communities visited in the proposed project area is the indiscriminate disposal of refuse into drainage channels, along the road and around residential buildings. The analysis of the data collected through the questionnaire indicates that 55% of the residents in the area dump their household waste into open dump sites, 45.4% (open road side drainage/river channels), 31.60% (Public refuse dumps), while 29.90% (bury and or burn their wastes).

Consultation and Public Participation

Community consultation is a fundamental aspect of many multi-lateral donor assisted projects in developing countries. Experiences have shown that top-bottom approach to development have failed in the areas where they were implemented. Community driven project have become so important considering the high incidences of project abandonment and discontinuance in developing countries and in particular Nigeria. Participation by affected individuals, group of individuals and the entire community is considered a fundamental tool for building understanding and fostering better decision making all through the project life cycle.

Stakeholders Consultations and Meetings

Several Stakeholders' consultative forum tailored to introduce and intimate the community(ies) of the objective of NEWMAP project and the ESMP study commenced from 12th May, 2016. During the consultations, the Lead consultant engaged the Igwe of Imeama Community HRH Rtd. Col Udeh and some members of his cabinet in an interactive session. Chief Daniel Ugwu (Item Okwojo) explained that Imeama Community is made up of three villages namely Okwojo, Amabor and Umuase. He further stated that NEWMAP staff had made series of visit to the gully site and they were optimistic that the government will surely come to their aid. Some of the concerns of the people gathered from the various consultations are stated below:

- Fear that the NEWMAP project might be one of such projects that never come to reality.
- Worried if the project implementation will be in line with Engineering Design.
- Fear that their youths might not be employed by the contractor to be employed to handling the civil works.

ES.10 Assessment of Potential Adverse Impacts and Analysis of Project Alternatives

Methodology

The Impact assessment methodologies adopted for this study include checklist, briefing and consultations, field survey and professional judgment. While the applied procedures involve impact identification, prediction and evaluation. The identified potential impacts are evaluated using characteristics parameters which categorize the impacts into aspects (Environmental or Social Impact), effects (Beneficial or Adverse impact), magnitude (mild, moderate, significant or severe impact), and likelihood of occurrence (certain, likely, unlikely or rare).

Significant Potential Impacts of the Proposed Project

The summary of the significant adverse and beneficial impacts of the proposed gully rehabilitation and stabilization project at Agbaja Ngwo are summarized below. It is realized that the beneficial impacts of the proposed project far outweigh the negative impacts and as such represent the justification for embarking on the proposed intervention project. The successful implementation of the proposed intervention works will stabilize the gully, reduce longer term erosion vulnerability, prevent landslides, regenerate and restore vegetal cover/floral habitat and improve microclimatic conditions in the area as well as the create employment opportunities, diversify livelihoods, improve agricultural productivity and increase land values. The identified negative impacts of the proposed project include increased noise, solid waste generation, vehicular traffic and likely attendant accidents; loss of vegetal cover and, soil and water contamination by spilled oils, spoils, discharges and other chemical/hydrocarbon substances. Majority of these negative impacts are temporary in nature and will be effectively mitigated by the suggested mitigation measures.

Assessment of Implementation Options

This section weighs the project implementation alternatives that were put into consideration at the planning stage of Agbaja Ngwo gully intervention program. The best option was selected after careful examination of merits and demerits of each of the technologies brought to the table.

Intervention Options

The *No Intervention* option suggests that the erosion site remains as it is and that the proposed project shall not be executed. But considering the rate of expansion and the destructive effect of the erosion, the 'no Intervention' case will exacerbate the suffering of the people because in the future they will have no land to farm, the reservoir might cave inside the gully and worsened the scarcity of water in the community. It was realised during site survey that any further neglect of the gully may lead to untold losses of cashew trees, water reservoir, loss of homes, fragmentation of community and increased cost of accessing assets and facilities. The erosion may also threaten ecosystem and the microclimatic condition of the area. The option was considered not viable and was rejected. As earlier stated, further delay of the intervention which the deterred option represents will not do any good rather it will lead to losses in cashew plantation, water reservoir, homes, fragmentation of community and increased cost of accessing assets and facilities. The cost of executing the project will certainly push up in a future date. Therefore, deferring the implementation was considered unnecessary and was rejected. Since the 'Do it Now' option will avert these perceived adverse effects mentioned in the other options, then this option was considered feasible and was approved.

Technological Alternatives

A number of technological alternatives were considered for use in the implementation of the proposed gully rehabilitation and stabilization project. These include; *Full Fill, Rigid Civil works, Bio-engineering and Flexible Structures*. However based on the merits and demerits of each of technological alternative, the flexible structures alternative was chosen because it approximates and consolidates on the merits of the various technological alternatives. This method is the integration of moderate civil engineering works with vegetation. The combination also complements each other in their areas of weakness. The intervention will have less adverse impacts on the environment. The technology was designed to allow the passage of runoff which at a reduced speed at the gully head and traps down only the soil particles. As the sediments continue building up and the introduced vegetation gathers momentum, the gully will stabilize and completely healed over time. This is the chosen technology for the intervention because it is economical, sustainable and durable.

ES.11 Environmental and Social Management Plan (ESMP)

Environmental and Social Management Plan (ESMP) is a tool that provides the means for continuous self assessment of the predictive accuracy of the impacts and the management effectiveness of project and social implementation and operations.

Mitigation Measures

The mitigation measures are activities aimed at reducing, ameliorating avoiding or compensating for impacts and where possible enhance environmental quality through the designed alternatives and operational procedures. A summary of the potential and associated impacts of the project, and the corresponding mitigation measures and the institutional responsibility for enforcement are outlined. The mitigation measures formulated for the ESMP are specific, measurable, achievable, relevant and time-based (SMART). To this extent estimated cost of each mitigation measure is indicated in order to guide the preparation of the project implementation manual. Implementation of these measures to enhance positive impacts and reduce negative impacts in consonance with the general environmental works will ensure they are effective and functional.

Monitoring Program and Responsibilities

In order to effectively implement mitigation measures, specific ESMP tasks must be determined. A detailed monitoring program that would ensure compliance with specific actions, assure accruing of predicated impacts, guide identification of effective mitigation measures and evaluate compliance with regulatory measures is drawn up. Issues of specific indicators or parameters to be monitored, method of measurement, sampling location, and frequency of monitoring, responsibility for implementation and supervision as well as cost of monitoring are articulated into the monitoring program

Appropriate Reporting and Record Keeping

Appropriate records keeping and reporting procedures for all site activities guarantee that environmental incidents, accidents and hazards are appropriately captured and used to evaluate the predictive accuracy of impacts, effectiveness of monitoring programs and operational efficiency of the ESMP. Records shall be kept and used to monitor enforce where necessary all operational construction activities. Such information shall be stored

in electronic form to facilitate safe keeping and prompt retrieval. The following records and or registers will be maintained as an integral part of the ESMP.

- A register of environmental complaints defining the nature of complaint, date of complaint, corrective action taken and date it was resolved;
- A register of incidents such as spillages and leakages including the date, nature of the incident and corrective action taken;
- Date on the types and quantities of waste removed from the site;
- Records of formal consultation or communication activities
- Site inspection checklists; and

Institutional Arrangement and Responsibilities for Implementation of the ESMP

An overlapping institutional and management arrangement designed to properly implement the proposed mitigation measures for the ESMP is proposed. The Federal Ministry of Environment through the EIA Department and relevant agencies will play the role of lead environmental regulator performing oversight functions. The World Bank will assess implementation and recommend additional measures for strengthening the management framework and implementation performance. The roles and responsibilities of the Site Manager and Contractor(s) are meant to ensure sound environmental management practices and, compliance with mitigation measures and monitoring requirements and regulations respectively. Other stakeholders like CDA/CDOs, NGOs/CSOs and site committee members/local community will perform external monitoring functions.

Proposed Capacity Training Needs for the ESMP.

Institutions and agencies to be involved in the ESMP implementation would require capacity building in order to effectively and efficiently discharge their monitoring and management responsibilities. From the issues raised by stakeholders during consultation meetings across the three communities in the project area, the SPMUE&S Safeguard officers will require capacity building to acquire better public communication and consultation skills for effective interaction with Contractors, workers, Community stakeholders, Project Affected Persons (PAPs) and other relevant stakeholders. Community Based Organizations (CBOs) will need capacity training in the area of environmental assessment, external monitoring functions, support aggrieved community members especially PAPs and vulnerable persons to get prompt and fair redress, and to enforce corrective actions. To enhance their respective roles and ensure collaboration of the relevant stakeholders like the site manager, HSE officers, Site Committee members, community stakeholders, the following broad areas for capacity building have been drawn up for the effective implementation of the ESMP.

Cost of Implementation of the ESMP

The effective implementation of the ESMP would require the use of equipment, logistics and expert/professional services to achieve objectives of good engineering construction practice and overall sound environmental and social sustainability. These would require money to execute. The total estimated cost for implementing the ESMP is estimated to be Twelve Million, Two Hundred and Fifty-Eight Thousand (N12,258,000.00) Only (Table ES.2)

Table ES.2: Estimated Budget for the Implementation of ESMP

S/N	Item	Responsibilities	Estimated Budget (N)
1	Mitigation	Contractor	3,600,000.00
2	Monitoring	Enugu State NEWMAP ENS MDAs, FMEEnv, Federal MDAs	6,548,000.00
3	Capacity Building	ENSNEWMAP	2,110,000.00
Total			N12,258,000.00

ES.12 Summary, Recommendations and Conclusions

This Environmental and Social Management Plan (ESMP) has been prepared as one of the safeguard instruments to be used in the implementation of the proposed civil engineering works designed to rehabilitate and stabilize the Agbaja Ngwo Gully Erosion Site by the Enugu State Nigeria Erosion and Watershed Management Project (ENS-NEWMAP). The rationale for the preparation of this ESMP is to develop a site specific management framework which will ensure that the likely environmental and social concerns that will arise from the proposed Agbaja Ngwo Intervention works are translated into specific costed, measurable and monitorable mitigation activities.

The study reveals that the successful implementation of the proposed intervention works will stabilize the gully, reduce longer term erosion vulnerability, prevent landslides, regenerate and restore vegetal cover/floral habitat and improve microclimatic conditions in the area besides the creation of employment opportunities, diversification of livelihoods, improved agricultural productivity and increase in land values. The identified negative impacts of the proposed project include increased noise, solid waste generation, vehicular traffic and likely attendant accidents, loss of vegetal cover and soil and water contamination by spilled oils, spoils, discharges and other chemical/hydrocarbon substances. Majority of these negative impacts are temporary in nature and will be effectively mitigated by the suggested mitigation measures.

To effectively implement the proposed mitigation measures, a participatory driven integrated environmental and social management framework is drawn up that captures the specific tasks to be performed by the relevant institution agencies and organizations to be involved during the various implementation phases of the proposed intervention works. In conclusion the timely and successful implementation of this ESMP will reduce environmental and social/livelihood impacts or concerns that will arise from the implementation of the proposed Agbaja Ngwo Gully Erosion Site Intervention Works and generate beneficial multiplier effects in the areas of agricultural land and productivity, progressive restoration of degraded vegetation cover and environmental conditions, preservation of cultural landscape and biodiversity including the promotion of sustainable watershed management practices in the area.

CHAPTER ONE

1.0 Introduction**1.1 Background of NEWMAP**

The countries of sub-Saharan Africa are besieged by serious environmental degradation resulting from desert encroachment, drought and soil erosion due to dry wind impact and very high intensive rainfall resulting in heavy water runoff and soil loss. The problems have adversely affected agricultural productivity and thus casting doubt on food security in the sub-region. In Nigeria, desertification and aridity are the major environmental problems of the northern part of the country while the high torrential rainfall of the southern Nigeria creates enabling environment for catastrophic soil erosion in the region. Gully erosion types are the most visible forms of erosion in Nigeria mainly because of the remarkable impression they leave on the surface of the earth. Also, more than 1.6% of the entire land area of eastern Nigeria is occupied by gullies. This is very significant for an area that has the highest population density of 500 persons per km² in Nigeria. Before the 1980's the classical gully sites in the region were the Agulu, Nanka, Ozuitem, Oko in Aguata area, Isuikwuato and Orlu in Anambra, Abia and Imo states respectively. At the last count the Federal Government of Nigeria has started showing interest in ecological problems in the country including the control of gullies which have reached more than 600 active sites in the region.

It is against this background that the Federal Government of Nigeria (FGN) deemed it expedient to seek the assistance of the World Bank and has received a credit to tackle the worsening problems of soil erosion and degraded watersheds in seven states of Nigeria comprising Abia, Anambra, Cross Rivers, Ebonyi, Edo, Enugu and Imo through an eight-year project titled "The Nigeria Erosion and Watershed Management Project (NEWMAP)". The multi-sectorial Nigeria Erosion and Watershed Management Project (NEWMAP) is financed by the World Bank, Global Environment Facility, the Special Climate Change Fund and the Government of Nigeria. The project initially kicked off with 7 states, namely Anambra, Abia, Cross River, Edo, Enugu, Abia, and Imo and currently 7 additional states had joined in the program and these include Kogi, Gombe, Kano, Delta, Oyo, Sokoto and Kebbi States. The lead agency at the Federal level is the Federal Ministry of Environment (FMENV), Department of Erosion, Flood and Coastal Zone Management. State and local governments, local communities and CSOs are or will be involved in the project, given that the project is a multi-sector operation involving MDAs concerned with water resources management, public works, agriculture, regional and town planning, earth and natural resources information, and disaster risk management.

The development objective of NEWMAP is: *to rehabilitate degraded lands and reduce longer-term erosion vulnerability in targeted areas*. The Enugu State Government as one of the participating States represented by the State Project Management Unit (SPMU) has selected Agbaja Ngwo gully erosion as one of the priority sites for intervention.

1.2 Description of NEWMAP Components

NEWMAP has four components as outlined in the Project Implementation Manual (PIM) namely: -

- a. **Watershed and Catchment Management Investments:** The main activity of this component is to channel and contain flood water with river channel and conduct Community based catchment intervention.
- b. **Watershed and Catchment Management Institution and Information Services:** The main activity of the component is to strengthen the enabling environment for effective control and watershed management. The outcome of this process will result to a situation where existing administrative frameworks will become more capable, modernised and co-ordinated in their operational activities.
- c. **Climate Change Agenda Support:** This is designed to strengthen government capacity to promote low carbon climate resilient development. Through this, government (that is, different government levels) will become better equipped to respond to and initiate climate change and low carbon development options and strategies.
- d. **Project Management:** This main activity of this component is to procure goods and specialist services required to support project management and safeguards activities as monitoring and evaluation procedures and oversight functions. This will lead to mainstreaming of best practices in project management, monitoring and evaluation which may be replicated for use by other stakeholders.

1.3 Description of Proposed Intervention Site**1.3.1 Geographical Location**

Agbaja Ngwo Gully Erosion Site is located in Okwojo in Imeama autonomous community in Udi Local Government Area of Enugu State at geographical co-ordinates of Latitude 06°26' 15" N and Longitude 07°

26°19" E and six miles North of Enugu Capital City (Fig.1.1- 1.2). It is currently posing a threat to the water reservoir that receives water from Ajali and Oji River water schemes. The water reservoir serves as the main source of water supply to Enugu City, as 50% of Enugu Urban population depends on the reservoir for water supply for different uses.



Fig. 1.1 Map of Enugu State showing Udi Local Government Area

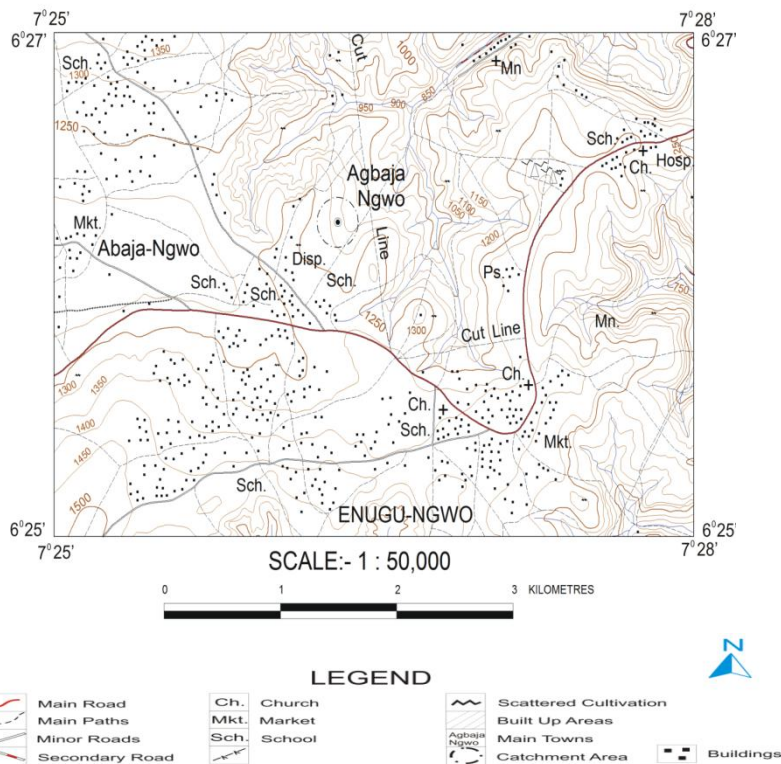


Figure1.2: Location Map of Agbaja Ngwo showing catchment area of the Erosion Site
 Source: Federal Ministry of Land and Surveying and Urban Development

1.4 Current Situation at the Intervention Site

Agbaja Ngwo gully emanated as a result of abrupt termination of an existing concrete trapezoidal channel that conveys the outwash from a reservoir that receives water from Ajali and Oji River Water Schemes (Plate 1.1- 1.3). The gully continued to expand rapidly due to continuous increase in rainfall. The erosion has destroyed large expanse of farmland and vegetation thereby depriving the community of their sources of livelihood, particularly peasant farmers who depend primarily on the farm produce and fruits to feed their families. The

erosion has destroyed large expanse of cashew and palm plantations and it is aggressively encroaching into the water reservoir (Plates 1.4 & 1.5).



Plate 1.1: Water Reservoir



Plate 1.2: Existing trapezoidal channel



Plate 1.3: Part of Agbaja Ngwo Gully



Plate 1.4: Farmlands destroyed by the Gully

1.5 The Proposed Intervention Civil Work

1.5.1 Design Concept

The Agbaja Ngwo Gully has two fingers, one of which has healed naturally and therefore does not require intervention. The gully for intervention has a total length of approximately 0.509km. Observations during the site visit indicates that gully erosions from the gully head are still very active and if left unchecked, these gullies would continue to advance and would result in damages to adjacent infrastructure and building structures. It could also lead to loss of soil productivity and probably loss of lives. The proposed intervention works therefore comprise four district sub-project activities (Figures 1.3 & 1.4)

1. Gully Head Stabilization

To halt gully head advancement especially with high volume of runoff, installation of hard engineering structures has been proposed. Hard structures would be constructed on the deep steep slopes and deep cuts which varies between 10m to as high as 18m. The aim of these hard structures is to ensure that run offs are safely conveyed downstream into the gully bed without causing excessive erosion.

2. Gully Bed Stabilization

In order to stabilize the gully bed that is expected to receive storm runoffs from the steep slopes of the gully a number of check dams are proposed to be constructed at intermediate locations along the stretch of the gully. These check dams will minimize velocity of the flow and reduce the erosive force of the flowing water, and trap sediments which will partially fill the gully bed. Once this is achieved then vegetation can be applied.

3. Gully Bank Stabilization

Diversion of runoff flows above the gully banks is very important in stabilizing the banks although it would require a stable discharge point or inflow point in order to be effective. In the absence of these stable inflow points a confinement system (geocell) which is a method of a gully bank reshaping reinforced with soil is being proposed to minimize excessive cutting, of the slopes and hence stabilize them through bioengineering techniques.

4. Watershed Management

It has been proven that proper management of the watershed is a very effective and less expensive approach to erosion control. The approach which is predicated on the conservation of soil and water by controlling the effect of damaging runoffs and soil degradation is expected to improve the sustainability and productivity of existing farmlands within the watersheds. Such land resource management initiatives are expected to increase rain water infiltration and water storage capacity, thereby improving land surface cover.

5. Specific Project Activities Proposed to be implemented in the Erosion Site

Summary of specific project activities for Agbaja Ngwo gully erosion site rehabilitation and stabilization intervention works include:

- j) Extension of existing trapezoidal channel deep into the gully head;
- k) Design of transitional channel to join the chute channel;
- l) Design of chute channel to collect the flow from the transitional channel into the stilling basin;
- m) Design of stilling basin with its baffle blocks, weep holes and drainage of the apron;
- n) Filling and compaction of fill to reclaim part of the gully head and its finger gully;
- o) Flat gabion mattress lying on geotextile material;
- p) Reno/gabion mattresses where necessary to protect the base from scouring;
- q) Check dams placed at appropriate intervals along the gully bed; and
- r) Re-vegetation with local grass and trees within the distance of the gully (Figures 1.3 & 1.4)

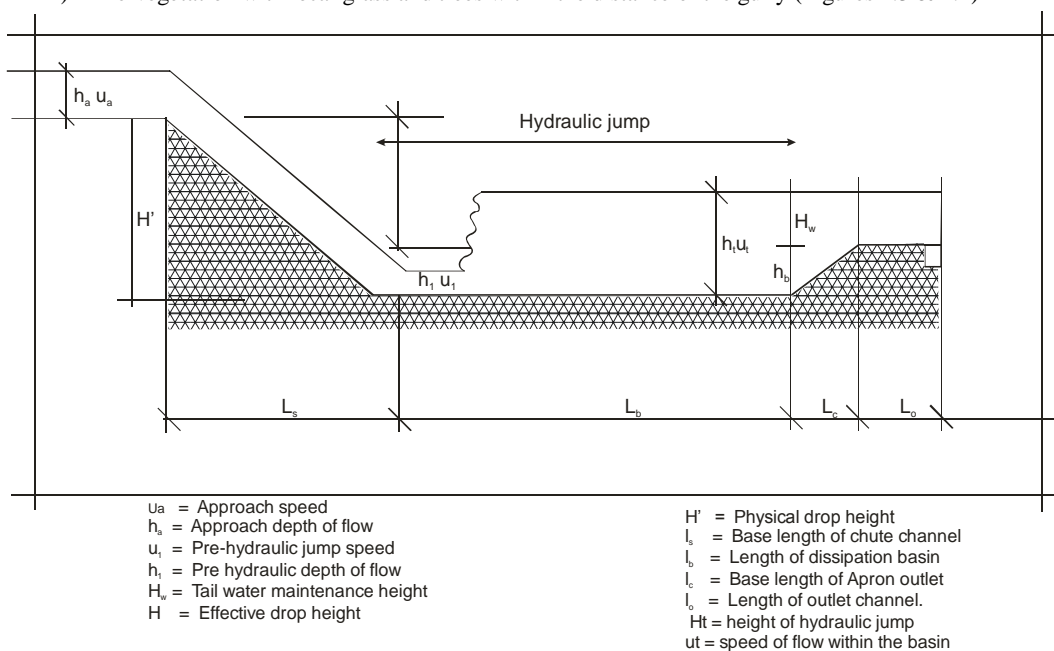


Fig 1.3: Engineering Design for Intervention work

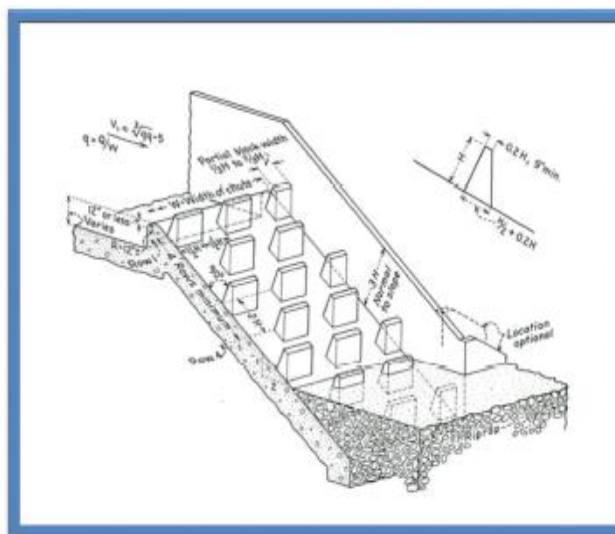


Fig 1.4: USBR Type IX Baffled Apron

1.6 Rationale for the ESMP

The rationale for the preparation of the ESMP is to develop a site specific management framework that will ensure that the likely environmental and social concerns that will arise from the proposed Agbaja Ngwo intervention works are translated into specific costed, measurable and monitorable mitigation activities.

1.7 Objectives of the ESMP

The overall objective of the ESMP is to identify the likely potential environmental and social impacts of the proposed project activities as well as proffer appropriate mitigation and ameliorating measures to be integrated into project implementation and operational phases in order to promote environmental and social sustainability in the project area.

The specific objectives of this ESMP as derived from the Terms of Reference (TOR) include the following:

- To examine the project in terms of its major activities and identify the aspects of project construction that may trigger environmental impacts;
- Identify the environmental issues associated with the major activities;
- Develop mitigation measures for the aspects identified as having adverse environmental impacts;
- Incorporate environmental mitigation measures into activities and develop corrective actions and ensure monitoring;
- Define the specific actions required, roles and responsibilities for these actions, and associated costs; and
- Define a proposed institutional structure to govern the implementation of the ESMP and its monitoring;

1.8 Scope of the ESMP Study

The scope of activities to be pursued in the ESMP are:

- To work in close collaboration with the engineering design consultants and ENUGU-NEWMAP Safeguard team;
- Visit the full sub-watershed as delineated in the given gully stabilization design;
- Receive the draft technical/feasibility studies in order to take into account the technical variant of the proposed activities;
- Inform the technical design consultants of any major constraint that may arise due to the social and environmental situation on ground;
- Take into account the proposed civil engineering designs, vegetative land management measures and other activities aimed at reducing or managing runoff that would be carried out within the sub-watershed;
- Assess natural resources and infrastructures potentially affected during project implementation and operation and select the management strategies needed to ensure that environmental risks are appropriately mitigated; and
- Develop an ESMP as an integral part of the overall project planning, design, budget, and implementation, vis-à-vis a template for managing and monitoring environmental concerns as they relate to the proposed activities.

1.9 Approach and Methodology

The methodology adopted for the preparation of the ESMP is consistent with the World Bank Safeguard Policies - Operational Policy on Environmental Assessment (OP/BP 4.01) as well as the Nigerian Environmental Assessment guidelines and procedures. The methodology for the preparation of the ESMP includes site reconnaissance survey, desktop research/literature review, field work (actual field environmental sampling), laboratory analysis, public consultation; and the preparation of ESMP report.

1.9.1 Reconnaissance Survey

A reconnaissance visit to the proposed intervention site was undertaken by the SPMU, consultant and his entire team to get a spot assessment of the gully erosion site. Thereafter, a detailed assessment of the project site was carried out.

1.9.2 Literature Review/Desktop Studies

Literature review and desktop studies were undertaken to obtain information on the proposed project and ecological conditions in the project area. Documents reviewed include: ESMF, RPF, Project Implementation Manual (PIM), Project Appraisal Document (PAD) Integrated Safeguards Data Sheet (ISDS), World Bank's safeguard policies, relevant federal/state laws, regulations, policies and guidelines, proposed civil engineering designs and other completed NEWMAP ESMP and RAP Reports for different project sites in Nigeria.

1.9.3 Public Consultation

Consultations were held with community leaders such as traditional rulers, members of the Igwe-in-council, women and youth leaders. Subsequently, a more detailed consultation with a greater number of people from

the 3 villages that made up Imeama Community held and Focus Group Discussions (FGD) conducted with the use of structured questionnaires. Group meetings (informal and formal) were held with the Project Affected Persons (PAPs) and vulnerable groups. Stakeholders from relevant State Ministries, Departments and Agencies (MDAs) like Federal Ministry of Environment (FMEnv), Enugu State Ministry of Environment & Mineral Resources, Enugu State Ministry of Lands & Urban Development, Enugu State Ministry of Water Resources, Enugu State Water Corporation, Enugu State Ministry of Agriculture & Rural Development, Enugu State Waste Management Authority, Enugu State Ministry of Works and infrastructure, Non-Governmental Organizations (NGOs) and Community Based Organizations (CBOs) were consulted to identify institutional arrangements and capacity training needs for implementation and monitoring of the ESMP.

1.9.4 Field Studies

Field studies were carried out to obtain site specific environmental baseline data of the project area. It involved visual observation, in-situ measurements and collection of samples for laboratory analysis/testing. The baseline data will provide information on the existing environmental conditions against which subsequent changes can be detected through monitoring. The results of the assessment were cross referenced with secondary data available in the literature.

1.9.5 Identification of Potential Impacts and Mitigation Measures

Identification of impacts was carried out through consultation of literatures on similar projects, environmental experts and Community Based Organizations (CBOs). Mitigation measures were proffered to either eliminate or ameliorate adverse environmental and social impacts that may arise from the project while enhancing the beneficial effects.

1.10 Structure of the ESMP Report

The ESMP report is presented in seven chapters as derived from the (Terms of Reference)

Chapter One:	Provides the background of the project. It also contains the rationale, scope and brief description of proposed project activities.
Chapter Two:	Deals on the policy, legal and institutional framework for environmental and social management as well as the triggered World Bank Safeguard policies, Federal, State and Local Government policies and regulations.
Chapter Three:	Describes the biophysical environment and presents the baseline information on existing environmental characteristics of the project.
Chapter Four:	Discusses the socio-economic characteristics of the community with analysis of existing livelihoods, grievances redress mechanisms, consultations with relevant stakeholders and Project Affected Persons (PAPs).
Chapter five:	Deals on the potential adverse environmental and social impacts of the proposed intervention project as well as project alternatives'
Chapter Six:	Discusses the ESMP, mitigation measures, monitoring programme, conflicts resolution as well as outlines roles, responsibilities and cost of implementing the management actions and monitoring schemes.
Chapter Seven:	Focuses on the ESMP summary, recommendations and conclusions.

CHAPTER TWO:

2.0 LEGAL AND ADMINISTRATIVE FRAME WORK

2.1 Introduction

This chapter covers both National and International legislative requirements for environmental protection. The essence of this legal framework is to show the commitment on the part of the project proponent towards meeting the set standards and guidelines. Policies and regulations relevant to the proposed project are discussed in this chapter as they relate to the State, Federal and International arenas.

2.2 Administrative Framework

In Nigeria, the power to regulate all environmental matters is vested in the Federal Ministry of Environment (FMENV) since 1999. Hitherto, the now defunct Federal Environmental Protection Agency (FEPA) which was set up by Act 88, of 1988 exercised this power. The Federal Ministry of Environment has the responsibility of ensuring that all development and industry activities, operations and emissions are conducted within the limits prescribed by various national environmental guidelines, policies, regulations as well as other relevant regulations for environmental management in Nigeria. However in the Part III of the Act, State Governments are encouraged to set up “their own Environmental Protection Agencies for the purpose of maintaining good environmental quality”.

2.3 Relevant National and State Policies

The most relevant national policy on managing the Environment in Nigeria is the National Policy on the Environment. There are, however, other various environmental legislations, regulations and guidelines at both national and state levels of government. Table 2.1 shows the various environmental legislations, regulations and guidelines at both national and state levels, as well as relevant regulatory instruments that have been derived from the ESMF and other documents. A comparison of the various documents was made with a view to identifying ameliorable gaps. Measures for the amelioration are also given in the Table 2.1.

i. Federal Ministries, Departments and Agencies (MDAs):

The Federal Ministry of Environment (FMEnv) and the National Environmental Standards and Regulations Enforcement Agency (NESREA) are the Federal MDAs that are responsible for regulating and monitoring environmental issues at the federal level. The Federal Ministries of Agriculture and Natural Resources (FMANR) and Water Resources and their agencies, such as River Basin Development Authorities (RBDAs), as well as National Water Resources Institute (NWRI), Nigeria Integrated Water Resources Management Commission (NIWRMC) are other Federal MDAs considered relevant to the proposed project.

ii. State MDAs:

The State ministry that has the responsibility for the general protection and development of the environment, conservation of biodiversity, natural resources and sustainable development is the Enugu State Ministry of Environment and Mineral Resources. The Ministry is in charge of the Enugu State Waste Management Authority (ESWAMA). Other State MDAs relevant to the project include Enugu State Ministry of Agriculture and Rural Development (ENMARD), Enugu State Ministry of Water Resources (ENSMWR) and its agency – the Enugu State Water Corporation (ENSWC).

The Enugu State Ministry of Environment and Mineral Resources established by an Act of Parliament in 2004 has the following functions:

- (i) Liaising with the Federal Ministry of Environment, FMENV to achieve a healthy and better management of the environment via development of National Policies on Environment;
- (ii) Liaising with FMENV and other National Directorates/Agencies in the performance of environmental functions including environmental education/awareness to the citizenry;
- (iii) Responsibility for monitoring waste management standards;
- (iv) Responsibility for general environmental matters in the State, and;
- (v) Monitoring the implementation of EIA studies and other environmental studies for all development projects in the State;
- (vi) Management of open space;
- (vii) Setting standards for mitigation of climate change;
- (viii) Setting standards and guidelines for fumigation of premises;
- (ix) Urban sanitation and beautification;
- (x) Urban sewage management and control;
- (xi) Regulation of outdoor advertising in the state;
- (xii) Oversee activities of forestry commission;

- (xiii) Conservation of solid minerals and water resources;
- (xiv) Soil Erosion and pollution control.

2.4: International Treaties and Conventions on Environment to which Nigeria is a Party

Some of the International Treaties and Conventions on Environment to which Nigeria is a party considered relevant to the ESMP are summarized in Table 2.2 below

S/N	Treaties and Conventions	Year	Agreement
1.	The United Nations Environmental Guidance Principles	1972	Provide guidelines for protecting the integrity of the global environment and the development system
2.	Montreal Protocol on Substances that deplete the Ozone Layer	1987	An international treaty to eliminate Ozone depleting chemical production and consumption.
3.	United Nations Convention on Biological Diversity	1992	Places general obligations on countries to observe sustainable use and equitably share the plants and animals of the earth
4.	United Nations Framework Convention on Climate Change	1994	It calls on developed countries and economies to limit her emissions of the greenhouse gases which cause global warming
5.	Convention on International Trade in Endangered Species of Wild Fauna and Flora	1973	Restricts the trade of fauna and flora species termed as endangered species
6.	Convention on Conservation of Migratory species of Wild animals (Bonn Convention)	1979	Stipulates actions for the conservation and management of migratory species including habitat conservation
7.	Vienna Convention for the Protection of the Ozone Layer	1985	Places general obligation on countries to make appropriate measures to protect human health and the environment against adverse effects resulting from human activities which tend to modify the ozone layer

2.5 World Bank Safeguards Policies triggered by NEWMAP and the proposed activity

The World Bank has 10+ 2 Environmental and Social Safeguard Policies to reduce or eliminate the adverse effects of development projects, and improve decision making which are summarized in Appendix 3.

Of these Safeguard Policies, the intervention work at the proposed site triggers Environmental Assessment (OP/BP 4.01), Natural Habitats (OP/BP 4.04), Indigenous People (OP/BP 4.10) and Involuntary Resettlement (OP/BP 4.12) as indicated in Table 2.3.

Table 2.2: Triggered World Bank Safeguard Policies

Safeguard Policies	Triggered by NEWMAP?		Triggered by Site-specific Project?		Applicability to Project due to	How Project Address Policy Requirements
	Yes	No	Yes	No		
Environmental Assessment (OP/BP 4.01)	[x]	[]	[x]	[]	Civil works with site-specific impacts	ESMF prepared for NEWMAP & site specific mitigation measures developed in this ESMP
Natural Habitats (OP/BP 4.04)	[x]	[]	[x]	[]	Civil works with site-specific impacts	ESMF prepared for NEWMAP & site specific mitigation measures developed in this ESMP
Pest Management (OP 4.09)	[x]	[]	[]	[x]	NA	NA
Physical Cultural Resources (OP/BP 4.11)	[x]	[]	[]	[x]	NA	NA
Involuntary Resettlement (OP/BP 4.12)	[x]	[]	[x]	[]	Restriction of access to sources of livelihoods.	RPF prepared for NEWMAP & a standalone RAP spells out site specific issues to be addressed & how.
Indigenous Peoples (OP/BP 4.10)	[x]	[]	[x]	[]	Restriction of access to sources of livelihoods.	RPF prepared for NEWMAP & a standalone RAP spells out site specific issues to be addressed & how.
Forests (OP/BP 4.36)	[x]	[]	[]	[x]	NA	NA
Safety of Dams (OP/BP 4.37)	[x]	[]	[]	[x]	NA	NA
Projects in Disputed Areas (OP/BP 7.60)	[]	[x]	[]	[x]	NA	NA
Projects on International Waterways (OP/BP 7.50)	[x]	[]	[]	[x]	NA	NA

Table 2.3: National and State Environmental Legislations, Regulations and Guidelines

S/N	Legal Framework	Year	Description	Aspect of World Bank Policies	Whether Applicable		Where Deficient	Remarks
					YES	NO		
1	National Policy on the Environment	1989 revised 1991	Describes the conceptual framework and strategies for achieving the overall goal of sustainable development in Nigeria	Assessment and Management of environmental and social risks	Yes	-	-	-
2	Environmental Impact Assessment (EIA) Act No. 86	1992	Provide guidelines for activities of developmental projects for which EIA is mandatory in Nigeria. The Act also stipulates the minimum content of an EIA as well as a schedule of projects, which require mandatory EIAs	Biodiversity conservation and sustainable management of living Natural Resources	Yes	-	No specific guideline is in place for Biodiversity conservation and sustainable management of living Natural Resources	Specific guideline required for Biodiversity conservation
3	National Erosion and Flood Control Policy	2005	Addresses the need to combat erosion and flooding in the country utilizing the procedures outlined in the National Action Plan for Flood and Erosion Control and Technical guidelines, developed by the WC Environmental Committee which was set up to plan an operational platform for these issues	Safety of hydraulic structures/check dams	Yes	-	Implementation of policy is very poor	Implementation of policy will ensure safety of hydraulic structures and check dams related issues
4	Land Use Act	1978 modified 1990	The Act vests all land comprised in the territory of each state in the Federation on the Governor of the state and requires that such land shall be held in trust and administered for the use and common benefit of all Nigerians in accordance with the provisions of the Act.	Land Acquisition, Restrictions on land use and involuntary resettlement	Yes	-	Only people with legal title of Land are duly compensated	People affected by land acquisition should be properly informed and compensated
5	Forestry Act	1994	Provides for the preservation of forests and the setting up of forests reserves	Forest	Yes	-	-	-
6	Endangered Species Act	1985	Provides for the conservation and management of Nigeria's wildlife and the protection of some of her endangered species in danger of extinction as a result of over-exploration	Natural Habitats	Yes	-	No adequate measure provided to avoid endangering wildlife, coastal organisms and forest in their Natural Habitats by Projects.	Project area should be restored as much as possible to the Natural state or condition prior to project commencement
7	FEPA/FMEnv EIA Procedural Guidelines	1995	The Procedural Guidelines indicates the steps to be followed in the EIA process from project conception to commissioning in order to ensure that the project is implemented with maximum consideration for the	Resource efficiency and pollution prevention and management	Yes	-	-	-

			environment					
8	National Guideline and Standard for Environmental Pollution Control	1991	Provide guidelines for management of pollution control measures	Resource efficiency and pollution prevention and management	Yes	-	The guidelines are weak and do not abate pollution in project areas. E.g. Greenhouse emissions	Guideline should be reviewed and operational mechanisms devised for enforcement by regulatory authorities
9	S.I.15 National Environmental Protection (Management of Solid and Hazardous Waste)	1991	Regulates the framework for the effective control of the disposal of toxic and hazardous waste into any environment within the confines of Nigeria	Resource efficiency and pollution prevention and management	Yes	-	-	-
10	Urban and Regional Planning Decree No. 88	1993	Planned development of urban areas (to include and manage waste sites)	Indigenous people	Yes	-	The rights and cultures of indigenous people are not well represented in Act	The human rights and cultures of indigenous people should be respected and protected
11	Workmen Compensation Act	1987 review 2010	Occupational Health and Safety	Community Health and Safety	Yes	-	Implementation failures do arise	To ensure that workers in the projects areas are treated fairly and provided with safe and healthy working conditions
12	Public Health Laws	-	Covering Public Health matters	Labour and working conditions	Yes	-	No well-defined Law on public health issues	Defined law that protect vulnerable workers such as women, person with disabilities and project affected persons (PAPs)
13	Enugu State Ministry of Environmental and Mineral Resources	2004	Focuses on the protection of the rural and urban environment	Physical cultural resources	Yes	-	Rural environment usually neglected	Projection of rural environment should be included in the state environmental protection regulations
14	Environmental Sanitation Edicts, laws and Enforcement Agencies	-	General Environmental health and sanitation enforcing necessary laws	Projects on international waterways	Yes	-	Enforcement of the Act for International waterways is poor	More is expected in the enforcement of Laws
15	Enugu State Waste Management Authority	2004	Ensures proper disposal and clearing of waste	Stakeholder engagement and information disclosure	Yes	-	Stakeholder involvement is usually low in developmental Projects	Stakeholders should be totally carried along in the Project that affects them

CHAPTER THREE

3.0 DESCRIPTION OF BASELINE CONDITIONS (BIOPHYSICAL ENVIRONMENT)**3.1 Introduction**

The baseline data provides a benchmark for future assessment of temporal and spatial changes of the environment due to the proposed project. This chapter describes the existing (biophysical) environmental conditions at the proposed Agbaja Ngwo gully erosion intervention project site.

3.2 Study Approach used in the Collection of Primary Data

Considering the multi-variant nature of baseline studies, an integrated approach was adopted to study the geophysical and socio-economic characteristics of the project area. This involved field reconnaissance surveys, collection of primary data through questionnaires, direct interview, measurements, discussion, photographs, review of existing literature(public library), Geographical Information System (GIS), publications in Newspapers and refereed journals.

3.2.1 Field Reconnaissance Surveys

A reconnaissance survey of the project area was undertaken by the lead consultant with his team of consultants on 10thMay, 2016.The survey was carried out in order to acquaint the team with the project location as well as the nature of environmental and social characteristics in the area. The GPS coordinates of locations where the soil and water samples were collected and in-situ air quality parameters and assessments were carried out are indicated in tables 3.1a & b.

Table 3.1a: GPS Coordinates of Sample Points (Wind Speed, Air Quality, Noise, Soil)

Sample Point	Parameter	GPS Coordinate	Elevation (Ft)
1. Agbaja Ngwo Gully Head	Wind Speed	6°26'18.3"N 7°26'16.6"E	1178
	Air quality	6°26'18.3"N 7°26'16.6"E	1178
	Noise	6°26'18.3"N 7°26'16.6"E	1178
	Soil	6°26'18.3"N 7°26'16.6"E	1178
2. 150m from Gully Head	Wind Speed	6°26'20.8"N 7°26'19.4"E	1130
	Air quality	6°26'20.8"N 7°26'19.4"E	1130
	Noise	6°26'20.8"N 7°26'19.4"E	1130
	Soil	6°26'20.8"N 7°26'19.4"E	1130
3. 320m from Gully Head	Wind Speed	6°26'21.8"N 7°26'23.1"E	1074
	Air quality	6°26'21.8"N 7°26'23.1"E	1074
	Noise	6°26'21.8"N 7°26'23.1"E	1074
	Soil	6°26'21.8"N 7°26'23.1"E	1074
4. 600m from Gully Head	Wind Speed	6°26'26.5"N 7°26'21.4"E	1014
	Air quality	6°26'26.5"N 7°26'21.4"E	1014
	Noise	6°26'26.5"N 7°26'21.4"E	1014
	Soil	6°26'26.5"N 7°26'21.4"E	1014

Table 3.1b: GPS Coordinates of Sample Points (Water)

Sample Point	Parameter	GPS Coordinate	Elevation (Ft)
1.Nnadiri Spring Up	Water	6°26'26.82"N 7°26'70"E	1066
2. Nnadiri Spring down	Water	6°26'27.42"N 7°26'27.90"E	1037
3. Water reservoir tank	Water	6°26'15.42"N 7°26'15.60"E	1177
4. Borehole okwojo	Water	6°25'50.30"N 7°26'12.10"E	1211

3.2.2 Quality Assurance

The quality assurance standards employed in the collection of environmental samples cover all aspects of the study including sample collection, handling, laboratory analysis, data coding, statistical analysis and data presentation. The methods used for the laboratory analysis of relevant physico-chemical parameters are shown in table 3.2.

3.2.2.1 Soil Sample Study

Soil samples were collected at different locations around the gully erosion intervention site using a hand metal Auger. Top soil and sub soil were collected within the range of 0-15cm and 15-30cm respectively. Soil samples collected were deposited in black labeled polythene bags as contained in Environmental Guidelines and Standards. The co-ordinates of locations where soil samples were taken are shown in Figure 3.1.

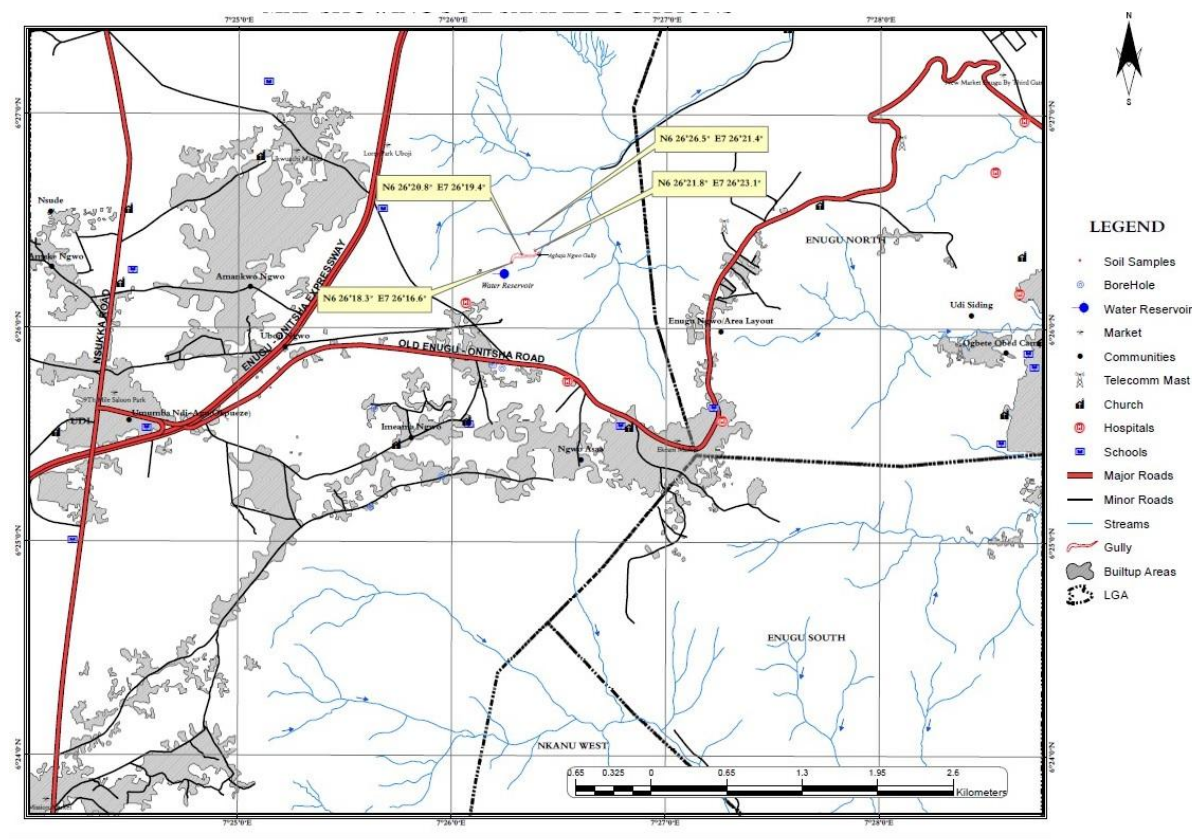


Figure 3.1: Map Showing GPS Locations for soil samples collections

3.2.2.2 Air Quality

Air quality studies were measured at four (4) different locations around the gully site using the Aeroqual digital gas monitor (Model 500) to determine the ambient air quality. Dust particulates were also measured in four locations using Met One 321 particle monitor. Noise levels were measured in-situ at different locations using Extech 407732. All air quality assessment studies were geo-referenced at location shown in figure 3.2a,b&c

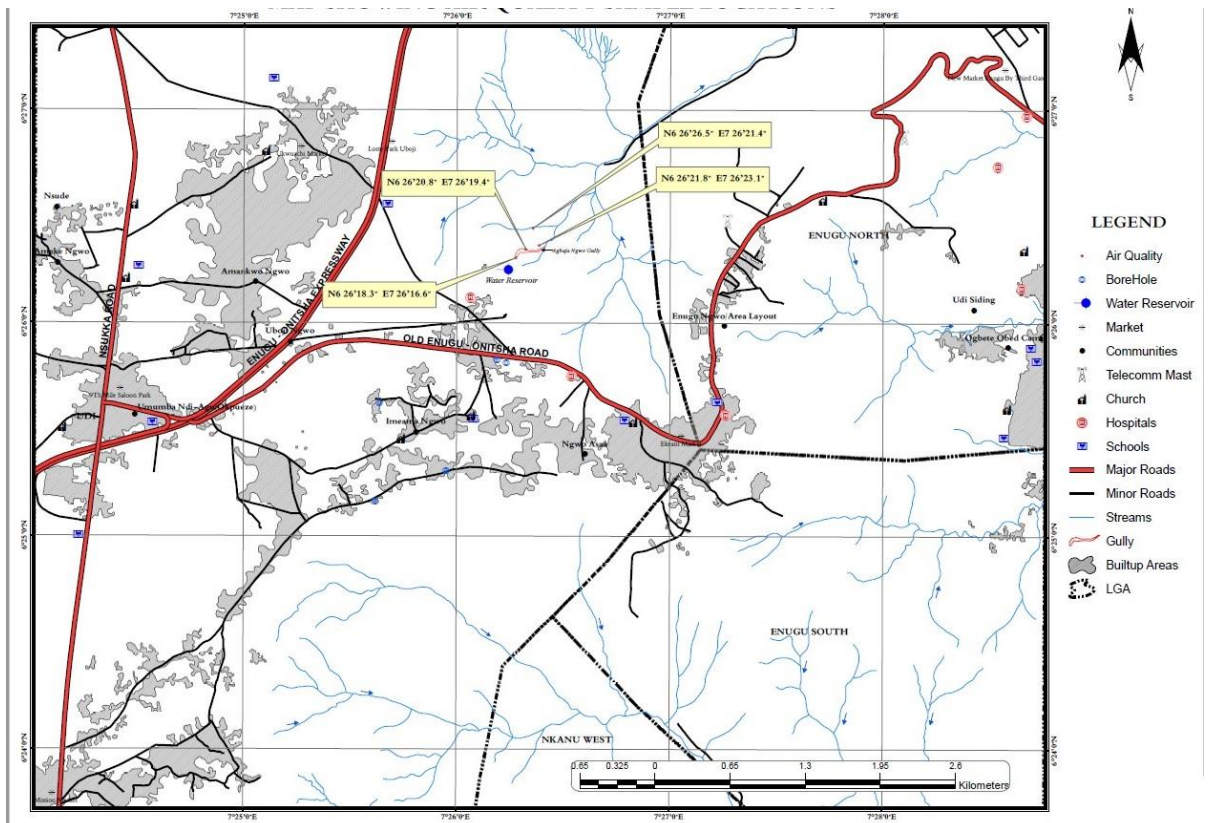


Figure 3.2a: Map showing GPS locations for Air Quality Assessment

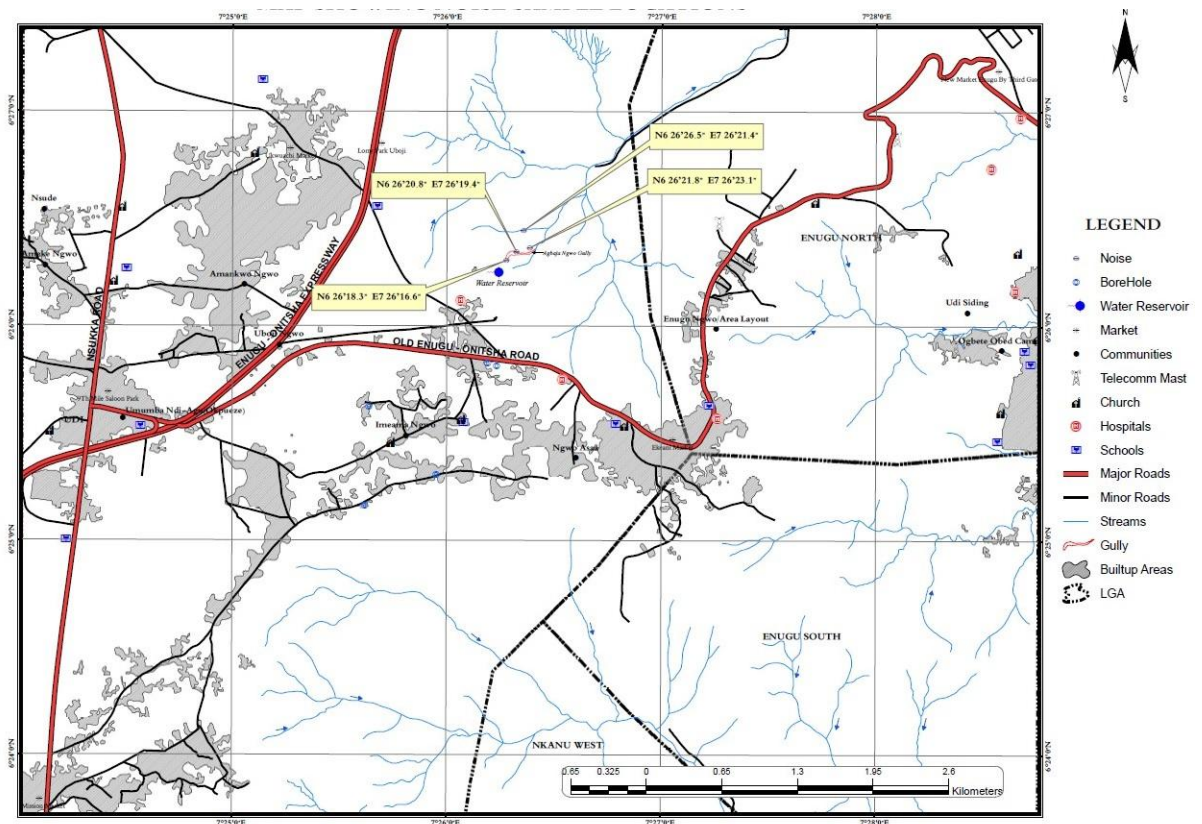


Figure 3.2b: Map showing GPS locations for Noise Assessment

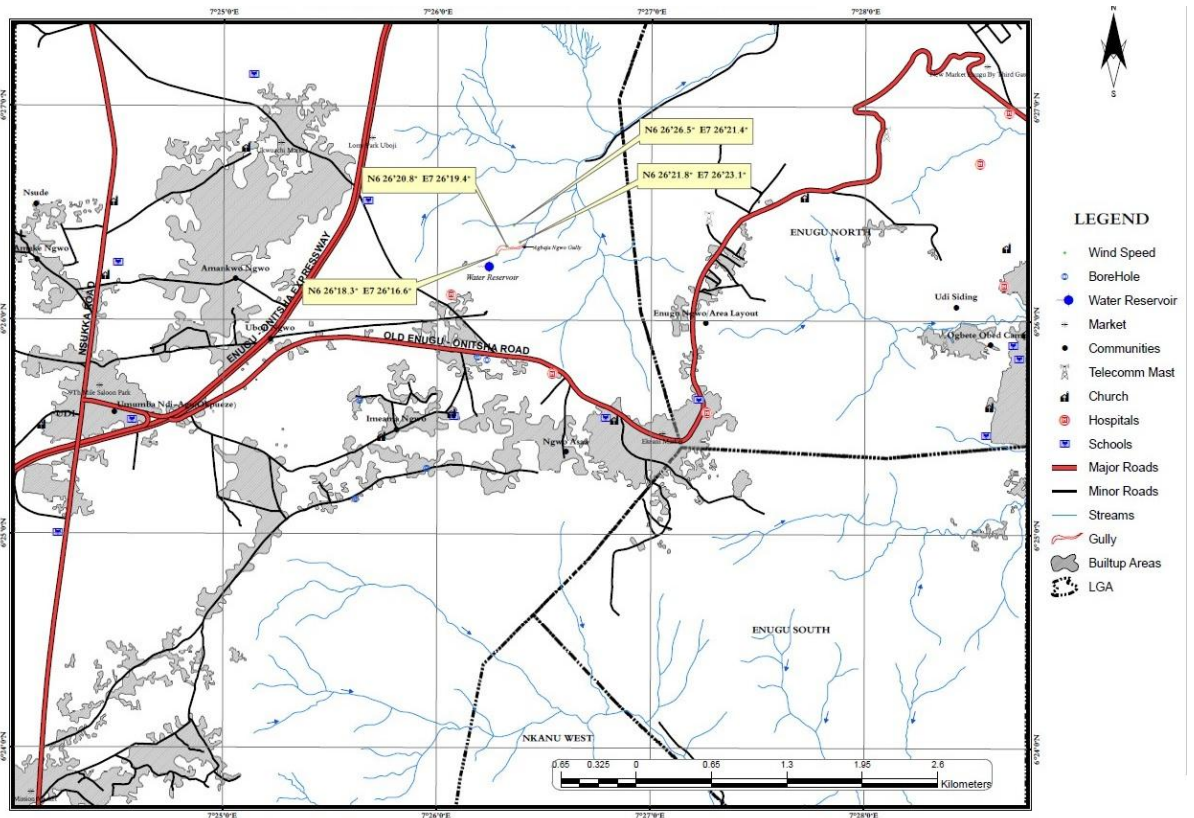


Figure 3.2c: Map showing GPS locations for the Assessment of Wind Speed

3.2.2.3 Water Quality Studies

Similarly, water samples were collected at four (4) different locations. Water samples were collected from the water reservoir, spring water (Nnadiri) and borehole about 600m away from the gully. The later (fourth location) served as a control point (Figure 3.3). Water samples were collected in containers, properly labeled and stored in a cooler as applicable using quality assurance criteria in line with best international practices in laboratory protocols.

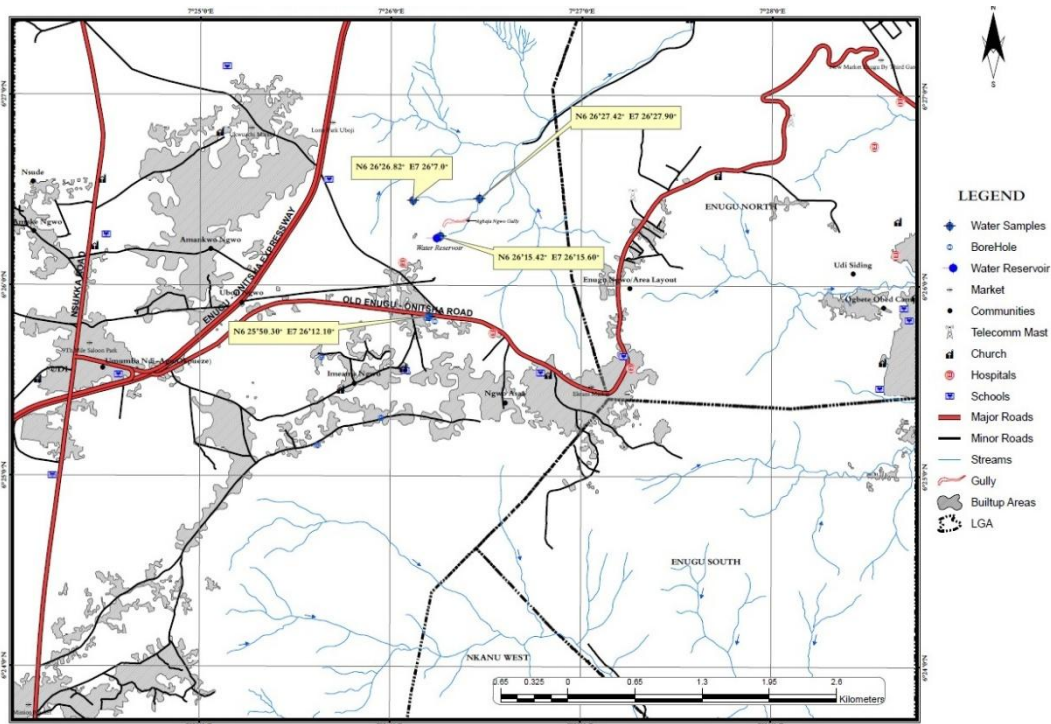


Figure 3.3: Map showing GPS Locations used for the collection of Water Samples

3.2.2.4 Plant and Animals

Flora and Fauna were investigated in the project area using different approaches such as quadrants, observations, foot print and oral interviews. Plant species were enumerated and characterized into genera, species, family and common names while animals were categorized into Arthropods, Gastropods, Snakes, Fishes and Birds. Local animals that still exist or became extinct were also indicated.

3.2.2.5 Socio-economic Studies

A well structured questionnaire was designed and administered to households within the project area to ascertain the socio-economic status of the people. Questions were asked on their sources of livelihood, income, physical infrastructure and social facilities, including the potential and associated impacts likely to result from the implementation of proposed intervention civil works.

3.3 Results of Desktop Studies

Meteorological and climatic data including other geological and hydrological data information were sourced from secondary sources as indicated below.

3.3.1 Topography

Enugu lies at the foot of an escarpment and not a hill. Enugu is located in the Cross River basin and the Benue trough and has the best developed coal in South East Nigeria. The region is overlaid with sediments bearing coal from the Cretaceous and Tertiary age. Coal seams in the Enugu coal district measure between 1 and 2 metres (3.3 and 6.6 ft) in thickness and the reserves have been estimated to be more than 300 million tonnes. Highlands surrounding Enugu for the most part are underlain by sandstone, while lowlands are underlain by shale. Much of the escarpment stretching from Enugu to Orlu has been ravaged by soil and gully erosion.

3.3.2 Geology and Hydrogeology

Geologically, Enugu State contains about nine geological formations from east to west in terms of age and sequence of exposure. The Asu River Group of the Albian (Lower Cretaceous) Age is made up of shale, sandstone and siltstones. EzeAku shale formation of the Turonian Age which contains shales, siltstones and limestone. Awgu Ndeaboh shale's formation of the Coniacian Santonian Age.

Agbaja Ngwo lies within Anambra basin which is situated in the south western extremity of the benue trough of Nigeria (Figure 3.2). It is roughly triangular in shape and covers an area of about 40000sqkm. It is characterized by three distinct formations such as Enugu shale, Ajaliand Mamu formations. The Enugu Shale

is carbonaceous, fissile, grey and jointed with beds of siltstone and clay. The Ajali formation whose age is upper Maastrichtian is false bedded and highly friable sandstone while the Mamu formation (lower Maastrichtian) which is also known as the lower coal measure is mainly made up of shale with intercalations of sand and siltstone. Mamu formation is moderately well sorted to moderately sorted, coarse skewed to strongly fine skewed and very leptokurtic to extremely leptokurtics. It is worthy to note that the Mamu formation is the main coal bearing unit of the area. Ekulu River is seen at main points around Enugu, which rises from the Nsukka Udi Escarpment and flows eastwards joining Nyaba before flowing to Ebonyi River. These rivers have courses and are not completely unnavigable. The rivers, seasonal streams, lakes and the underground water constitute the sources of water supply in Enugu. It must be noted that most of the rivers especially Ekulu, Idodo, Nyaba and Ajalli carry a lot of sediments, solid wastes and industrial effluents.

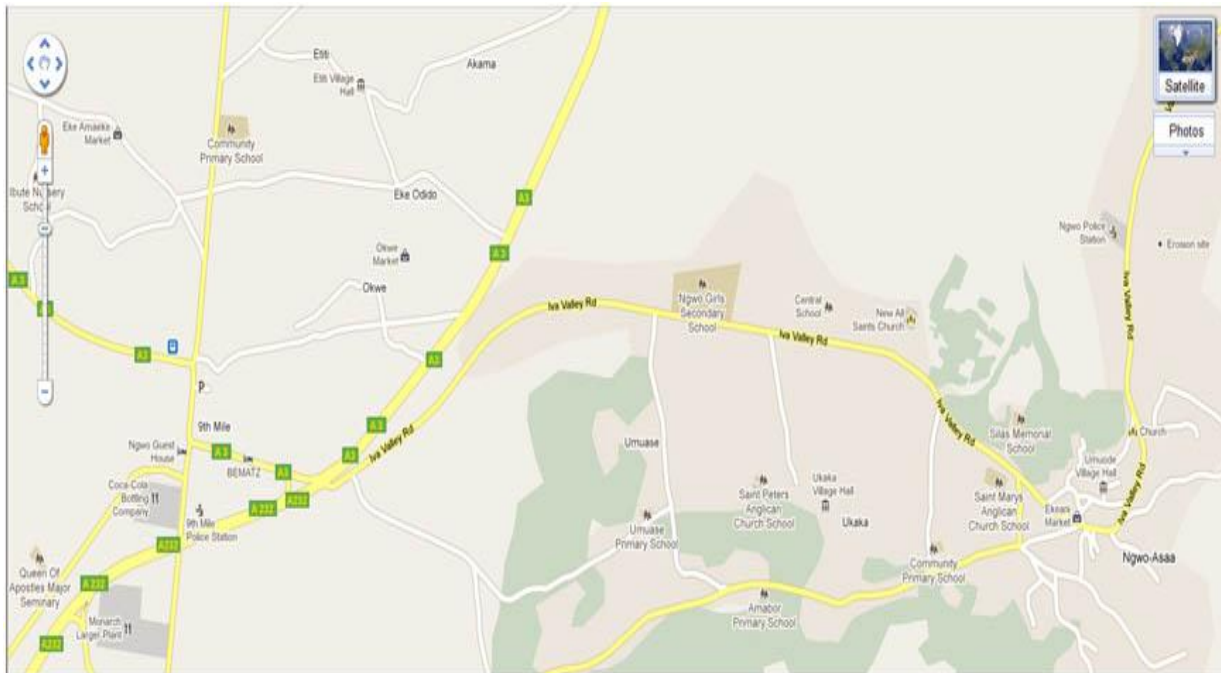


Figure: 3.4 Geography of Ngwo
Source: Ngwo Progressive Union, Abuja Branch

3.4 Climate/Meteorology

3.4.1 Climate

Enugu is located in a tropical rain forest zone with a derived savannah. The city has a tropical savanna climate. Enugu's climate is humid with humidity at its highest between March and November. For the whole of Enugu State, the mean daily temperature is 26.7 °C (80.1 °F). As in the rest of West Africa, the rainy season and dry season are the only weather periods that recur in Enugu. The average annual rainfall in Enugu is around 2,000 millimetres (79 in), which arrives intermittently and becomes very heavy during the rainy season. Other weather conditions affecting the city include Harmattan, (a dusty trade wind lasting a few weeks of December and January). Like the rest of Nigeria, Enugu is hot all year round.

Table 3.2: Climate Data for Enugu

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high	36.9	37.6	38.5	36.4	34.2	33.2	32.9	32.3	32.5	34.1	34.8	36.5	38.5
°C (°F)	(98.4)	(99.7)	(101.3)	(97.5)	(93.6)	(91.8)	(91.2)	(90.1)	(90.5)	(93.4)	(94.6)	(97.7)	(101.3)
Average high	34	35	35	34	32	31	30	30	30	31	33	33	32
°C (°F)	(93)	(95)	(95)	(93)	(90)	(88)	(86)	(86)	(86)	(88)	(91)	(91)	(90)
Daily mean	27	29	29.5	29	27.5	27	26	26	26	26.5	27.5	26.5	27
°C (°F)	(81)	(84)	(85.1)	(84)	(81.5)	(81)	(79)	(79)	(79)	(79.7)	(81.5)	(79.7)	(81)
Average low	20	23	24	24	23	23	22	22	22	22	22	20	22
°C (°F)	(68)	(73)	(75)	(75)	(73)	(73)	(72)	(72)	(72)	(72)	(72)	(68)	(72)
Record low	10.3	15.9	19.8	20.9	20.6	20.1	20.2	20.5	20.0	17.4	13.5	9.8	9.8
°C (°F)	(50.5)	(60.6)	(67.6)	(69.6)	(69.1)	(68.2)	(68.4)	(68.9)	(68)	(63.3)	(56.3)	(49.6)	(49.6)
Average precipitation	19	15	70	130	217	252	242	237	292	201	12	8	1,695
mm (inches)	(0.75)	(0.59)	(2.76)	(5.12)	(8.54)	(9.92)	(9.53)	(9.33)	(11.5)	(7.91)	(0.47)	(0.31)	(66.73)
Average precipitation days	1	1	4	7	12	14	16	15	18	12	1	1	102
Mean monthly sunshine hours	186	174	183	183	186	153	118	118	123	174	219	217	2,034

Source: [The Weather Network](#)

3.5 Results of Biophysical Assessment

3.5.1 Relative Humidity

Relative humidity measures the ratio of the air actually present and the amount that can saturate the air and this value is expressed in percentage. Relative humidity of 100 percent means that the air is fully saturated and it can give rise to rain.

The relative humidity of the project area recorded a lowest value of 66.8% and highest value of 69.3% as shown in table 3.3. The high value indicates that the data were collected during the period of rainy season.

Table 3.3: Relative Humidity, Wind Speed, Light and Air Temperature at Agbaja Ngwo Gully Site (Equipment Used: Extech 4-In-1 Environmental Meter; Model 45170)

S/N	Stations	Relative Humidity (%)	Wind Speed (M/S)	Light (Lux)	Temp. (Oc)
1.	Gully Head.	69.3	2.5	444 x 10	32.3
2.	150m downward from gully head.	67.7	2.4	434 x 10	32.7
3.	320m downward from the gully head.	66.8	2.3	428 x 10	33.4
4.	600m downward from the gully head.	67.4	2.3	426 x 10	33.1

Source: Field Survey, May 2016

3.5.2 Wind Speed

The raining season (April to October) typified by the southwest trade winds and the dry season (November to March) is characterized by the northeast trade winds which bring harmattan. Wind speed measurement in the project area recorded a lowest value of 2.3m/s and highest value of 2.5m/s (Table 3.3).

3.5.3 Air Quality Assessment

Ambient Air Quality

The ambient air quality parameters considered during the study include Nitrogen (IV) oxide (NO₂), Sulphur (IV) oxide (SO₂), Carbon monoxide (CO), carbon dioxide (CO₂), Volatile Organic Carbon (VOC), Methane (CH₄), Hydrogen Sulphide (H₂S), and Ammonia (NH₄). The results of air quality analysis revealed that the parameters were within FMENV emission limit.

Table 3.4: Nigerian Ambient Air Quality Standards

Pollutants	Average Time	Limit
Particulates	Daily Average Value/hour	250µg/m ³ -600µg/m ³
Sulphur oxide (Sulphur dioxide)	Daily average of hourly value/hour	0.01ppm (26µg/m ³)- 0.1ppm (26gµ/m ³)
Non-methane	Daily average of 3 hourly values	160gµ/m ³
Carbon monoxide	Daily average of hourly values (8 hourly)	10ppm (11.4µg/m ³)- 20ppm (22.8µg/m ³)
Nitrogen oxides (Nitrogen dioxide)		0.04ppm – 0.06ppm- 75.0µg/m ³ -11.3µg/m ³
Photochemical oxidants	Hourly values	0.06ppm

Source: FMENV.

Tables 3.4 shows the Nigerian Ambient Air Quality Standard and Tolerance Limit for Ambient Air Quality for some selected Air pollutants (short term). While table 3.5 shows the results of air quality at the project location

Table 3.5: Ambient Level of Gaseous Compounds in the Project Areas

Stations	GASES (mg/m ³)							
	VOC	CO	NH ₃	NO ₂	CH ₄	SO ₂	H ₂ S	CO ₂
Gully Head	0.00	0.0	0.1	0.000	3.0	0.00	0.00	0.00
150m downward from the gully head	0.00	0.0	0.1	0.000	0.00	0.00	0.44	0.00
320m downward from the gully head	0.00	0.0	0.1	0.000	1.00	0.00	0.08	0.00
600m downward from the gully head	0.00	0.0	0.1	0.000	1.00	0.00	0.09	0.00
FMENV LIMIT	-	10.00	0.6	0.04 – 0.06	-	0.26	8.00	-

Source: Field Survey, May 2016

Tables 3.5 and 3.6 clearly shows that the air quality in the proposed project area is high with no significant identifiable source(s) of pollution.

Table 3.6: Ambient Levels of Suspended Particulate Matter (SPM) in the Project Area

Stations	Suspended Particulate Matter (SPM)					
	PM0.3	PM0.5	PM1.0	PM2.0	PM5.0	SPM
Gully Head	0.808	0.666	0.188	0.063	0.002	1.727
150m downward from the gully head	2.191	0.131	0.363	0.011	0.005	2.701
320m downward from the gully head	1.151	0.847	0.268	0.093	0.004	2.563
600m downward from the gully head	0.935	0.755	0.279	0.046	0.003	2.018

Source: Field Survey, May,2016

The results of Suspended Particulate Matter (SPM) around the project site ranges from 1.727 to 2.701 mg/m³.

Noise Level

Noise level within and around the proposed project site was assessed using Digital Exttech 407732 sound meter calibrated in decibel dBA. The results revealed that noise level varies between 46.4 to 66.3 dBA with a mean value of 58.4dBA. Noise level as revealed is below the permissible limits of 90dBA set by the Federal Ministry of Environment (Table 3.7)

Table 3.7: Noise Level Assessment in the Project Area

Stations	Noise Level	FMEEnv Limit (Dba)
Gully head	46.4	90
150m downward from the gully head	58.3	90
320m downward from the gully head	66.3	90
600m downward from the gully head	62.7	90

Source: Field Survey, May,2016

3.5.4 Biodiversity

Flora

The flora pattern in the project area is closely related to the soil structure, which has been largely influenced over time by geological formation/changes erosion and prevailing climatic conditions. Flora within the study area are luxuriant and consist of shrubs, grass and tree components.

The woody species include: *Danielliaoliveri*, *Vitexdoniana*, *Nuclealatifolia*, *Annonasenegalensis*, *Uvariachamae*, *Alstoniaboonei*, *Cussoniabarberi*, *Ceibapentandra*, *Canariumschweinfurthii*, *Berliniagrandiflora*, *Cassia spp*, *Dialiumguineense*, *Alchorneacordifolia*, *Hymenocardiaacida*, *Napoleanaimperialis*, *Anthocleistavogelli*, *Parkiacclappertoniana*, *Pentaclethramacrophylla*, *Baphianitida*, *Newbouldialaavis*, *Rauwolfiavomitoria*, *Terminaliaivorensis*, *Acioabarberi*, *Erythrophylumspp*, *Pterocarpusstantalinoide* and *Lonchocarpuscyanescens*.

Herbaceous or semi-woody species include: *Aspiliasspp*, *Panicum maximum*, *Andropogonspp*, *Anthephoraspp*, *Commelinaspp*, *Axonopuscompressus*, *Aframomumlatifolium*, *Mimosa spp*, *Chromolenaodorata*, *Ipomea involucrate*, *Centrosomaspp*, *Calopogoniummucunoides*, *Sidaacuta*, *Bambusa vulgaris*.

Pteridophytes include: *Gleichenialinear*, *Lycopodiumcernum*, *Selaginellamyosurus*.

Economic trees include: *Elaeisqueensis* (Palm), *Mangiferaindica*(Mango), *Dacroyoidesedulis*(Pear), *Carica papaya* (paw paw), *Anacardiumoccidentale* (Cashew), *Gmelinaaborea* (Gmelina).

Arable crops include: *Manihotesculenta* (Cassava), *Amaranthusspinosa* (Green vegetable), *Telfairaoccidentalis* (Fluted pumpkin), *Citruslanatus* (Melon), *Solanummicrocarpum* (Egg plant), *Pepper nigrum* (Pepper), *Zea mays* (Maize), *Reccinuscommunis* (Castor oil), *Colocassiaspp* (Cocoa yam), *Vernoniaarmendalina* (Bitter leaf), *Musaspp* (Plantain & Banana), *Lycopersiconesculentum* (Tomatoes).

Fauna

Faunacomposition found in the project area include: *Hyperiodrilus*(Earth worm), *Pachybolus* (Millipede), *Acraeasp* (Butterflies), *Precissp* (Moths), *Papiliosp* (Caterpillars), *Zonocerussp* (Grasshopper), *Apis* (Bee), *Oecophylla* (Ants), *Bradinopyga* (Dragon flies), *Sphedromantis* (Praying mantis), *Vespa* (Wasp), *Numida* (Guinea fowl), *Francolinuslanthami* (Bush fowl), *Streptopeliasp* (Dove), *Cricetomysgambianus* (Giant rat), *Heliosciurussp* (Tree squirrel), *Xeruserythropus*(Ground squirrel), *Thryonomyswinderianus* (Grass cutter), *Najamelanoleuca* (Black cobra), *Polyboroidesradiatus* (Harrier hawk), *Lophocerossp* (Hornbill), *Neophronmonachus* (Hooded vulture), *Pyconotusbarbatus* (Bulbul), *Lepuscapensiszechi* (Hare), *Hypsignathussp* (Fruit bat), *Bufo sp.* (Toad), *Notonecta sp.* (Water boatman), *Gerrislacustris* (Pond- skater).

3.5.5 Soil

Soil in the project area is made up of loosely clay silty fine sand, ferrallitic(also called Red Earth or Acidic) sands and hydromorphic soils. Soil in the area is acidic and ranges from 4.2 to 5.5 with mean value of 4.75 (Table 3.8).

Table 3.8: Laboratory Results of collected Soil Samples

S/N	PARAMETERS	UNITS	1TS	1SS	2TS	2SS	3TS	3SS	4TS	4SS
1	Temperature	0C	27.2	27.2	27.2	27.2	27.2	27.2	27.1	27.1
2	pH		4.3	5.1	4.8	4.7	4.9	5.5	4.1	4.5
3	Loss on Ignition	%	13.04	13.28	11.63	10.38	12.49	10.79	10.94	11.63
4	Moisture	%	38.13	41.16	40.02	43.07	40.36	43.32	32.59	39.48
5	Acidity	Mg/l	160	185	150	175	150	160	200	180
6	Alkalinity	Mg/l	170	200	120	140	180	180	140	200
7	Calcium	Mg/l	18.66	26.2	27.14	39.13	23.41	33.74	25.02	28.17
8	Magnesium	Mg/l	9.59	15.05	13.09	21.52	11.32	14.81	16.14	18.03
9	Lead	Mg/l	0.04	0.05	0.04	0.1	0.05	0.08	0.03	0.03
10	Copper	Mg/l	0.03	0.12	0.03	0.07	0.02	0.04	0.04	0.09
11	Sodium	Mg/l	31.01	25.59	37.26	39.06	34.9	44.12	40.06	33.25
12	Potassium	Mg/l	39.25	48.04	46.13	55.27	31.39	52.9	48.37	49.74
13	Iron	Mg/l	0.4	0.59	0.65	0.42	0.72	0.29	0.9	0.63
14	Nitrate	Mg/l	5.73	3.8	7.34	7.75	6.94	8.51	8.13	5.09
15	Sulphate	Mg/l	3.84	4.13	4.77	8.36	5.18	6.95	5.96	6.53
16	Chloride	Mg/l	22.15	31.73	42.03	44.03	48.01	37.64	52.12	41.26
17	Aluminium	Mg/l	1.89	3.85	4.17	6.14	3.04	6.03	6.01	4.69
18	Phosphate	Mg/l	1.07	0.52	1.92	1.95	0.46	2.13	0.95	1.27
19	Manganese	Mg/l	0.12	0.07	0.09	0.18	0.15	0.06	0.05	0.04

Source: Field Survey, May 2016

1TS–Gully Head (Top Soil)

1SS-Gully Head (Sub Soil)

2TS 150m from Gully Head (Top Soil)

2SS 150m from Gully Head(Sub Soil)

3TS-320m from Gully Head (Top Soil)

3SS-320m from Gully Head (Sub Soil)

4TS 600m from Gully Head (Top Soil)

4SS 600m from Gully Head (Sub Soil)

3.5.4 Water Quality

Water samples were collected from four locations for laboratory analysis of their physic-chemical parameters.

The result of Laboratory analysis is shown in table 3.9.

Table 3.9: Summary Results of Water Analysis in the Project Area

S/N	Parameters	Units	Nnadiri spring up	Nnadiri spring down	Water reservoir	Bore Hole Okwojo	FMEnv Limit	
1.	pH		5.73	6.2	6.5	5.3	6 – 9	
2.	Temperature	0C	27.2	27.2	27.2	27.3		
3.	Taste	Unobjectionable						
4.	Odour							
5.	Electrical conductivity	µS/cm	0.9x102	0.4x102	3.8x 102	4.2x102		
6.	Acidity	Mg/l CaCO3	200	150	140	180		
7.	Alkalinity	Mg/l CaCO3	150	100	100	70	200	
8.	Total Hardness	Mg/l CaCO3	12.69	23.52	18.56	14.16	100	
9.	Total Solids	Mg/l	56.83	88.15	64.08	59.14	500	
10.	Total Dissolved Solids	Mg/l	35.05	35.68	38.14	34.24		
11.	Total Suspended Solids	Mg/l	21.78	52.47	25.94	24.9	30	
12.	Calcium	Mg/l	3.84	6.18	5.16	4.26	70	
13.	Magnesium	Mg/l	1.02	2.64	1.8	1.05	30	
14.	Iron	Mg/l	0.18	0.12	0.16	0.13	0.3	
15.	Lead	Mg/l	Nil	Nil	Nil	Nil	0.05	
16.	Copper	Mg/l	Nil	Nil	Nil	Nil	1.0	
17.	Arsenic	Mg/l	Nil	Nil	Nil	Nil	0.05	
18.	BOD		9.24	8.41	7.74	8.89	80	
19.	COD	Mg/l	7.92	6.83	6.82	7.06	30	
20.	Sodium	Mg/l	34.52	43.12	38.04	32.14	200	
21.	Potassium	Mg/l	40.89	55.02	49.18	41.09		
22.	Chloride	Mg/l	114.36	134.01	89.62	102.32	200	
23.	Dissolved Oxygen	Mg/l	0.42	0.58	0.49	0.56		
24.	Nitrate	Mg/l	0.16	0.25	0.15	0.18	45	
25.	Sulphate	Mg/l	148.09	182.14	108.46	134.6	200	
26.	Phenols	Mg/l	Nil	Nil	Nil	Nil	0.5	
27.	Manganese	Mg/l	Nil	Nil	Nil	Nil	0.05	
28.	Mercury	Mg/l	ND	ND	ND	Nil	0.01	
29.	Zinc	Mg/l	Nil	Nil	Nil	Nil		
30.	Cadmium	Mg/l	ND	ND	Nil	ND	0.01	
31.	E-Coli	MPN/100ml	Nil	Nil	Nil	Nil	0	
32.	Coliform	MPN/100ml	Nil	Nil	Nil	Nil	10	

Source: Field Survey, May 2016

The result of water samples collected shows that the tested parameters were all within FMEnv acceptable limits except pH which recorded 5.73 and 5.3 at Nnadiri Spring upstream and Bore hole respectively as against 6-9. Total Suspended Solids recorded value is 52.47mg/l at Nnadiri downstream as against FMEnv limit of 30mg/l. Mercury and Cadmium were not detected.

CHAPTER 4

4.0 SOCIO-ECONOMIC CHARACTERISTICS AND CONSULTATION WITHSTAKEHOLDERS

4.1 Introduction

This section examines the existing socio-economic conditions in the project area that is Agbaja–Ngwo gully erosion site as revealed by analyses of data and information generated primarily from questionnaire, oral interview and field observations, population and some demographic information were collected from National Population Commission, census reports and other relevant materials.

4.2 Gender Distribution of Respondents

In the survey data generated in Agbaja Ngwo, 54.0% of the respondents are males while 46.0% are females as shown in Figure 4.1.

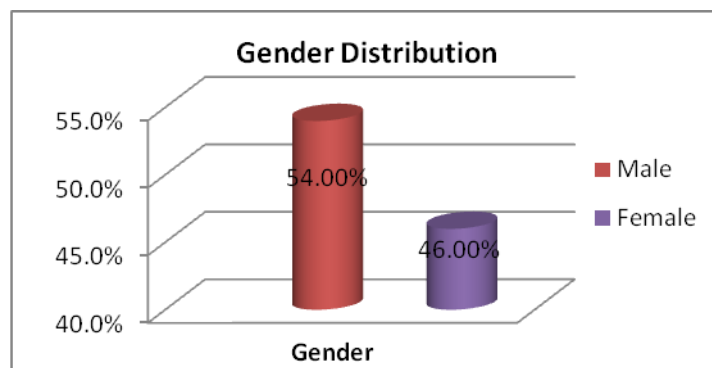


Figure 4.1: Gender Distribution of Respondents

4.2.1 Marital Status of Respondents

The data generated from the survey indicates that 20.70% of the respondents are single, 55.20% married, 1.1% are divorced, 1.7% separated while 21.3% are widowed (Figure 4.2).

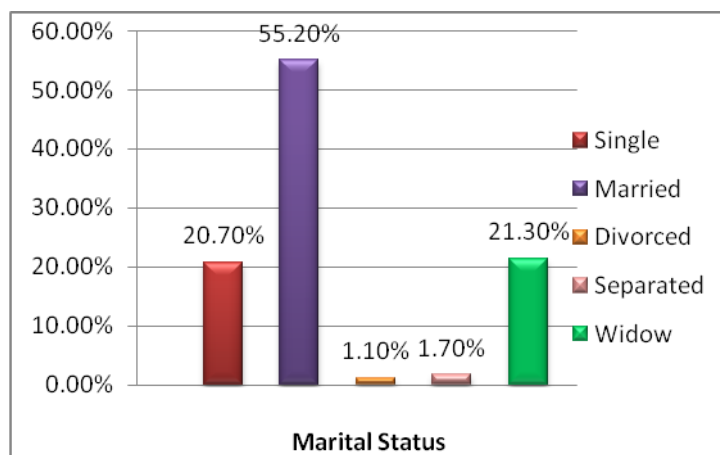


Figure 4.2: Marital Status of Respondents

4.2.2 Household Characteristics of respondents

Household distribution of the respondents ranged from 1 person to 15 persons per Household. 64.40% of the respondents have family size of 1-5 persons, 33.30% have household size of 6-10 persons, while 2.30% have household size of 11-15 persons (Figure 4.3).

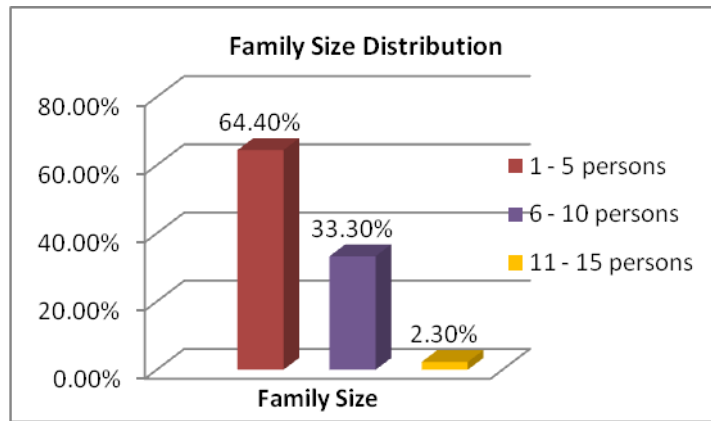


Figure 4.3: Family Size Distribution of Respondents

4.2.3 Religion

The religion of the respondents is predominantly Christianity. Thus 99% of the respondents are Christians as shown in Figure 4.4. Only few members of the community are Muslims, Atheists and pagan worshippers. Religious institutions encountered in the area include Churches, Shrines, and sacred grounds.

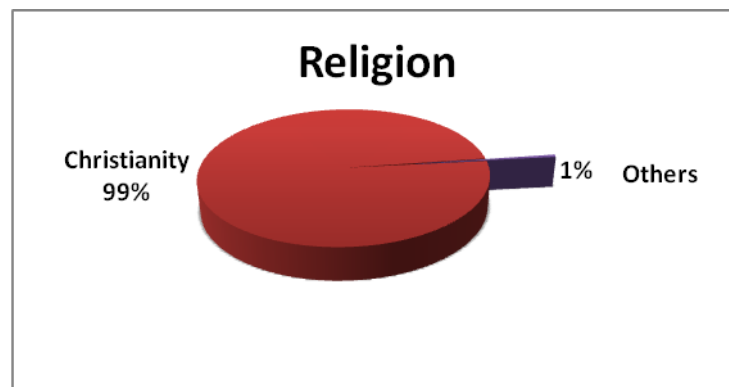


Figure 4.4: Religion Distribution of Respondents

4.2.4 Income Generation Capacity of Respondents

The monthly income status of the respondents indicates that majority of the respondents (53.80%) earn less than the national minimum wage of ₦18,000.00. In specific terms, 18.40% of the respondents at Agbaja Ngwo earn less than ₦10,000 per month, 27.80% earn between ₦ 11,000-20,000 monthly, 4.60% earn between ₦ 21,000-30,000 monthly, 6.30% earn between ₦ 31,000-40,000 monthly, 14.90% earn between ₦ 41,000-50,000 monthly, 20.70% earn above ₦ 50,000 monthly, while 7.50% of the respondents claimed they do not earn income (Figure 4.5). The high level of poverty of residents of the project communities underscores the need to effectively control erosion menace and increase land holdings available for farming activities.

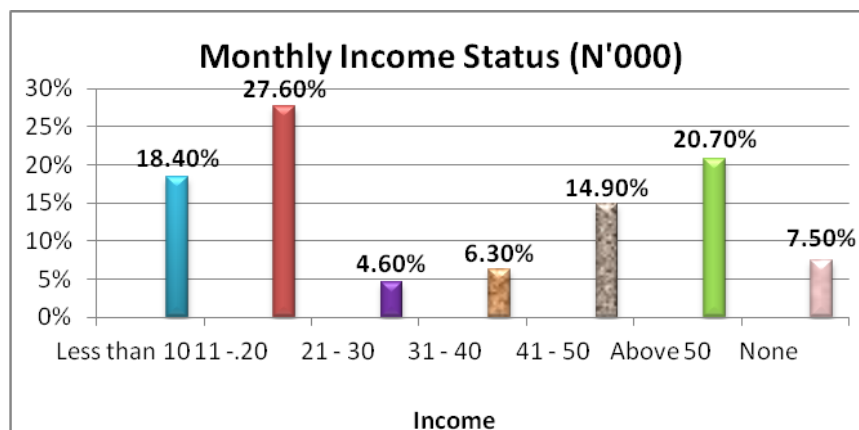


Figure 4.5: Monthly Income Status of Respondents

4.2.5 School

The type, number and quality of educational institutions in an area reveal the quality of human capital development. A number of schools such as nursery, primary and secondary, vocational and technical schools exist in the project area. Physical inspection of these schools indicate that majority of their buildings are still structurally stable although their roofs and fenestrations are in different stages of dilapidation. The survey showed that 31.60%, 87.40%, 81.60%, 18.40%, 4.60% and 6.90% of the respondents send their wards to existing nursery, primary, secondary, vocational/technical and tertiary at Agbaja Ngwo respectively (Figure 4.6).

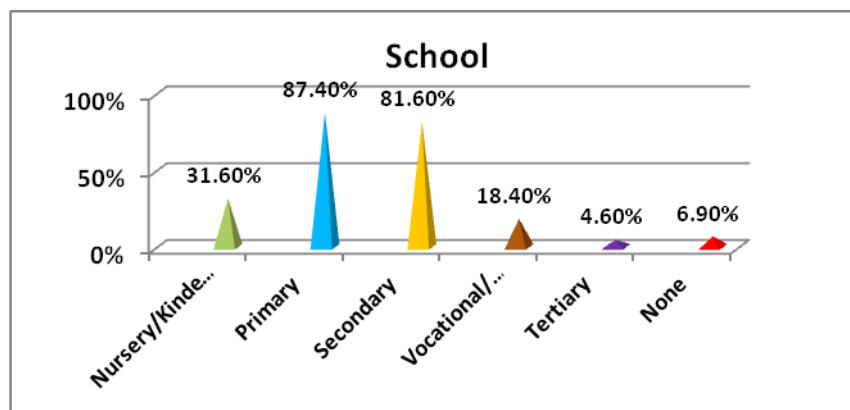


Figure 4.6: Educational Institutions attended by Children of Respondents

4.2.6 Education, Occupation and livelihoods of Respondents.

Although majority of respondents (95.2%) interviewed are holders of SSCE, ND/HND, NCE, BSc/MSc certificates, many of the people engage in farming (43.7%) and business (trading) (29.30) as their main occupation. Other sources of income and means of livelihood of the people are animal husbandry 13.20%, horticulture 5.20%, artisans 8.00%, agro processing 7.50%, civil servants 8.60%, student 10.30%. While 1.70% are into transport business, professional discipline 11.50% and retired civil servants 21.30% (figure 4.7).

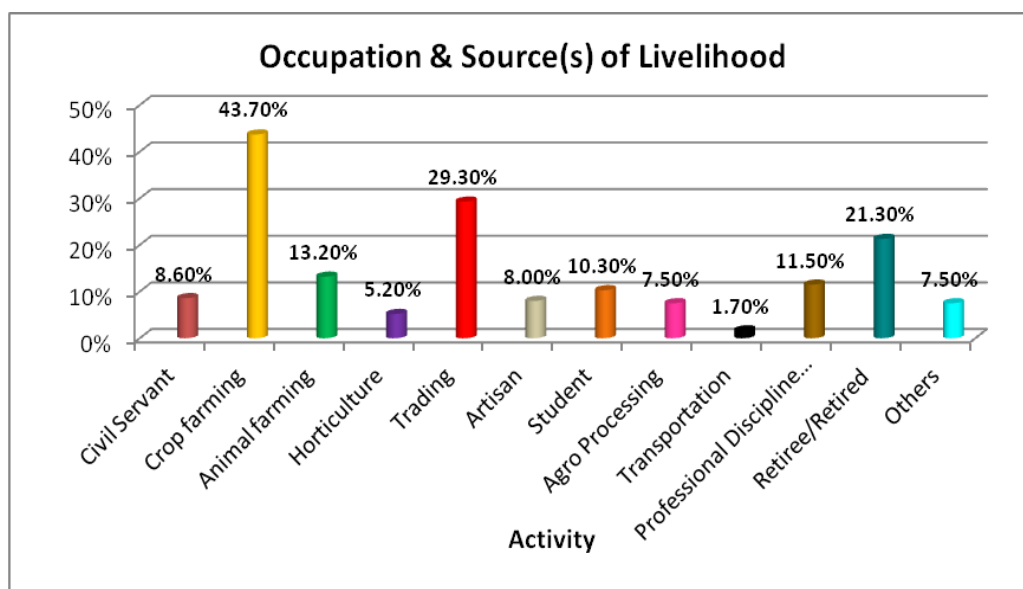


Figure 4.7: Occupation and source of livelihood of Respondents

4.3 Public Utilities Infrastructure and Social Facilities

4.3.1 Water

The results of analysis of collected data from the socio-economic study reveals that 8.60%, 33.30%, 52.30%, 18.40%, 34.50%, 40.80% and 17.80% of the respondents source water for domestic purposes from public taps, borehole, rain water, stream, spring water, water vendor and hand dug wells respectively as shown in Figure 4.8. The implication of the responses shows that the people of Agbaja Ngwo do not have access to portable

water supply and therefore may be prone to water diseases such as typhoid, cholera, dysentery and other water related infections (Figure 4.8).

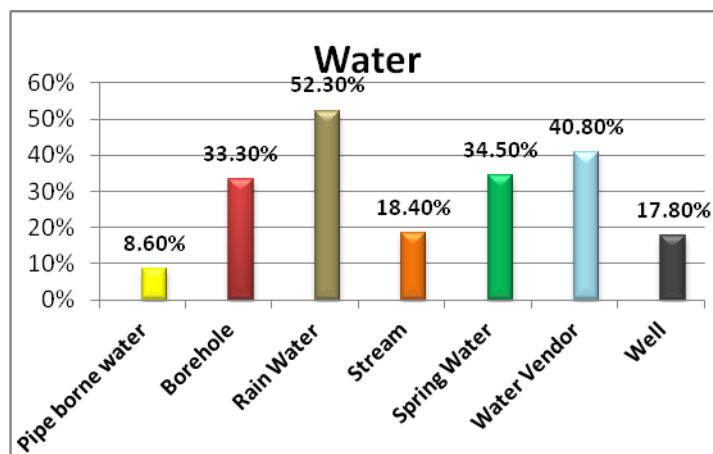


Figure 4.8: Response on Availability of Water

4.3.2 Common Health Ailments Suffered by Households

The Common ailment suffered by individuals in the village- Agbaja Ngwo are malaria, cholera , dysentery, typhoid fever, Arthritis, Eye problems, Hypertension, Diabetes. Specifically 82.80% suffered typhoid fever, 79.30% suffered from malaria, respondents with eye related problems(55.10%), blood pressure (53.40%), diarrhea (51.10%), cholera (41.40%), dysentery (37.40%) and arthritis (46.60%)(Figure 4.9).The high incidence of typhoid fever among the respondents is not unconnected with the access to portable water supply, hence their daily reliance on rain water and water vendor in order to meet their domestic water needs calls for urgent intervention.

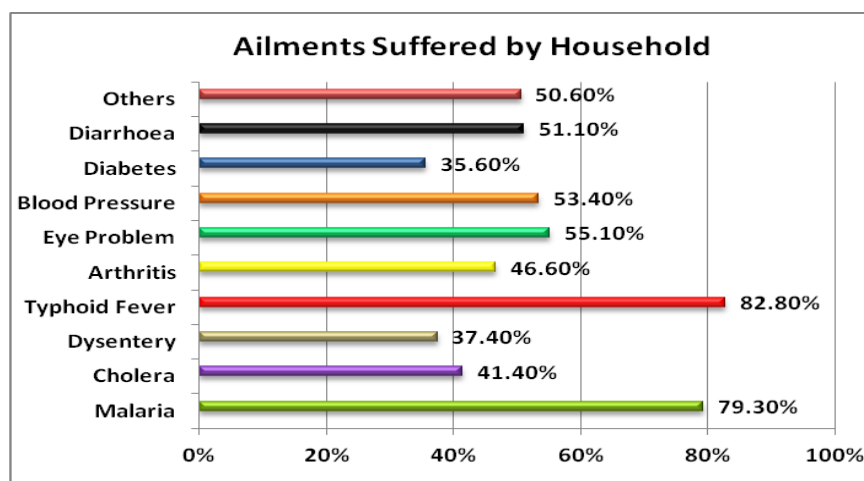


Figure 4.9: Response on Ailments Suffered by Household

4.3.3 Health

The availability of health facilities in an area indicate the level of health care services provided in an area. Health facilities patronized in the area include Hospital (25.2%). The result of the survey shows that private clinics (20.7%), Patent medicine (69%), Dispensaries (72.4%) traditional healing homes (17.8%), maternity homes (15.50%) (Figure 4.10). This shows that the people in the project area depend mainly on existing dispensaries and patent medical stores for their medical needs.

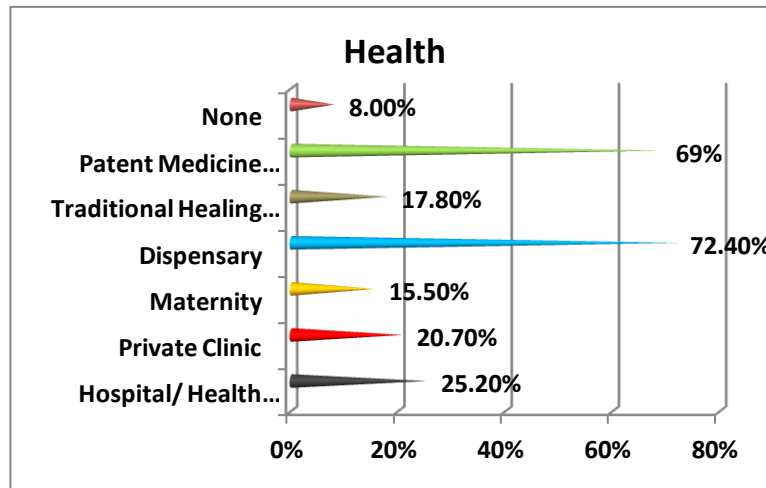


Figure 4.10: Response on Health Facilities

4.3.4 Roads

The major tarred arterial road leading from Enugu metropolis to the project communities is presently in a dilapidated condition. Due to the hilly topography of the area, the few earth roads that are motorable are fraught with gullies and sharp valleys. It is not surprising that respondents perceived the conditions of these roads are generally poor (Figure 4.11)

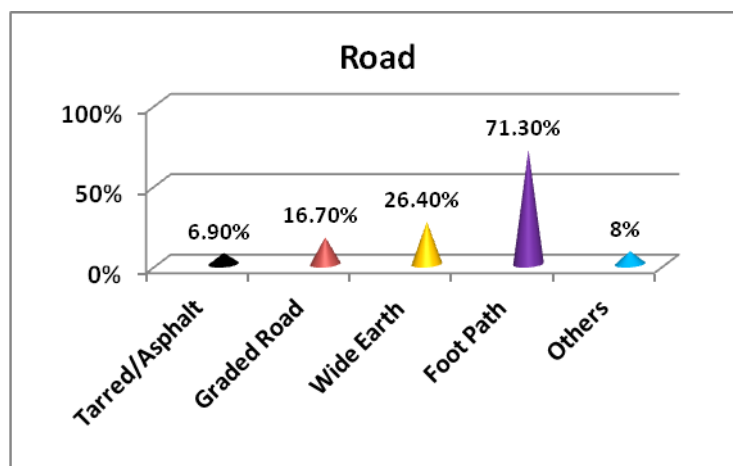


Figure 4.11: Assessment of the conditions of roads in the project area

4.3.5 Transportation

The major means of transportation in Agbaja Ngwo is motor cycle. Greater percentage of the respondents opined that the most frequently means of transportation is motorcycle with frequency response of 93.10%, mini bus (88.50%) while tricycle is 63.20% , Others are private car (37.40%), truck/lorry (23.60%) and other means not specified is (19.50%) (Figure 4.12).

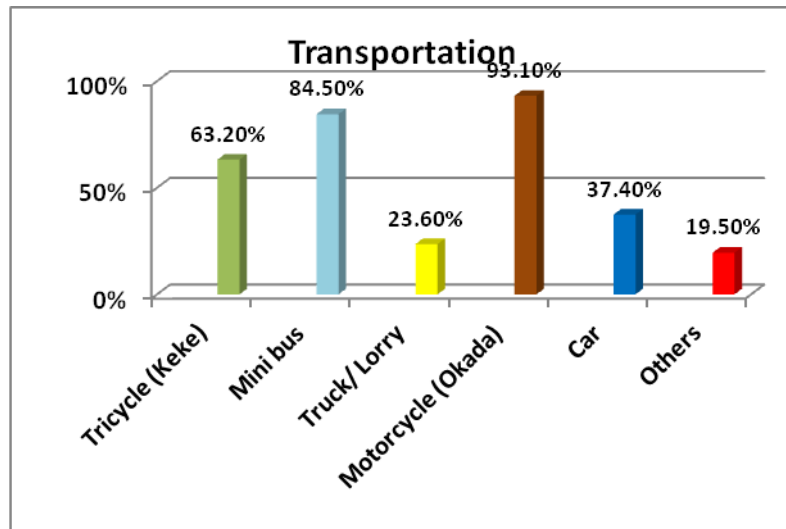


Figure 4.12: Response on Transportation

4.3.6 Markets

Since a significant 29.3% of respondents are traders, the study sought to investigate the basic facilities for trading activities in the area. Figure 4.13 shows that trading activities in Agbaja Ngwo take place in unbuilt/open village markets (77.60%), built-open markets (21.80%) and built lock-up shops (18.40%). This clearly indicates that trading facilities in the area are not modernized.

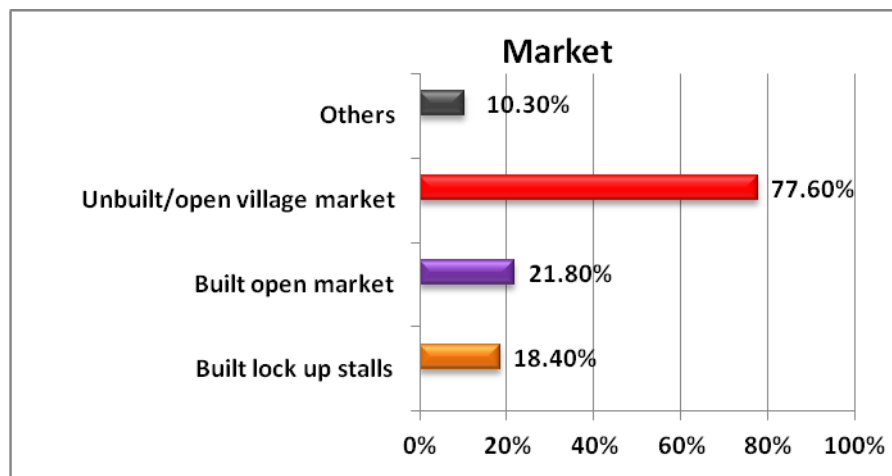


Figure 4.13: Availability of Market Trading Places

4.3.7 Recreational facilities

The respondents opined that the following recreational facilities are available in the area- Village Square, park, Town Hall, Beach, Forest reserve and others. The percentage frequency response by respondents are 86.2% 8.00%, 23.60%, 4.60%, 21.30% and 3.40% respectively as shown in figure 4.14.

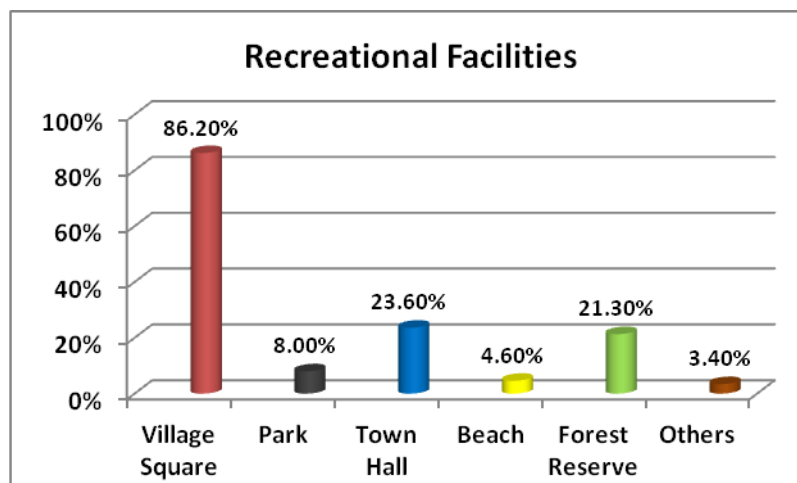


Figure 4.14: Response on Recreational Facilities

4.3.8 Waste Management and Disposal

A common environmental sanitation feature in the various communities visited in the proposed project area is the indiscriminate disposal of refuse into drainage channels, along the road and around residential buildings. The analysis of the data collected through the questionnaire indicates that 55% of the residents in the area dump their household waste into open dump sites, 45.4% (open road side drainage/river channels), 31.60% (Public refuse dumps), while 29.90% (bury and or burn their waste) (Table 4.15).

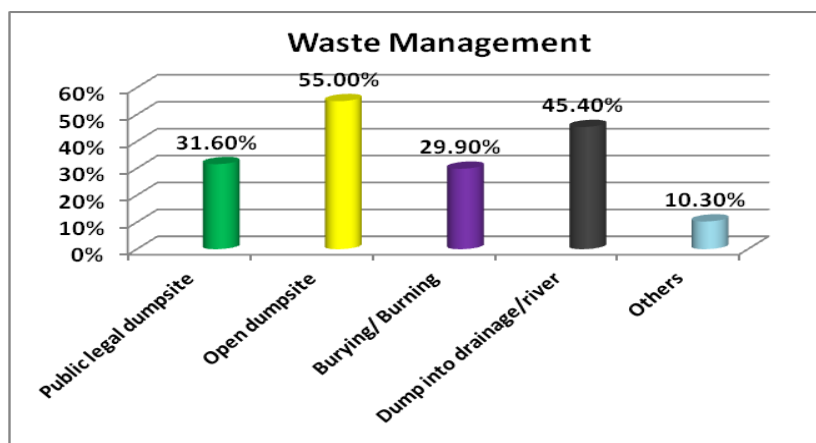


Figure 4.15: Response on Waste Management

4.4 Consultation and Public Participation

Community consultation is a fundamental aspect of many multi-lateral donor assisted projects in developing countries. Experiences have shown that top-bottom approach to beneficiaries development have failed in the areas where they were implemented. Community driven project have become so important considering the high incidences of project abandonment and discontinuance in developing countries and in particular Nigeria. Participation by affected individuals, group of individuals and the entire community is considered a fundamental tool for building understanding and fostering better decision making all through the project life cycle.

4.4.1 Objectives of Community Consultation

The objectives of the community consultation at various levels for the preparation of this ESMP include:

- To sensitize all the stakeholders and actors in the project on the mandate of the Enugu-NEWMAP and introduce other consultants who are expected to kick off other activities on completion of ESMP.
- To elicit information and knowledge from men, women, individuals in the community, NGOs, CBOs and FBOs and other stakeholders for the purpose of facilitating project implementation and monitoring;

- To ensure community ownership of the project through community participation in decision making processes; as well as
- To identify possible conflict in the community, worries and concerns of the people about the proposed project and develop possible strategies for resolving such conflicts and worries before the actual implementation of the gully rehabilitation and stabilization project.

4.4.2 Stakeholders Consultations and Meetings

Several Stakeholders' consultative forum tailored to introduce and intimate the community(ies) of the objective of NEWMAP project and the ESMP study commenced from 12th May, 2016. During the consultations, the Lead consultant engaged the Igwe of Imeama Community HRH Col Udeh (Rtd) and some members of his cabinet in an interactive session. Chief Daniel Ugwu (Item Okwojo) explained that Imeama Community is made up of three villages namely Okwojo, Amabor and Umuase. He further stated that NEWMAP staff had made series of visit to the gully site and they were optimistic that the government will surely come to their aid. The Lead consultant in his address explained the scope and objective of the ESMP assignment. He charged the Igwe and his cabinet to champion the course of the intervention program. The Igwe and his cabinet then promised to disseminate the information to other members of the community and also arrange for time and venue for the Consultation with the entire community (Plates 4.1-4.4).



Plate 4.1



Plate 4.2



Plate 4.3



Plate 4.4

Plate 4.1-4.4: Stakeholders Consultations and Meetings

I. Hierarchy of Traditional Authority and Conflict Resolution Mechanism

The first in the hierarchy of authority in Agbaja Ngwo is the traditional ruler (Igwe) followed by the Igwe-in-Council comprising the Igwe, Chiefs, Ozo and Nze. Next to this level of authority are the chiefs of the three villages. After the chiefs (Item) comes another level called the Item-in-Council comprising Item, Ozo, Nze and the President General. The last is the office of the president general (Figure 4.16).

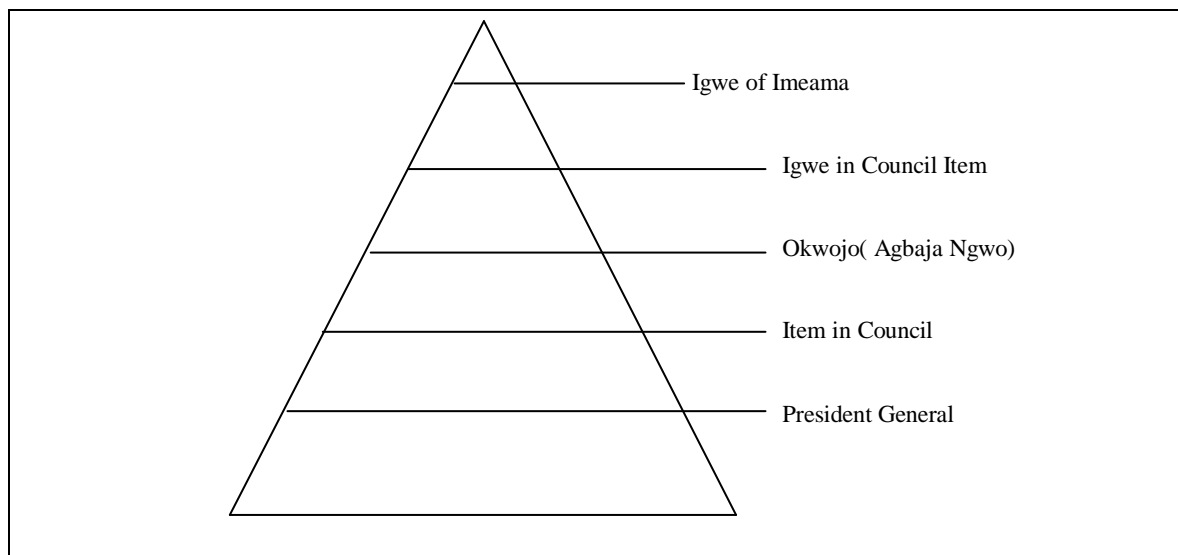


Figure 4.16: Hierarchy of Authority at Agbaja Ngwo (Okwojo)
Source: Field Survey, May 2016

Some of concerns of the people gathered from the various consultations are stated below:

- Fear that the NEWMAP project might be one of such projects that never come to reality.
 - Worried if the project implementation will be in line with Engineering Design.
 - Fear that their youths might not be employed by the contractor to be employed to handling the civil works.
- In response to the `above worries, the Lead Consultant informed them that World Bank projects are never abandoned. On the issue of implementing the engineering design, the Lead Consultant informed them that the contractor will consult them before commencement of construction work. It is also expected that the site committee comprising indigenes of Agbaja Ngwo will be made to work closely with the contractor. He informed them also that the project will generate employment for their youths willing to earn income during construction works.

4.5.3 Grievance Redress Mechanism

It was gathered from the consultations with the Council of chiefs that most conflicts are usually resolved traditionally. Conflict arising between two villages are usually referred to the Igwe in Council while conflict within Agbaja Ngwo (Okwojo) are referred to the Item in Council and where such matters are not resolved, they are referred to the Igwe in Council. However, police cases are referred to the President General of the community and where the conflict cannot be resolved; it is referred to the commissioner for Local Government and Chieftaincy Affairs the matter is then taken to the courts.

CHAPTER 5

5.0 ASSESSMENT OF POTENTIAL IMPACTS AND ANALYSIS OF PROJECT ALTERNATIVES

5.1 Introduction

The proposed Intervention works at Agbaja Ngwo Gully Erosion site was designed to involve mechanical, civil works and bio-engineering measures. These will involve clearing, excavation, haulage, earthworks, construction of channels, chute, stilling basin, check dams and embankments. These works which will be carried out through four phases namely: Mobilization, Pre-construction, Construction, and Operation/Maintenance will trigger the World Bank's Safeguards Policies. This chapter therefore highlights the perceived impacts and their magnitude during the various phases of the project implementation stages and processes using a number of methodologies.

5.2 Methodology

The Impact assessment methodologies adopted for this study include checklist, briefing and consultations, field survey and professional judgment. The applied procedures involve impact identification, prediction and evaluation. The identified potential impacts are evaluated using characteristics parameters which categorize the impacts into aspects (Environmental or Social Impact), effects (Beneficial or Adverse impact), magnitude (mild, moderate, significant or severe impact), and likelihood of occurrence (certain, likely, unlikely or rare). The magnitude of impacts and likelihood of occurrence are summarized in the table 5.1.

Table 5.1 Impact magnitude and likelihood table

<i>Magnitude/Severity table</i>		
<i>Magnitude</i>		<i>Implication</i>
1	Mild	Impact is unnoticeable
2	Moderate	Impact is enough to cause a shift from the status quo
3	Significant	Impact is profound
4	Severe	Impact is disastrous

<i>likelihood table</i>		
<i>Likelihood</i>		<i>Implication</i>
C	Certain	Impact will occur
L	Likely	Impact has high chances of occurrence
U	Unlikely	Impact has low chances of occurrence
R	Rare	Impact will scarcely occur

5.3 Impact Identification and Assessment

5.3.1 Mobilization

Mobilization indicates the commencement of the intervention work. It involves land resettlement and benefits conveying of the construction equipment and machineries to site, construction of office site(s) and installation of equipment's. In the course of achieving these activities, the following impacts may likely take place (table 5.2).

Table 5.2: Summary of the perceived potential Impacts during Mobilization phase

Potential Impact	Aspect		Effect		Magnitude 1= mild 2= moderate 3= significant 4= severe	Likelihood C=certain L=likely U=unlikely R=rare
	Environmental	Social	Beneficial	Adverse		
Land dispute and Crises over compensation and resettlement.		√		√	3	L
Temporal road congestion from movement of heavy equipment.		√		√	2	R
Job creation		√	√		3	C
Emotional disturbances		√		√	1	R
Damage/disruption of public utilities		√		√	1	U
Awareness and sensitization		√	√		3	C

There will be land take during paving, grading and widening of the pathways to the site for easy movement of trucks and equipment. This will inevitably encroach into nearby farmlands while other farmlands may be used as yard for equipment. Some public utilities like electric poles and overhead cables may be destroyed as a result of conveying heavy equipment to site. Grading of entrance roads may also damage existing underground pipes. Smokes and fumes generated by big trucks will cause poor visibility and inconveniences to other road users. Movement of equipment to site may contravene traffic rules resulting to congestion and accidents. Curiosity by the community members about the project and on how the influx of non indigenous workers may affect their lives within their stay in the community may give rise to emotional imbalance. Significantly the mobilization to site will create temporal jobs for the community youths. They will be engaged in immediate labour works like clearing and cleaning. Petty trading by women will start around the construction premises. Others may serve as local language translators in the case the contractor crew do not understand or speak local language of the host community.

5.3.2 Pre-construction

This phase is the general preparation of the site for the civil construction. It involves activities like clearing of vegetation, earth movement, filling and landscaping. There will be increase in human population and equipment in the site. The activities at this stage will generate various impacts on the environment and livelihood as summarized in table 5.3:

Table 5.3: Summary of the perceived potential during pre-construction phase

Potential Impact	Aspect		Effect		Magnitude 1= mild 2= moderate 3= significant 4= severe	Likelihood C=certain L=likely U=unlikely R=rare
	Environmental	Social	Beneficial	Adverse		
Disturbance and destruction of flora and fauna habitat and displacement/destruction of fauna due to site clearing	√			√	2	C
Exposure of soil to erosion and loss of quality from deforestation.	√			√	2	C
Job creation		√	√		3	C
Generation of vegetal wastes, other cleared materials and construction	√			√	2	L
Surface water contamination as a result of sediment run off from exposed soils	√			√	1	U
Traffic congestion and increased risk of road traffic accidents and injuries		√		√	1	R
Risk of occupational accidents, injuries and diseases		√		√	1	U

Large area of land will be cleared and graded for construction works to commence. Clearing and removal of top soil may severely alter the habitat of both the flora and fauna making it unfavorable for their survival. Threatened animals will migrate in search of favorable condition while others of less vigour die off. Cashew plantation and other cash crops may be destroyed. Clearing of vegetation and movement of heavy equipment at the gully corridor will expose it to sheet and gully erosion. Again, the runoff that will be diverted off the existing gully channel during intervention works can build up and gradually create a new channel which will later develop into another gully. Similarly local artisans will be engaged in various activities during the pre-construction phase. They can also be trained to acquire the basic skills required to successfully perform necessary work operations and tasks.

The influx of workers to the project site may generate domestic non-biodegradable wastes as well as vegetal and construction waste from cut down vegetation and construction materials. These may litter and deface the environment. The probability of surface water siltation is high. Loose soil particles and other debris will be transported by runoff to nearby surface water (existing spring water/stream). Oil and grease droppings from equipment and machineries could be washed into the surface waters and pollute it. It may lead to loss in aquatic features/organisms. There will be cases of accidents among the laborers due to inappropriate handling of working tools. They may not have sufficient knowledge on occupational safety and may be more conscious on job target than personal safety. There may be cases where site visitors and on-lookers get injured by off cuts and sharp objects. The construction activities will increase traffic on the local road as trucks will shuttle from construction site to borrow pit. As a result, there will be increase in congestion and increase chances of accidents on the local road.

5.3.3 Construction phase

Construction stage is the actual implementation of the intervention work according to the proposed engineering design details. It involves hauling, filling, slope stabilization, transporting in construction materials, building channels, stilling basin, chute, gabion walls and check dams. In this stage, several activities will be going on simultaneously so the impacts may be as a result of single action or from combination of several actions. The potential impacts associated with this phase are summarized in table 5.4:

Table 5.4: Summary of the perceived potential Impacts during construction phase

Potential Impact	Aspect		Effect		Magnitude 1= mild 2= moderate 3= significant 4= severe	Likelihood C=certain L=likely U=unlikely R=rare
	Environmental	Social	Beneficial	Adverse		
Noise pollution and vibration		√			3	C
Soil erosion from exposure of soil to rain and wind	√				2	L
Employment		√			3	C
Surface water contamination by sediment transported by runoff.	√				1	U
Risk of occupational accidents, injuries and diseases		√			2	U
Pollution of underground water by oil and grease.	√				1	U
Generation construction wastes and other food waste.	√				3	L
Damage to existing underground public utility.		√			1	U
Soil stabilization and regeneration	√				3	C
Diversification of livelihood		√			3	L

The use of machineries, equipment and construction materials will increase the ambient noise level of the environment. Noise and vibration can cause ear impairment and difficulty in communication to the local residents. It can also prompt irritation and restlessness. Local artisans will be engaged at the various activities during construction phase. They can also be trained to acquire the basic skills required to work. They may

work as staff holders for site surveyors, drivers and vehicle attendants to excavators, dozers, forklifts etc. They could be engaged as operators of concrete mixers, concrete batch workers, masons and molders and iron fitters. Others will work in gabion wall building. There will be presence of dust and particulate matters from the hauling materials, excavation activities, cement dust from batch mix and concrete mixer. The dust and particulate matters reduce visibility and increase the risk of eye problems. The land may become vulnerable to soil erosion due to runoffs and wind when vegetation and top soil are removed. The soil nutrient could also be eroded and farm productivity reduced.

The Agbaja Ngwo reservoir situated few meters away from the gully edge has underground pipes conveying water from the pumping station to the reservoir. There is also the trapezoidal channel transmitting overflow water from the reservoir downstream of the basin. These public facilities may be tampered with during the construction activities. The construction of hydraulic structures along the erosion channel will slow down the degrading effect of erosion water or water run offs. This will kick start soil stabilization and regeneration. The presence of check dams along the channel will trap soil particles which will gradually build up for reclamation processes. The expected effect is that over the years the gully would completely heal and become suitable once more for agricultural and other uses. Furthermore, groundwater pollution, diversification of livelihoods, occupational injuries and diseases are other likely impacts that may result from construction phase activities.

5.3.4 Operation phase

Once construction activities are completed and the rehabilitated and stabilized gully put to different uses, the purpose for carrying the intervention works will be realized (Table 5.5). Jobs will be created. The community can use the site as recreation center and location for shooting films. In that case it will be source of livelihood to some households. There will be increased agricultural availability of reclaimed lands and reduced incidence of washing away of soil nutrients by erosion will boost agro productivity. Farmers will regain their confident on the restored lands and put them in optimal utilization. The recovery of land from erosion menace will increase land values as the perception on those lands as degraded and vulnerable will be reversed. Another determinant is the variant use of land as people may turn the land from only agricultural land to residential and commercial purposes.

Table 5.5: Summary of the potential and associated Impacts during operational

Potential Impact	Aspect		Effect		Magnitude 1= mild 2= moderate 3= significant 4= severe	Likelihood C=certain L=likely U=unlikely R=rare
	Environmental	Social	Beneficial	Adverse		
Job creation		√	√		3	C
Diversification of livelihood.		√	√		3	L
Risk of failure and collapse of check dams	√			√	1	U
Prevention of landslides	√		√		3	C
Improved agricultural land and productivity		√	√		3	L
Regeneration of vegetal cover	√		√		3	C
Restoration of flora habitat	√		√		3	C
Ecological balance.	√		√		3	L
Soil stabilization and conservation.	√		√		3	C
Improved microclimatic conditions.	√		√		3	C
Reduction of soil erosion	√		√		3	C
Increased land value		√	√		2	L

The healing of the gully will encourage natural emergence of diverse vegetation that will improve the microclimatic conditions in the area. Adequate protection and routine maintenance of the erosion control structures will check further incidences of erosion. Also the knowledge gained by the community during project implementation will spur best practices thereby reducing soil erosion. The habitat to various organisms will gradually restore as the gully corridor stabilizes. There shall be increase in species diversity due to reduced disturbances on their habitat by landslides, earth cave-in and noise. The training gained from

operation and maintenance of the hydraulic structures can boost local skills and technical knowledge gained can be applied to other fields of human endeavor for the purpose of earning income.

5.4 Significant Potential Impacts of the Proposed Project

The summary of the significant adverse and beneficial impacts of the proposed gully rehabilitation and stabilization project at Agbaja Ngwo are summarized in table 5.6 below. It is realized that the beneficial impacts of the proposed project far outweigh the negative impacts and as such represent the justification for embarking on the proposed intervention project.

5.5 Assessment of Implementation Options

This section assesses the project implementation alternatives that were put into consideration at the planning stage of the Agbaja Ngwo gully intervention program. The best option was selected after careful examination of merits and demerits of each of the technologies considered. The proposed intervention measures were analyzed based on the most sustainable implementation option and technology for optimal beneficial impact on man and environment. The results of the analysis are given below.

Intervention Options

The *No Intervention* option suggests that the erosion site remains as it is and that the proposed project shall not be executed. But considering the rate of expansion and the destructive effect of the erosion, the 'no Intervention' case will exacerbate the suffering of the people because in the future they will have no land to farm, the reservoir might cave inside the gully and worsened the scarcity of water in the community. It was discovered during the site survey that any further neglect of the gully may lead to undue losses of cashew trees, water from reservoir, loss of buildings including the fragmentation of community and increased cost of accessing assets and facilities. The erosion may also threaten existing ecosystem and the microclimatic conditions of the area. The option was considered not viable and was rejected. The cost of executing the project will certainly push up in a future date. Therefore, deferring the implementation was considered unnecessary and was rejected. Since the '*Do it Now*' option will avert these perceived adverse effects mentioned in the other options, then this option was considered feasible and was approved.

Technological Alternatives

A number of technological alternatives were considered for use in the implementation of the proposed gully rehabilitation and stabilization project. These include; *Full Fill*, *Rigid Civil works*, *Bio-engineering* and *Flexible Structures*. However based on the merits and demerits of each of technological alternatives, the flexible structures option was chosen because it approximates and consolidates on the merits of the various technological alternatives. This method represents the integration of moderate civil engineering works with vegetation. The combination complements each other in their areas of weaknesses. The intervention will have less adverse impacts on the environment. The technology is designed to allow the passage of runoff at reduced speed at the gully head to trap down only the soil particles. As the sediments continue building up and the introduced vegetation gathers momentum, the gully will stabilize and completely healed over time. This is the chosen technology for the intervention because it is economical, sustainable and durable.

Table 5.6: Summary of Significant Potential Impacts of Proposed Project at Agbaja Ngwo

Project Phase	Significant Potential Impact			
	Positive impacts		Negative impacts	
	Environment	Social	Environment	Social
Pre-construction		<ul style="list-style-type: none"> • Employment of community youths for local labour • Awareness and sensitization 	<ul style="list-style-type: none"> • Disturbance and destruction of flora and fauna habitat • Exposure of soil to erosion • Generation of vegetal and construction waste • Contamination of surface water due to sediment runoff 	<ul style="list-style-type: none"> • Land dispute and crises over compensation and resettlement • Traffic congestion and increased risk of road traffic accident and injuries • Emotional disturbances • Damage /disruption of public utilities • Risk of occupational accidents, injuries and diseases
Construction	<ul style="list-style-type: none"> • Soil stabilization and regeneration • Propagation of vegetal cover 	<ul style="list-style-type: none"> • Employment of community youths for local labour • Diversification of livelihood 	<ul style="list-style-type: none"> • Noise and vibration • Air quality deterioration • Exposure of soil to rain and wind • Ground water pollution due to oil and grease spillage • Surface water contamination due to sediment runoff • Generation of construction wastes and other food waste 	<ul style="list-style-type: none"> • Damage to existing underground public utility • Risk of occupational accidents, injuries and diseases • HIV/AIDS and other STDs arising from the interactions amongst the work force and the host community
Operation/Maintenance	<ul style="list-style-type: none"> • Improved microclimatic conditions due to increase carbon sequestration • Prevention of landslides • Regeneration of vegetal cover • Restoration of flora habitat • Ecological balance • Soil stabilization and conservation • Reduction of soil erosion 	<ul style="list-style-type: none"> • Employment of community youths • Diversification of livelihood • Improved agricultural land and productivity • Increase in land value 	<ul style="list-style-type: none"> • Risk of failure and collapse of check dams 	

CHAPTER SIX

6.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

6.1 Introduction

Environmental and Social Management Plan (ESMP) is a tool that provides the means for continuous self assessment of the predictive accuracy of the impacts and the management effectiveness of project and social implementation and operations. In addition to this function the ESMP will be used to ensure compliance with statutory requirements and remains a dynamic working tool that shall be updated and revised periodically throughout the project's life span so as to incorporate better environmental standards, management systems, guidelines and policies. The primary objectives of the ESMP will be pursued through the following activities:

- Ensuring compliance with stipulated legislation on protections of the environment;
- Integrating environmental issues fully into the project development cycle(s) and operational phases;
- Promoting environmental management awareness among the project contractors, consultants and monitoring staff;
- Rationalizing and streamlining existing environmental activities to add value to efficiency and effectiveness;
- Main streaming social and livelihood issues into project implantations and post-operational phases and;
- Providing standards for overall planning, operation, monitoring, audit and review.

This chapter outlines the elements, components, activities, responsibilities, capacity needs as well as the estimated cost of the ESMP.

6.2 Mitigation Measures

The mitigation measures are activities aimed at reducing, ameliorating avoiding or compensating for impacts and where possible enhance environmental quality through the designed alternatives, and operational procedures. Table 6.1 outlines a summary of the potential and associated impacts of the project, and the corresponding mitigation measures and the institutional responsibilities for implementation. The mitigation measures formulated for the ESMP are specific measurable, achievable, relevant and time-based (SMART). To this extent estimated cost of each mitigation measure is indicated in order to guide the preparation of the project implementation manual. Implementation of these measures to enhance positive impacts and reduce negative impacts in consonance with the general environmental works will ensure they are effective and functional.

Table 6.1: Mitigation Measures

S/N	Activities Envisaged	Potential Impact	Mitigation measures	Monitoring Indicators	Frequency	Responsibility	Cost (N)
A Mobilization and site Preparatory activities							
1.	Movement of Equipment & Materials	Dust and noise generation	Plan the movement of heavy duty vehicles and machines in a manner that noise nuisance are within regulatory limits	Noise level and public complaints about noise dust nuisances.	At periodic intervals and specific locations	Contractor, SPMU Environmental and Social Safeguard officer	150,000.00
2	Movement of Equipment & Materials	Reduction in air quality due to vehicular movement	Employ fuel efficient and well-maintained haulage trucks with proper exhaust system to minimize emissions. All parked vehicles on the site shall have their engines turned off; Develop and follow a controlled fueling, maintenance and servicing protocol	Number/absence of public complaints	At periodic intervals and specific locations along the entire road	Contractor, SPMU Environmental and Social Safeguard officer; site committee members(s)	
3.	Movement of Equipment & Materials -Health & Safety Issues -	Accidents - Movement of heavy equipment to worksite which may pose danger to the public	Place visible warning signs on roads and vehicles. Raise public awareness on the unusual activity and its purpose.	Numbers of accidents and vehicular infractions	During Mobilization/ actual movement to the site	Contractor, SPMU Environmental and Social Safeguard officer	
Sub-total							150,000.00
CONSTRUCTION							
B Biophysical Issues							
1	Site clearing of set-back from edge of gully	Removal of Flora & Fauna; Displacement of asset	Perform clearance in stages Develop compensation plan for displaced asset in line with the prepared RAP	Absence of land despoliation/absence of complaints from the PAP/communities	Throughout the period of site clearance	SPMU, Contractor, MoH, MoE / MOW,	500,000.00
2	General Treatment of the gully erosion.	Failure due to poor integration between physical and biological measures. Failure to complete the treatment works for any reason – tantamount to not getting the required protection leading to waste of time and resources	Careful planning and attention to work operations and details; Remove the cause of the gully formation; Do gully filling only after the water flow that caused the gully has been controlled or diverted above the gully head; Avoid filling gullies with rubbish, logs, rocks, metal scraps and other foreign materials that are not suitable; Use earthen banks that divert runoff away from the gully head, and convert it to slower, less erosive flow away from the actively eroding area.	Absence of gully failure	Weekly during construction activities	SPMU Contractor MoE&MoW/World Bank	250,000.00
3.	Gully Stabilisation, Use of vegetation as control & buffers - grass-lined channel (Turf reinforcement mats)	Accumulation of debris, sediment accumulation, dead grasses, shrub/bush and free standing trees.	Design structures so that the flow in the gully is reduced to a non-scouring velocity; plant vegetation between the structures and the stabilized gully; Locations of the structures must be placed so that as much sediment	Absence of debris; evidence of repairs made on outlets and points where concentrated flow enters channels, structure(s); Inspections of lined drainage channels and energy	Carry out weekly inspections during construction activities especially after heavy rainfall	SPMU ESSO, Contractor, MH, MOE &	

			is collected as possible, while still ensuring that the structures are stable; prepare the sides of the gully to have the slope and the gully floor to be smooth to ease water runoff; Sites should also be relatively smooth at the gully floor, and have a gentle slope between the gully floor and sides; Choose the right time to do it and Implement this late dry season to early onset of rainy season before heavy rains is in order to avoid high volumes of run-offs and when there sufficient soil moisture and warmth to promote the growth of vegetation.	dissipaters after major storms/rainfall.			
4.	Earthworks-Excavation, grading, compaction filling and other civil works	Vibration and disturbance of natural damage system; Increase in sedimentation and runoffs; risk of pollution to watercourses	Develop a site plan that does not require a significant amount of grade changes—that fits into existing land contours to ensure the site is not disturbed again for a long period; Trap excavated soil from temporary sediment and stockpile same; Carry out earthworks operations such that surfaces have adequate falls, profiling and drainage to control run-off and prevent ponding and flooding; Control run-off through silt/sediment traps as appropriate to minimise the turbidity of water in outfall areas.	Number of drainage lines and ephemeral waterways that could be ‘erosion starter; Number of complaints from the community due to poor water quality/sedimentation	After heavy downpour of rain	SPMU Contractor, MH, MOE & MOW	
5	Use of heavy equipments on the site and transport vehicles on the public roads	Vibration-generate lateral waves to the surrounding structure and could lead to failure and contaminate ground or surface water sources including spills, leaks or injuries from any type of hazardous material (e.g. bitumen,	As much as possible avoid use of heavy duty equipment like bulldozers, pay loaders and trucks used in excavation and loading at the control site; enforce proper work schedule to minimize disturbance. Alert the public when loud noise will be generated; Employ sound proof machines more or station construction vehicles, machineries and equipments in designated area(s) only and do not carry out activities	Absence/number of oil leakages spills; cracks damages to abutting construction Sites/structures; Number of complaints due to noise & dust; generation Absence of transported sediment from the site onto public roads or adjacent properties via the wheels, chassis and side of vehicles.	At periodic intervals (weekly or bi-weekly) during the construction phase	SPMU Contractor, MH, MOE & MOW	

		cement, paint, explosives, fuels, lubricants)	beyond specified project areas				
6	Construction camp and crew	Soil contamination and environmental sanitation/public hygiene due to poor disposal of liquid and solid wastes	Identify suitable camp site in consultation with relevant authorities; Regular collection and proper disposal of solid waste; Ensure and enforce good housekeeping	Littering of camp site and environs with refuse/wastes	Daily throughout the Construction period.	SPMU ESSO, Contractor, and relevant Government officials of MDAs staff	100,000.00
7	Storage of Materials	Loss of the stockpiled materials; damage to valuable ecosystems and habitats due to leakages of hazardous materials from equipments or storage area.	Stockpiles should not be located within an overland flow path; Construct flow diversion banks up-slope of the stockpile to divert run-offs; also install a sediment fence (or heightened bound wall) on the downhill side.	Presence/absence of moved stored material by rain/wind, as well as leaks from stored substances.	Daily throughout the period of construction.	SPMU Contractor and relevant Government MDAs staff	
Social Issues							
1	Waste/spoil generation & management	Waste generation volume of wastes spoils; Spoils tipped away from designated areas	As part of contract requirements, contractor be required to develop, implement and maintain a Waste Management Plan during the construction works with emphasis on minimization and segregation of wastes; Protection of neighborhood from debris due to construction; Minimize spoil by balancing cut and fill wherever possible; Safe tipping areas should be identified and enforced; Spoil traps should be constructed and ensure that waste disposal take place only on approved site; Dispose wastes only in approved sites	Volume of waste generated and disposal/Evidence of a good waste management plan in place-acceptable in light of best practices.	Daily throughout the construction period.	SPMU Contractor and relevant officials Government MDAs.	150,000
2	Local people excluded from activities	Conflicts; protests; disruption of work activities leading to closure of site work	Incorporate methods within the skills of local people; Contractors encouraged to use local labour wherever possible.	Number of community members involved in construction work	Daily throughout the construction period.	SPMU Contractor, Local Government Site Committee chairman	100,000.00

		operations					
3	Quarry for fill materials	Agricultural farmlands and form cops may be damaged comprised.	Avoid use of agricultural land and other sensitive areas for guarding activities, Restore burrow and quarry pits after development and abandonment	Presence/absence of scouring, erosion, damage to property, water supply disruption; Complaints from local people	During construction	SPMU ESSO, Contractor, MoH, MOW, Local MoE Government/Site Committee, Chairman	300,000.00
	Sub-total						1,200,000.00
C	Operation and Maintenance						
1	Maintenance and Utilization of Rehabilitated Gully	Collapse of structure/failure of erosion control measures	Monitor and maintain intervention work for continued stability and quality of construction; Shortcomings in the control structures should be corrected before they develop into serious problems; damage vegetated areas should be replaced; Treated gullies should be checked regularly and the healing process monitored closely; Structures built in the gully for stabilization purpose should be observed for damages especially during rainy seasons and after heavy storms; Damaged check-dams should be repaired immediately to avoid further damages and the eventual collapse; Avoid delay of repairs even in small damages or structure collapse.	Number of failure of structure/ incidence of damaged vegetation treated gullies/check-dams and structures including entire section of collapsed structures	Once in three months during dry periods and immediately after heavy down pour during the rainy season	Community Site committee, chairman SPMU Environmental and Social Safeguard Officer, MoE, MoW, FPMU, World Bank	1,000,000.00
2	Maintenance and Utilization of Rehabilitated Gully	Unsustainable use of rehabilitated gully areas crossing different land uses owned by different land users which may lead to conflicts.	Identify potential end-users of gully areas concept or management plan for them; Before treatment of gullies, the users should be identified and the boundaries should be clearly demarcated, the gully rehabilitation process should be objective oriented and responsibilities of owners in managing, maintaining and utilizing the gully should be agreed upon.	Number of agreement signed with users of rehabilitated gully areas; presence/absence of land users/ conflicts.	Once every three months	SPMU, FPMU, Community members, World Bank	750,000.00
3	Maintenance and Utilization of	Poor maintenance of vegetated	Maintain healthy pasture on slope to reduce bare	Incidence of damaged or dying grasses, shrubbs,	Once every three months	Community Site committee, chairman SPMU	

	Rehabilitated Gully	area(s)	ground.	vegetations		MoE, MoW, FPMU World Bank,	
	Sub-total						1,750,000.00
4	Decommissioning	Cause soil erosion and degrade surface water quality, dust generation damage to valuable ecosystems and habitat	Plan and execute removal of machines and equipment from site in phases and as periodic times.	Absence of soil erosion, water quality degradation and dust generation	Throughout the period of decommissioning period	Contractor, SPMU Environmental and Social Safeguard Officer, Relevant Government MDAs staff.	500,000.00
	Sub-total						500,000.00
	Grand Total						3,600,000.00

6.3 Considerations for Ensuring Effective Implementation of Mitigation Measures and Monitoring Programs.

6.3.1 Pre-Implementation period

A starting point for ensuring compliance with the implementation of design of proposed project is to review the concept plan meant to guide the implementation process. The Quality Assurance Engineer to confirm that the design provided for implementation and as used for the preparation of the various Safeguard instruments are in accordance with those prepared in the concept plan. If there is need for change(s), the Quality Assurance Engineer to notify the environmental officers and indicate the nature of the change(s). Otherwise, the Quality Assurance Engineer to approve of the design for implementation.

6.3.2 Project Implementation period (construction phase)

a. Site Preparation/Clearance:

All site clearance works to be carried out within defined perimeters and only when necessary. The maximum permissible time lapse between site clearing and initiation of construction operations to be reduced to the barest minimum.

b. Construction Phase/Period

During construction phase, contractor shall ensure that an appropriate and suitable protective measure is implemented.

6.3.3 Post Implementation and Operational Phase Decommissioning and Abandonment

Decommissioning would involve removal of all site facilities that are no longer relevant for the operation of the project which may pose some degree of safety hazards to the general public and personnel within the base camp and the construction area. The hazards and safety risks posed by the abandoned facilities shall have long-term effect. However, decommissioning will make the acquired machineries, equipment and materials available for alternative uses.

Maintenance and Inspection of Treated Gully

In order to be effective, the intervention work must be properly designed, implemented, inspected and maintained. To maintain the integrity of the intervention work (treated gully) the site check shall include regular inspection. Maintenance generally shall focus on the following activities:

- Eroded areas are to be repaired immediately.
- Regular removal of debris and repair of channel at the outlets and points where concentrated flow enters the channel.
- Seeded slopes identified for signs of erosion, shall be slightly above original grade, and thereafter roughened, reseeded and mulched.
- Lining of drainage channels and energy dissipaters at regular intervals and after major storms.

- Prompt reinstatement of sediments, damaged pipes, and unstable banks and scour holes. Accumulation, piping, bank instability, and scour holes.
- Use of sandbags during rainfall events if extra height is needed on the ridges of contour drains.
- Prompt reinstatement of drains if destroyed by machinery movement or other forces.
- Check dams should be cleaned after each significant storm event or when accumulated sediment reaches half the height of the check dam.

6.4 Monitoring Program and Responsibilities

How do we assure that the proposed mitigation measures are properly implemented as laid down and as agreed? Table 6.2 summarizes the types of monitoring and the parameters that require monitoring for the successful implementation of the ESMP.

Table 6.2 Types of Monitoring for the Effective Implementation of Mitigation Measures

Types of monitoring	Description	Area/Parameters/Dimensions
Effects monitoring	Repetitive, systematic measurements of environmental parameters during projects '3 phases to detect changes attributed to proposed projects	Gaseous emissions, clogging of drainage channels, structural changes on ground surface configuration siltation of nearby streams, surface water bodies e.t.c
Compliance monitoring	Periodic sampling or continuous measurement of environmental parameters to ensure that regulatory requirements are observed and standards met	Compliance with air, water, soil pollution standards; procedures for mitigation, monitoring programs and time(s) for data collection, storage, retrieval and processing

In order to effectively implement mitigation measures, specific ESMP tasks must be determined. A checklist of some likely ESMP tasks to be undertaken at the initial stages of the proposed project are given in Table 6.3. A detailed monitoring program that would ensure compliance with specific actions, assure the accuracy of predicted impacts, guide identification of effective mitigation measures and evaluate compliance with regulatory measures is drawn up in Table 6.4. Issues of specific indicators or parameters to be monitored, method of measurement, sampling location, frequency of monitoring, responsibility for implementation and supervision as well as cost of monitoring are articulated into the monitoring program (Table 6.4)

Table 6.3 Checklist ESMP Tasks for the Implementation of Mitigation Measures

Pre-site preparation	Assign project staff to areas where demolitions are to be effected to protect life, human safety and environmental quality; Constitute staff to oversee actual location, site development, planning, operation and management of company waste site(s). Move machineries, personnel and materials with supervision of management staff.
Construction phase	Prepare and approve ESMU specifications to cover daily work operations/schedule by contractors. Designate Enugu SPMU staff to monitor compliance of contractor's staff/operations with agreed specifications; review results of daily routine activities. Monitor effects and level of compliance with ESMP procedures, practices and targets. Co-ordinate all abandonment and decommissioning procedures for pits/waste dump sites with contractors.
Post construction operation	Liaise with traffic division of Nigeria Police/Federal Road Safety Commission (FRSC) by relevant ESMP staff to articulate and maintain appropriate traffic.

Table: 6.4 Monitoring Program.									
	Potential Impacts	Mitigation Measures	Indicators/ Parameters for monitoring	Method of Measurement	Sampling Location	Frequency of Monitoring	Responsibility		Cost of Monitoring Dollars (Naira)*
A	PRE CONSTRUCTION PHASE						Implementation	Supervision	
	Land Acquisition	<ul style="list-style-type: none"> • Prepare and implement as necessary before mobilizing to site • Ensure full involvement of community during preparation and implementation 	<ul style="list-style-type: none"> • ARAP Document • Minutes of meeting/ report of implementation with signatures showing community participation 	<ul style="list-style-type: none"> • Sighting • Interview 	Host Community (Agbaja Ngwo)	Once (Before commencement of project)	Project Coordinator ENS-NEWMAP Social Liaison Officer (SLO) - NEWMAP Community Liaison Officer (CLO)	Enugu SPMU SME site committee Local Government Staff	N200,000.00
1	Conflicts and crises over land resettlement and benefits								
	Mobilization of Equipment to Site	<ul style="list-style-type: none"> • Develop and implement a Traffic Management Plan (TMP). Traffic control measures to include: strict enforcement of speed limits, use of appropriate road safety signages and signallers and minimization of movement at peak hours of the day. • Ensure submission of TMP is a condition in the procurement document for the contractor • Train drivers on haulage safety and pedestrian safety 	<ul style="list-style-type: none"> • TM Submitted • Traffic flow • Safety signages & signallers installed at strategic locations • No of Complaints from residents and other road users • No of road traffic accidents (RTA) • No of drivers trained 	<ul style="list-style-type: none"> • Sighting • Visual Observation • Complaint Register • Police/FRSC Report • Interviews/ Training Records 	Along transport corridor Construction Site	Daily Once	Contractor	Environmental Safeguard Officer SPMU Police Federal Road Safety Corps (FRSC) Enugu State Transport Management Agency ENSTMA	N350,000.00
2	Traffic congestion and increased risk of road traffic accidents and injuries as a result of movement of heavy equipment								

3	Occupational accidents and injuries from the use of machineries and equipment	<ul style="list-style-type: none"> • Prepare and implement site specific HSE plan for workers addressing issues including; HSE rules and instruction; Provision of PPE to workers; Emergency contingency plans; Education of workers; Incident/accident reporting; Provision of First Aid onsite 	<ul style="list-style-type: none"> • HSE Plan Submitted • Workers using PPE • First Aid Provision • No of accidents and injuries • HSE Statistics {First Aid Cases (FAC), Lost Time Injuries (LTI), etc} 	<ul style="list-style-type: none"> • Sighting • Routine/ Unannounced Inspection • HSE Report 	Construction Site	Daily	Contractor	SPMU SME, FMEv, HSE officer	N205,000.00
Site Clearing		<ul style="list-style-type: none"> • Suppress dust emissions by appropriate methods such as spraying water on soil 	<ul style="list-style-type: none"> • Suspended Particulates (SPM, or smaller), SO₂, NOx, CO, • Vehicle Exhaust Measurements • Records of maintenance for all machineries and equipments 	<ul style="list-style-type: none"> • In-Situ Measurement • Sighting 	Construction Site	Daily	Contractor	SPMU SME FMEnv NESREA (State)	N180,000.00
4	Air quality deterioration from release of dusts and gaseous emissions from exposed soil surfaces and vehicle	<ul style="list-style-type: none"> • Maintain vehicles in good working condition • Ensure exhaust fumes from vehicles conform to applicable National standard and specifications 							
5	Noise and vibration from the use of machineries and motorized equipment	<ul style="list-style-type: none"> • Maintain equipment and machineries adequately to reduce their noise levels • Fit machineries and motorized equipment with exhaust mufflers/silencers to minimize noise generation • Avoid unnecessary idling of internal combustion engines 	<ul style="list-style-type: none"> • Noise Levels (Not to exceed 90dB(A) • No of Complaints • Records of Equipment Maintenance 	<ul style="list-style-type: none"> • In-Situ Measurement • Sighting • Complaint Register 	Construction Site and surrounding area	Daily	Contractor	SPMU SME FMEnv NESREA	N175,000.00

	Potential Impacts	Mitigation Measures	Indicators/ Parameters	Method of Measurement	Sampling Location	Frequency of Monitoring	Responsibility		Cost of Monitoring Dollars (Naira)*
							Implementation	Supervision	
6	Vegetation loss from land cleaning	<ul style="list-style-type: none"> Limit land clearing strictly to necessary areas so as to minimize the destruction of flora and fauna. 	<ul style="list-style-type: none"> Clearly Defined Boundaries % of Vegetal Density Loss/Vegetal cover 	<ul style="list-style-type: none"> Visual Observation Visual Estimate of Cover Framed Quadrats 	Construction Site (high activity areas) and to some extent transport corridor	Once during site clearing and quarterly afterwards	Contractor	SPMU Enugu State Min. of Agriculture and Rural Development (EMSMARD) Site Committee	N150,000.00
7	Disturbance and destruction of flora and fauna habitat (ecosystem) and displacement/destruction of fauna due to site cleaning								
8	Exposure of soil to erosion and loss of soil quality from de-vegetation	<ul style="list-style-type: none"> Prepare and implement Waste Management Plan (WMP), using the waste minimization hierarchy principles of avoid-reduce-reuse-recycle-disposal Ensure proper handling, stockpiling and disposal of waste (eg. Cleared vegetation, timber ,rubbles etc) 	<ul style="list-style-type: none"> % of vegetal loss Ratio of Natural/cultivated cover 	<ul style="list-style-type: none"> Visual estimate Waste tracking report 	Project area where vegetation was cleared	Once during site clearing and quarterly afterward	Contractor	SPMU ENSMARD	N206,000.00
9	Generation of vegetal wastes and other cleared materials from de-vegetation and site clearing activities	<ul style="list-style-type: none"> Prepare and implement waste management plan (WMP), using the waste minimization hierarchy principles of avoid-reduce- reuse- recycle- disposal. Ensure proper handling, stockpiling and disposal of wastes (e.g cleared vegetation, timber, rubbles, etc.) 	<ul style="list-style-type: none"> WMP Submitted Contractor's Compliance to WMP Waste Handling and Disposal of Wastes 	<ul style="list-style-type: none"> Sighting Visual Observation Waste Tracking Report 	Construction Site	Weekly	Contractor	SME/FMENV ENSEPA/ ESWAMA	N315,000.00

10	Risk of occupational diseases such as respiratory and eye disorder, noise related problems, stings and bites as a result of exposures to occupational hazards.	<ul style="list-style-type: none"> Implement site specific HSE plan 	<ul style="list-style-type: none"> Contractors Compliance Workers Using PPE HSE Statistics (FAC, LTI, etc) 	<ul style="list-style-type: none"> Routine Inspection HSE Reports 	Construction Site	Weekly	Contractor	SPMU SME/FMEnv SMH NESREA (3 fate) HSE officer	N210,000.00
Installation of Equipment and Site Structures									
11	Noise and vibration from the use of machineries and motorized equipment during construction of site structures	<ul style="list-style-type: none"> Maintain equipment and machineries adequately to reduce their noise levels Fit machineries and motorized equipment with exhaust mufflers/silencers to minimize noise generation Avoid unnecessary idling of internal combustion engines 	<ul style="list-style-type: none"> Noise Levels (Not to exceed 90dB(A) Records of Equipment Maintenance 	<ul style="list-style-type: none"> In-Situ Measurement Sighting 	Construction Site (high activity areas) and to some extent transport corridor	Daily	Contractor	SPMU SME FMEnv NESREA HSE officer	N270,000.00
12	Generation of Construction Waste	<ul style="list-style-type: none"> Implement the Waste Management Plan (WMP) Promote waste avoidance; reduction; reuse and recycling as applicable Ensure proper handling, and disposal of wastes (especially contaminated soil, concrete, oils, grease, lubricants, metals, etc.) 	<ul style="list-style-type: none"> Contractors Compliance to WMP Waste Handling and Disposal 	<ul style="list-style-type: none"> Visual Observation Waste Tracking Report 	Construction Site	Weekly	Contractor	SPMU ESWAMA	N250,000.00

13	Risk of noise related problems amongst workers from exposure of excessive noise	<ul style="list-style-type: none"> Implement site specific HSE Plan and Noise Control plan for workers to include use of hearing protective devices (HPD) 	<ul style="list-style-type: none"> No of workers using hearing protective devices (ear plugs) Workers with noise related problems 	<ul style="list-style-type: none"> Routine Inspection HSE Report 	Construction Site	Weekly	Contractor	SPMU SME/FMEnv SME HSE officer	N210,000.00
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B. CONSTRUCTION PHASE

Excavation , Burrowing, Filling, Back filling and Compaction									
1	Air quality deterioration from dusts generated during excavation, borrowing, filling, backfilling and compaction activities	<ul style="list-style-type: none"> Suppress dust emissions by appropriate methods such as spraying water on soil especially in windy conditions Minimize stockpile height and cover to avoid dust/particulate emissions Excavate in batches to minimize dust emissions Carry out backfilling and compaction quickly to prevent dusts from exposed loose soil 	<ul style="list-style-type: none"> Suspended Particulates (TSP, PM10, or smaller), SO₂, NO_x, CO, THC 	<ul style="list-style-type: none"> In-Situ Measurement 	Construction Site, area of high activity and surrounding	Daily (during high activity period and weekly thereafter)	Contractor	ENS-SPMU SME FMEnv NESREA	N450,000.00
2	Noise and vibration from the use of heavy duty vehicles during excavation, borrowing, backfilling and compaction activities	<ul style="list-style-type: none"> Maintain equipment and machineries adequately to reduce their noise levels Fit machineries and motorized equipment with exhaust mufflers/silencers to minimize noise generation Avoid unnecessary idling of internal combustion engines 	<ul style="list-style-type: none"> Noise Levels (Not to exceed 90dB(A)) No of Complaints Records of Equipment Maintenance 	<ul style="list-style-type: none"> In-Situ Measurement Complaint register Visual Observation 	Construction Site (high activity areas)	Daily	Contractor	ENS-ESWAMA SME/SMH HSE officer	N390,000.00
3	Water pollution due to sedimentation and salutation from runoff from spoils	<ul style="list-style-type: none"> Control off-site storm and flood water before it reaches areas being excavated to prevent run-off of sediment. This can be achieved by construction of temporary drainage channels with sedimentation traps and/or screens Install sediment retention basins, silt fences or other similar devices at strategic locations to prevent run-offs of 	<ul style="list-style-type: none"> Surface Water Quality (pH, BOD, COD, Turbidity, THC, heavy metals) Contractor's Compliance to SHM Sub-Plan 	<ul style="list-style-type: none"> In-Situ/Laboratory Measurements Visual Observation Complaints Register Visual Observation 	Discharge point, mid-stream and downstream of the Construction Site	Weekly	Contractor	ENS-NEWMAP SME FMEnv NESREA	N502,000.00

		sediment/silt to surface water • Implement SHM Sub-Plan	(see B5)						
4	Health and safety risks associated with falls, injuries of humans/animals in improperly abandoned excavated pits	<ul style="list-style-type: none"> • Implement Site Reclamation Plan • Plan appropriate measures to ensure borrow pits are secured where borrow pit is likely to pose significant risk after rehabilitation e.g. stock proof fencing in concert with signages 	<ul style="list-style-type: none"> • Contractor's compliance • Warning Signages • No. of incident 	<ul style="list-style-type: none"> • Visual Inspection • Incident Reports 	Construction Site and material borrow area	Weekly	Contractor	ENS-SPMU SME/SMH FMEnv NESREA HSE officer	N320,000.00
5	Risk of occupational accidents and injuries from the use of machineries and equipment	<ul style="list-style-type: none"> • Implement site specific HSE plan (see A3) 	<ul style="list-style-type: none"> • HSE Statistics • Accident/Injuries • Workers using PPEs 	<ul style="list-style-type: none"> • HSE Reports • Routine Inspection 	Construction site	Weekly	Contractor	ENS-SPMU SME/SMH HSE officer	N220,000.00
Civil Engineering/Cement Works									
6	Noise and vibration from the use of machineries and motorised equipment	<ul style="list-style-type: none"> • Maintain equipment and machineries adequately to reduce their noise level • Fit machineries and motorized equipment with exhaust muffers/silencers to minimize noise generation • Avoid unnecessary idling of internal combustion engines 	<ul style="list-style-type: none"> • Noise levels (Not to exceed 90db (A)) • No. of complaint • Records of equipment maintenance 	<ul style="list-style-type: none"> • Complaint register • Visual observation 	Construction site (High activity areas) and to some extent transport corridor	Daily	Contractor	ENS-SPMU SME/SMN/S MH	N315,000.00
7	Soil contamination and loss of soil quality from waste water and spills of oil and other petroleum products from leakages and/improper handling	<ul style="list-style-type: none"> • Implement WMP including measures to control oil spillages. • Proper maintenance of equipment to avoid oil spillages. • Refuelling and maintenance of vehicles should conform to best practices to ensure there are no spillages or leakages. 	<ul style="list-style-type: none"> • Contractor's Compliance • Evidence of leakages of oil and fuels 	<ul style="list-style-type: none"> • In situ / Laboratory Measurement • Visual Observation • Spot Check 	Soil Quality Sample Points Construction Site	Monthly	Contractor	ENS-SPMU SME NESREA	N320,000.00
8	Waste generation from cement and concrete works such as cement bags and metal scraps etc	<ul style="list-style-type: none"> • Implement the Waste Management Plan (WMP). Promote avoidance; reduction; reuse and recycling; • Enhance proper handling and disposal of wastes (especially contaminated soil or water, concrete, demolition materials, oils, grease, lubricants, metals, etc.) 	<ul style="list-style-type: none"> • Contractors Compliance • Waste Handling, and Disposal 	Visual Observation Waste Tracking Report	Construction Site	Daily	Contractor	SPMU SMEMR	N375,000.00

8	Transportation of Construction Materials	<ul style="list-style-type: none"> Implement the Traffic Management Plan Train drivers on haulage safety and pedestrian safety 	<ul style="list-style-type: none"> Contractor's Compliance to TMP 	Visual Observation	Along transport	Daily	Contractor	SPMU, MoE HSE officer MoT	N135,000.00
9	Injuries from accidental discharge of sand and stones during transportation to site	Cover trucks vehicles conveying sand, stones, etc.	<ul style="list-style-type: none"> Complaints from residents and other road users No of Road Traffic Accidents (RTA) No of Drivers Trained 	Complaint Register Police/FRSC Report Interviews/ Training Records	corridor Construction Site	Once (during construction)	Contractor	SPMU, MoE HSE officer MoT	N220,000.00
Operations of Site Installations		<ul style="list-style-type: none"> Implement the Waste Management Plan Promote waste avoidance; reduction; reuse and recycling; Ensure proper handling and disposal of wastes (especially oils, grease, lubricants, sanitary wastes, metals, etc.) 	<ul style="list-style-type: none"> Contractors Compliance Waste Handling and Disposal 	<ul style="list-style-type: none"> Visual Observation Waste Tracking Report 	Construction Site, workshops and storage areas	Daily	Contractor	SPMU MoE HSE officer	N170,000.00
10	Waste generation from site office and maintenance activities such as used containers scraps and office waste								
11	Risk of occupational accidents and injuries from activities carried out in site offices and workshop including maintenance works	<ul style="list-style-type: none"> Implement site specific HSE plan (see A3) 	<ul style="list-style-type: none"> Contractors Compliance Workers using PPE HSE Statistics (FAC, LTI, etc) 	<ul style="list-style-type: none"> Routine Inspection HSE Reports 	Site Offices and Workshops	Weekly	Contractor	SPMU MoH HSE officer	N200,000.00
OPERATIONS AND MAINTENANCE PHASE									
3	Land dispute /communal clash due to influx of people to take advantage of reclaimed gully/use of gully area	<ul style="list-style-type: none"> Implement existing administration and land ownership system in place in the community 			Host community	As required	Contractor	SPMU MoE, Site Committee Local Government Staff	N210,000.00
Grand Total Cost Of Monitoring									N6,548,000.00

6.5 Appropriate Reporting and Record Keeping

Appropriate records keeping and reporting procedures for all site activities guarantee that environmental incidents, accidents and hazards are appropriately captured and used to evaluate the predictive accuracy of impacts, effectiveness of monitoring programs and operational efficiency of the ESMP. Records shall be kept and used to monitor enforce where necessary all operational construction activities. Such information shall be stored in electronic form to facilitate safe keeping and prompt retrieval. The following records or registers will be maintained as an integral part of the ESMP.

- A register of environmental complaints defining the nature of complaint, date of complaint, corrective action taken and date it was resolved;
- A register of incidents such as spillages and leakages including the date, nature of the incident and corrective action taken;
- Date on the types and quantities of waste removed from the site;
- Records of formal consultation or communication activities
- Site inspection checklists; and

6.6 Institutional Arrangements and Responsibilities for Implementation of the ESMP.

Table 6.5 presents the overlapping institutional and management arrangements designed to properly implement the proposed mitigation measures for the ESMP. The Federal Ministry of Environment through the EIA Department and relevant agencies will play the role of lead environmental regulator performing oversight functions. The World Bank will assess implementation and recommend additional measures for strengthening the management framework and implementation performance. The roles and responsibilities of the Site Manager and Contractor(s) are meant to ensure sound environmental management practices and compliance with mitigation measures and monitoring requirements and regulations respectively. Other stakeholders like CDA/CDOs, NGOs/CSOs and site committee members/local community will perform external monitoring functions (Table 6.5)

Table 6.5: Role and Responsibilities for Implementation of the ESMP

S/N	Category	Role and Responsibilities
1	Enugu SPMU	<p>Implementing authority, has the mandate to:</p> <ul style="list-style-type: none"> Co-ordinate all policies, programmes and actions of all Erosion and flord rehabilitation sites across the state Ensure the smooth and efficient implementation of the project's various technical programme Cooperate through a Steering Committee that provide guidance to all technical aspects of all project activities Maintain and manage all funds effectively for the projects Liaise with the FME_{env} and World Bank with respect to the preparation and Implementation of the ESMP Compile and prepare periodic environmental reports for submission FME_{env} World Bank.
2	State Ministry of Works	<ul style="list-style-type: none"> Site assessment and monitoring of construction and engineering activities
3	State Ministry of Environment and Mineral resources	<ul style="list-style-type: none"> Lead role to ensure adherence to this ESMP and applicable standards regulations environmental and social liability investigations, monitoring and evaluation process and criteria
4	State Ministry of Health	<ul style="list-style-type: none"> Assessment and monitoring of the health status of staff and workers on site through periodic checks Monitor performance of medical Kits/First Aid equipment, other medical facilities
5	Ministry of Lands, Survey and Urban	<ul style="list-style-type: none"> Compliance overseer at State level, on matters of Land Acquisition and compensation and other resettlement issues
	Other MDAs	<ul style="list-style-type: none"> Come in as and when relevant areas or resources under their jurisdiction or management are likely to be affected by or implicated projects such as utilities
6	World Bank	<ul style="list-style-type: none"> Assess implementation activities Recommend additional measures for strengthening the management framework and implementation performance Responsible for the final review and clearance of the ESMP;
7	Site Manager	<ul style="list-style-type: none"> Ensure land disturbance activities are conducted in accordance with relevant regulations Minimise on-site erosion and control sediment in accordance with the site erosion and sediment control plan Communicate the content of, and any changes to the site erosion and sediment control plan Communicate control plan to all employees' contractors and workers on-site. Inspect the operation of erosion and sediment control devices and initiate repair or maintenance as required Instruct employees and contractors on the purposes and operation of erosion and sediment control devices and the need to maintain these devices in proper working order at all times Provide adequate on-site waste collection bins, ensure proper waste disposal, not litter and not to create environmental nuisance
8	Contractor	<ul style="list-style-type: none"> Compliance with Bill of Quantity specification in procurement of material and construction and adherence to the ESMP and good practice Provide inputs into the regular environmental report to be prepared by ESO;
9	Site Engineers/Supervisor	<ul style="list-style-type: none"> Provide oversight function during construction and de-commissioning to ensure adherence to good practice and the ESMP
10	Site Committee	<ul style="list-style-type: none"> Ensure compliance to BOQ and agreed terms, including heath, safety and Environment (HSE) issues
11	Local Government	<ul style="list-style-type: none"> Promote environmental awareness in project area Assist and liaise with other stakeholders to ensure proper siting and provision of approval for waste disposed sites. Support with comprehensive and practical awareness campaign for the proposed projects, amongst the various relevant grassroots interest groups
12	CDA/CDOs	<ul style="list-style-type: none"> Ensure community participation by mobilizing, sensitizing community members
13	NGOs/CSOs	<ul style="list-style-type: none"> Assist in their respective ways to ensure effective response actions. Conducting investigators alongside government groups to evolve and devise sustainable environmental strategies and rehabilitation techniques. Organising, coordinating and ensuring safe use of volunteers can best render services effectively and providing wide support assistance helpful in management planning Institutional/governance issues and other livelihood related matter. Project impact mitigation measures, awareness campaigns(s).
14	Others/General Public	<ul style="list-style-type: none"> Identify issues that could derail the project Support project impacts and mitigation measures, awareness campaigns

6.7 Environmental Risks and Emergency Response

Potential environmental risks during project construction works include accidents, fire, emergency spills and pollution incidents, unexpected sediment problems and oil and grease spills/discharges from heavy duty machineries. The following emergency procedures are formulated and drawn up to mitigate such risks.

6.7.1 Basic Emergency Requirements

1. Make it Safe, Stop, Contain, Notify!
2. Identify the cause of the emergency or incident and act immediately to prevent it from getting worse.
3. Make sure that appropriate PPE is available to use where necessary.
4. Report any emergency or incident to the Site Manager and Environmental safety officer immediately, detailing the nature, cause and location so that appropriate action can be taken.
5. Contact the Local Authority, SEPA and / or SMoH as relevant to the incident.

A. Fire

DO:

1. Report emergency to Site Manager immediately.
2. Call fire brigade (the fire may only appear to be out).
3. Inform landowner / occupier and relevant site construction supervisor.

B. Emergency Spills and Pollution Incidents

DO:

1. Make sure you have the appropriate PPE before taking action.
2. Contain a pollution incident immediately using absorbent materials or by digging containment facilities or pits.
3. Report incident to site manager and the environmental manager(s) and contact SPMU.

C. Unexpected Sediment Problem

DO:

1. Check watercourses during periods of high rainfall or construction activities with potential for significant run-off impacts (or sedimentations).
2. Check for broken field drains which could lead to pollution at any time.
3. Take immediate action if you identify any high sediment which is causing pollution or if unsure if it is significant consult with the site Environmental officer(s) who should determine whether SPMU needs to be notified.
4. Implement mitigation measures immediately. Control pollution at source wherever possible. Consider whether the site activity should be halted. Consult the Environmental officer if in doubt.
5. Place silt screens etc to help control sediment immediately and/or check measures already in place for efficacy.
6. Monitor the effectiveness of protection measures daily and re-plan as necessary.
7. Always remove silted debris/screens dams etc regularly so they do not make problems worse.
8. Talk to SPMU regularly and check your plans for emergency procedures.
9. Reconsider working practices which may be causing pollution in poor weather conditions and re-plan/re-programme.
10. Plan water related activities to take account of the risk of flooding (e.g. when constructing water crossings).

D. Oil Spills/Grease Discharges

DO:

1. Stop the action/event which is causing pollution immediately.
2. Take immediate remedial actions – block spill; discharge materials to help soak up the spill and the advice in the oil spill response kit.
3. Inform the site Environmental officer(s) to identify more detailed required actions.
4. Inform SPMU and equipment Work yard manager/Site manager if the spill has not been contained and dealt with.
5. Monitor effects of spill.
6. Remove spill response materials and dispose off in accordance with the Site waste management plan.
7. Deal with any contaminated soils in accordance with the Site waste management plan.
8. Learn from the experience and plan site works to avoid pollution happening again.

6.8 Proposed Capacity Training Needs for the ESMP.

Institutions and agencies to be involved in the ESMP implementation would require capacity building in order to effectively and efficiently discharge their monitoring and management responsibilities. From the issues raised by stakeholders during consultation meetings across the three communities in the project area, the SPMU E&S Safeguard officers will require capacity building to acquire better public communication and consultation skills for effective interaction with Contractors, workers, Community stakeholders, project affected persons (PAPs) and other relevant stakeholders. Community based organizations (CBOs) will need capacity training in the area of environmental assessment, external monitoring functions, support aggrieved community members especially PAPs and vulnerable persons to get prompt and fair redress, and to enforce corrective actions. To enhance the respective roles and collaboration of the relevant stakeholders like the site manager, HSE officers, Site Committee members, community stakeholders, the following broad areas for capacity building have been drawn up for the effective implementation of the ESMP (Table 6.6)

Table 6.6 Training Modules for Environment and Social Management Issues

Programme	Description	Participants	Form Of Training	Duration /Location	Training/Conducting Agency	Cost (N)
Sensitization	General Environment Issues- Environment management functions, agencies, regulations and World Bank/Safeguard Instruments (ESMP, RAP) including NEEDS assessment	SPMU Engineer and Environment/Safeguard Unit, Procurements officers	Workshop	6 hours	Environment & Social Specialists Consultant engaged in capacity building training	350,000.00
Module I	General Environment Issues- Environment management functions, agencies, regulations and World Bank Safeguard Instruments (ESMP, RAP) including NEEDS assessment	Site Engineer/Manager, Workers, MoE, MoW, HSE officer, Environment Safeguard Officer(s)	Lecture	3 hours	Environment & Social Specialists Consultant engaged in capacity building training	300,000.00
Module 11	Environmental Considerations in Construction projects; Environmental components affected by project, Environmental Management best practices in gully erosion control, Stakeholder and Community project Participation e.t.c.	SPMU Engineers MoE/(Technical unit), Community leaders/CBOs/NGOs	Workshop	8 hours	Environment & Social Specialists Consultant/engaged for capacity building training	510,000.00
Module 111	Integration of ESMP components into construction activities; techniques for project effect and process monitoring; site selection criteria for identifying waste disposal sites; techniques for remediation/restoration/reclamation of degraded sites	SPMU Engineer, Contractors/MoE./ MoW related officials, Environment Safeguard Officer, HSE Officer(s).	Lecture and Field Visit	8 hours	Environment & Social Specialists Consultant/engaged for capacity building training	450,000.00
Module IV	Overview of PMU Projects, Environmental & Social Impacts, organizational management; overview of coordination activities between FPMU, SPMU, WB; Procedural requirements, operations and co-ordination with relevant Government MDAs Co-operation & Coordination with other Departments	Officials of MDAs, SPMU Staff, CBO/NGOs and Site Committee Member(s)	Workshop	6 hours	Environment & Social Specialists Consultant/engaged for capacity building training	350,000.00
Module V	Civil works and use of vegetation for gully stabilization in environmental management practices: roles and responsibilities of officials/contractors/consultants towards protection of environment during project operational phase	Officials of MoE, and other line MDAs	Workshop	6 hours	Environment & Social Specialists Consultant engaged for capacity building training	250,000.00
						2,110,000.0

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6.6 Implementation Schedule

The activities contained in the ESMP have to be integrated into the various phases of the project construction. The key elements of the implementation schedule are presented in Table 6.7 below:-

Table 6.7: Summary of Responsibility for Implementation of the ESMP

Project Cycle	Phase	Activities	Responsibilities
Planning	Scoping	<ul style="list-style-type: none"> • Clearance and final disclosure of ESMP • Review and approval of Contractors ESMP and construction schedule • Preparation of mitigation and monitoring guidelines and procedures • WB No-objection 	Consultant Supervised by SPMU/FPMU World Bank
Design	Preparation of ESMP and Consultations	<ul style="list-style-type: none"> • Review of concept design of project 	‘
	Completion and Integration	<ul style="list-style-type: none"> • Inclusion of ESMP in the • Contract documents • WB No-objection 	‘
Construction	Implementation and Monitoring	<ul style="list-style-type: none"> • Monitoring and reporting on Environmental and Social mitigation measures (performance monitoring) • Effects monitoring and reporting of ESMP and livelihood issues • Non-conformance and corrective action/measures 	Contractors and Consultant Supervised by SPMU, EHS-MDAs/Community stakeholders
Operation (Post Implementation)	Operations and Maintenance	<ul style="list-style-type: none"> • Maintenance • Monitoring and Reporting on Environmental and Social sustainability issues • Post project audit 	Contractors : and supervised by SPMU, FPMU, ENS MDAS/Community stakeholders

6.10 Cost of Implementation of the ESMP

The effective implementation of the ESMP would require the use of equipment logistics and expert/professional services to achieve objectives of good engineering construction practice and overall sound environmental and social sustainability. These would require money to execute. The total estimated cost for implementing the ESMP is estimated to be Twelve Million, Two Hundred and Fifty-Eight Thousand (N12,258,000.00) Only (Table 6.8)

Table 6.8: Estimated Budget for the Implementation of ESMP

S/N	Item	Responsibilities	Estimated Budget (N)
1	Mitigation	Contractor	3,600,000.00
2	Monitoring	Enugu State NEWMAP ENS MDAs, FMEnv, Federal MDAs	6,548,000.00
3	Capacity Building	ENS NEWMAP	2,110,000.00
Total			N12,258,000.00

CHAPTER 7

7.0 SUMMARY, RECOMMENDATIONS AND CONCLUSIONS

This Environmental and Social Management Plan (ESMP) has been prepared as one of the safeguard instruments to be used in the implementation of the proposed civil engineering works designed to rehabilitate and stabilize the Agbaja Ngwo Gully Erosion Site by the Enugu State Nigeria Erosion and Watershed Management Project (ENS-NEWMAP). The Gully site which developed from an abrupt termination of an existing concrete trapezoidal channel meant to convey the outwash from a major Reservoir that receives water from Ajali and Oji River Schemes is now aggressively encroaching the reservoir (50% of Enugu urban population depends the reservoir for water supply for different uses), destroying large expanse of farmlands, cashew and palm plantations and depriving the Imeama Community of their sources of livelihood. The proposed intervention works by ENS-NEWMAP involves gully head stabilization, gully bed stabilization, gully bank stabilization and watershed management construction and re-vegetation activities meant to rehabilitate the gully head, reduce longer-term erosion vulnerability in the area and promote overall sustainable watershed management.

In line with World Bank assisted projects, the proposed activities have triggered World Bank Safeguard Policies OP/BP 4.01 (Environmental Assessment) and OP/BP 4.12 (Involuntary Resettlement) and hence the need for the preparation of this ESMP. The rationale for the preparation of this ESMP is to develop a site specific management framework which will ensure that the likely environmental and social concerns that will arise from the proposed Agbaja Ngwo Intervention works are translated into specific costed, measurable and monitorable mitigation activities. The study reveals that the successful implementation of the proposed intervention works will stabilize the gully, promote longer term erosion vulnerability, prevent landslides, regenerate and restore vegetal cover/floral habitat and improve microclimatic conditions in the area besides the creation of employment opportunities, diversification of livelihoods, improved agricultural productivity and increase in land values. The identified negative impacts of the proposed project include increased noise, solid waste generation, vehicular traffic and likely attendant accidents, loss of vegetal cover and soil and water contamination by spilled oils, spoils, discharges and other chemical/hydrocarbon substances. Majority of these negative impacts are temporary in nature and will be effectively mitigated by the suggested mitigation measures.

To effectively implement the proposed mitigation measures, a participatory driven integrated environmental and social management framework is drawn up that captures the specific tasks to be performed by the relevant institutions agencies and organizations to be involved during the various implementation phases of the proposed intervention works. Similarly specific costed, measurable and monitorable mitigation activities have been developed and integrated into the different operational phases of construction processes. Also to address the issues of capacity needs and deficits identified during stakeholder's consultation meetings, a capacity enhancement training scheme has been formulated and included into the ESMP. Furthermore, to guide the preparation of the project implementation manual (PIM) to be used during the construction work, the total estimated cost for implementing this ESMP has been prepared. Finally the project implementation schedule and the responsibility for implementation and supervision has been suggested and proposed for the ESMP to promote smooth and faithful execution of the various activities contained in the ESMP.

In conclusion the timely and successful implementation of this ESMP will reduce the environmental and social/livelihood impacts or concerns that will arise from the implementation of the proposed Agbaja Ngwo Gully Erosion Site Intervention works. What is required to achieve these goals is for all stakeholders to play their roles and perform their responsibilities in a manner prescribed in this ESMP and other safeguard instruments that are required to guide the implementation of this intervention works. This is the challenge for the Enugu State Government, the Enugu State SPMU and the World Bank.

REFERENCES

- Abbreviated Resettlement Action Plan (ARAP) (2012) for the Construction of Alternate Bridge at (Km 7+350) along Enugu –Abakaliki Road, Emene Enugu State.
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- Environmental and Social Management Plan (ESMP) (2011) for Ajali Waterworks Gully Erosion Site (Final Report), Enugu State Nigeria Erosion and Watershed Management Project (EN-NEWMAP), Enugu
- Environmental and Social Management Plan (ESMP) (2016) for the Asu-Umunaga Flood Intervention Site (Final Report) Ebonyi State Nigeria Erosion and Watershed Management Project, Abakaliki, Ebonyi State
- Resettlement Action Plan (RAP) (2016) for Asu-Umunaga Flood Intervention Site (Final Report) Ebonyi State Nigeria Erosion and Watershed Management Project (EB-NEWMAP), Abakaliki, Ebonyi State
- Environmental and Social Management Plan (ESMP) (2016) for Old Waterworks Erosion and Flood Site (Final Report) Ebonyi State Erosion and Watershed Management Project (EB-NEWMAP), Abakaliki, Ebonyi State.
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- Project Appraisal Document for Nigeria Erosion and Watershed Management Project (NEWMAP)
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- World Bank 2001 Operational Policies: OP 4.01 Environmental Assessments and Annex
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ANNEXURES

ANNEX 1

ENUGU STATE NEWMAP: TERMS OF REFERENCE FOR THE PREPARATION OF ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP) FOR AGBAJA NGWO GULLY EROSION SITE IN ENUGU STATE UNDER THE NIGERIA EROSION AND WATERSHED MANAGEMENT PROJECT (NEWMAP)

Background

The Government of Nigeria is implementing the multi-sectoral Nigeria Erosion and Watershed Management Project (NEWMAP), which is financed by the World Bank, Global Environment Facility, the Special Climate Change Fund, and the Government of Nigeria. NEWMAP finances activities implemented by States and activities implemented by the Federal government. The project currently includes 7 states, namely Anambra, Abia, Cross River, Edo, Enugu, Ebonyi, and Imo.

The lead agency at the Federal level is the Federal Ministry of Environment (FME), Department of Erosion, Flood and Coastal Zone Management. State and local governments, local communities and CSOs are or will be involved in the project, given that the project is a multi-sector operation involving MDAs concerned with water resources management, public works, agriculture, regional and town planning, earth and natural resources information, and disaster risk management.

The development objective of NEWMAP is: *to rehabilitate degraded lands and reduce longer-term erosion vulnerability in targeted areas*. At State level, NEWMAP activities involve medium-sized civil works such as construction of infrastructure and/or stabilization or rehabilitation in and around the gullies themselves, as well as small works in the small watershed where gullies form and expand. These works trigger the World Bank's Safeguard Policies including Environmental Assessment OP 4.01; Natural Habitats OP 4.04; Cultural Property OP 11.03; Involuntary Resettlement OP 4.12 Safety of Dams OP 4.37.

The environmental and social safeguards concerns are being addressed through two national instruments already prepared under the project: an Environmental and Social Management Framework (ESMF) and a Resettlement Policy Framework (RPF). These framework instruments need to be translated into specific costed, measurable, and monitorable actions for specific intervention sites through the preparation of site-specific management and action plans.

ESMF. In general, the ESMF specifies the procedures to be used for preparing, approving and implementing (i) **environmental/social assessments** (ESAs, or alternately both an SA or an EA) and/or (2) **environmental/social management plans** (ESMPs, or alternately both an EMP and SMP) for individual civil works packages developed for each project. ESMPs are essential elements for Category B projects.

RPF. The RPF applies when land acquisition leads to the temporary or permanent physical displacement of persons, and/or loss of shelter, and /or loss of livelihoods and/or loss, denial or restriction of access to economic resources due to project activities. It sets out the resettlement and compensation principles, organizational arrangements and design criteria to be applied to meet the needs of project-affected people, and specifies the contents of a Resettlement Action Plan (RAP) for each package of investments.

Objective and Scope of the Consultancy

The objective of the consulting services is to prepare an environmental and social management plan (ESMP) for the Enugu State sub-projects for Agbaja Ngwo sub project(s) in Enugu State intervention site(s).

The ESMP is site-specific and consists of a well-documented set of mitigation, monitoring, and institutional actions to be taken before and during implementation to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. The ESMP also includes the measures needed to implement these actions, addressing the adequacy of the monitoring and institutional arrangements for the upper and lower watersheds in the intervention site.

The consultant will work in close collaboration with the engineering design consultants and NEWMAP State Project Management Unit's (SPMU) safeguard team, and with other actors as directed by the SPMU. In that respect the sequencing of the technical/feasibility studies and the ESMP will be critical. The consultant will have to receive the draft technical/feasibility studies in order to take into account the technical variants of the proposed activities and also in return inform the technical design consultants of any major constraint that may arise due to the social and environmental situation on the ground.

In each intervention site, the consultant will visit the full sub-watershed as delimited in the given gully stabilization design. These sub-watersheds are an average of four square kilometres in southern Nigeria. The consultant will take into account the proposed civil engineering designs, vegetative land management measures and other activities aimed at reducing or managing runoff that would be carried out within the sub-watershed. The consultant will assess natural resources and infrastructures potentially affected during project

implementation and operation and select the management strategies needed to ensure that environmental risks are appropriately mitigated.

Tasks of the consultant include the following:

- a) Describe the existing status of the sub-watershed and gullies;
- b) Identify the environmental and social issues/risks associated with the existing conditions;
- c) Select and measure appropriate baseline indicators (for example, m³/sec of runoff collected in the sub-watershed during a heavy hour-long rainfall);
- d) Develop a plan for mitigating environmental and social risks associated with construction and operation in the gully in consultation with the relevant public and government agencies; Identify feasible and cost-effective measures that may reduce potentially significant adverse environmental and social impacts to acceptable levels;
- e) Develop a time-bound plan for mitigating environmental and social risks associated with sub-watershed management in consultation with the relevant public and government agencies; Identify feasible and cost-effective measures that may reduce potentially significant adverse environmental and social impacts to acceptable levels;
- f) Identify monitoring objectives and specifies the type of monitoring, with linkages to the impacts assessed and the mitigation measures described above(in a-e);
- g) Provide a specific description of institutional arrangements: the agencies responsible for carrying out the mitigation and monitoring measures (e.g., for operation, supervision, enforcement, monitoring of implementation, remedial action, financing, reporting, and staff training) and the contractual arrangements for assuring the performance of each implementing agency;
- h) Define technical assistance programs that could strengthen environmental management capability in the agencies responsible for implementation;
- i) Provide an implementation schedule for measures that must be carried out as part of the project, showing phasing and coordination with overall project implementation plans; and
- j) Provide the expected capital and recurrent cost estimates and sources of funds for implementing the ESMP and inform accordingly the design consultants so that these costs are duly taken into consideration in the designs.

Description of Agbaja Ngwo Gully Erosion Intervention Site

Agbaja Ngwo gully erosion in Udi Local Government Area of Enugu State is one of the benefiting sites. This study is prepared for Agbaja Ngwo gully erosion site located in Udi Local Government Area of Enugu State, Nigeria.

Agbaja Ngwo Gully Erosion site is located in Ngwo town at geographical coordinates 06^o26' 15"N Latitude 07^o 26'19"E Longitude which is six miles North of Enugu Capital City. It is threatening the water reservoir that receives water from Ajali and Oji River water schemes. The water reservoir serves as the main source of water supply to Enugu city, as 50% of Enugu Urban population depends on the reservoir for water supply for different uses. A survey of the area reveals that the community's farmland has been negatively affected by the erosion thereby displacing many peasant farmers, who depend primarily on the farm produce and fruits to feed their families. The erosion has destroyed large expanse of farmland and vegetation thereby depriving the community from their sources of livelihood. Studies on engineering components have been carried out to access the design solutions at various stages of the gully. These include hydrological studies which determined the discharge of flow which the channel carries safely to its termination point (gully head) coming from the reservoir as a result of the overflow. The maximum discharge through the channel is approximately 20m³/s, but a discharge of 24m³/s was used as a safety measure for the design. Geotechnical studies which determine the type of soil within the gully erosion corridor and the environs showed, from the unified soil classification system, that the soil is an inorganic silty sands, poorly graded with low plasticity. The maximum dry density (MDD) ranged from 1.69g/cm³ to 1.84g/cm³.

These measures serve as water energy dissipater/hydraulic control structures. Apart from velocity control, the hydraulic structures also help, by reducing the velocity, to stabilize the invert/bottom of the gully as a step in gully erosion mitigation.

Summary of Agbaja Ngwo Gully Erosion Intervention Works

The intervention works for Agbaja Ngwo erosion site include the following;

- a. Extension of existing trapezoidal channel;
- b. Design of transitional channel to join the chute channel;
- c. Design of chute channel to collect the flow from the transitional channel into the stilling basin;
- d. Design of silting basin with its baffle blocks, weep holes and drainage of the apron;
- e. Filling and compaction of fill to reclaim part of the gully head and its finger gully;
- f. Flat gabion mattress lying on geotextile material;
- g. Reno/gabion mattress where necessary to protect the base from scouring;
- h. Check dams placed at appropriate intervals along the gully bed; and

- i. Re-vegetation with local grass and trees within the distance of the gully.

Note: The detailed engineering design of this site will be provided to the consultant on design.

The following socio-economic issues shall be addressed in the ESMP:

- A summary of the impacted communities for the project: location, access, population (number, demographic and social characteristics); economy (employment rate, income distribution); services (types, capacity, and adequacy) and housing. Concern is the ability to provide work force, service new development and absorb and adjust to growth (worker/family).
- A summary of the views of the population including vulnerable groups, determined through thoroughly documented discussions with local communities. These meetings and discussions must be documented and should show how issues and problems raised are or will be resolved (note that a Resettlement Action Plan (RAP) could be developed for the Site, and this is covered under separate TORs).
- Cultural: Summarize the possible effects of the project on historical/archaeological sites, heritage/artifacts, native religious or harvest sites of the affected communities and identification or development of mechanisms for handling chance findings.

Information will be gathered from field surveys and secondary data sources (interviews, structured questionnaires, in-depth interviews and focus group discussions).

Other Tasks:

The consultant shall assist the SPMU to: (i) Register the ESMP with the environmental assessment (EA) departments at Federal and State levels; and (ii) Disclose the finalized ESMP at National, State, LGA and Community levels.

Qualifications

The consultant(s) must have expertise and advanced degrees earned in relevant fields including but not limited to: civil/environmental engineering, environmental sciences, or the social sciences.

Minimum experience should be eight (8) years with a minimum specific experience of four (4) years on planning related to infrastructure development or disaster response.

The consultant(s) must have experience in design and preparation of an Environmental and Social Management Plan (ESMP) for infrastructure projects. The consultant(s) must have competency and documented experience in social and environmental scientific analysis and development of operational action plans.

The consultant(s) must have a working knowledge of World Bank operational safeguards policies gained through hands-on experience in the preparation and implementation of environmental and social management plans in an urban area.

Deliverables and timing

- **Inception Report:** One week after contract signing.
- **Week 4:** A draft ESMP will be submitted for comments in **Four weeks** from the date of signing the contract.
- **Week 6:** The draft final ESMP Report will take into account all comments, and will be submitted to the SPMU.
- **Week 8:** The Final ESMP acceptable to Enugu State and to the World Bank. A comprehensive database of relevant information collected in Excel format.

Project-specific background documents

- Environmental and Social Management Framework(ESMF)
- Resettlement Policy Framework (RPF)
- NEWMAP Project Appraisal Document (PAD)
- NEWMAP Project Implementation Manual (PIM)
- World Bank safeguards policies
- Intervention design

Due to the need to urgently conclude the study for possible early take off of the remediation work in order to take full advantage of the forthcoming dry season, 45 days is being projected for completion, but using very large pool of human resources. It is estimated that the duration and cost of consultancy for the preparation of this Environmental and social Management plan (ESMP), will be for 45days at xxxxx Naira per day which comes to Nxxxxxxx Associated field research costs will also be covered under the terms of the Assignment-

including payment for field researchers and associated travel costs. Costs of research and field based activities in the following areas are reimbursable with receipts. The following caps on cost have been agreed, however such costs will still require receipts:

Payment of field researchers:	Nxxxxxxx
Acquisition and Analysis of high resolution imageries for the referenced depiction of site characteristics	Nxxxxxxx
Refreshment and Logistics of consultations	Nxxxxxxx
Transportation Costs	Nxxxxxxx
Hotels, Food and incidentals	Nxxxxxxx
Contingency	Nxxxxxxx
Total =	Nxxxxxxx

The estimated total budget for the ESMP is Nxxxxxxxxx.

Payment Schedule

- 10% of Contract sum on signing of Contract
- 10% of Contract sum on successful submission of inception deliverable
- 30 % of Contract sum on submission of Draft Report
- 30% of Contract sum on submission of Draft Final Report
- 20% of Contract sum of submission and Acceptance of Final Report

ANNEX 2

S/No	
Date	

**SAMPLE COPY OF ADMINISTERED QUESTIONNAIRE
NIGERIA EROSION AND WATERSHED MANAGEMENT PROJECT (NEWMAP)
SOCIO-ECONOMIC BASELINE SURVEY
AGBAJA NGWO GULLY EROSION INTERVENTION SITE**

Dear Respondent,

Agbaja Ngwo gully erosion in Enugu North Local Government Area of Enugu State is one of the benefiting sites for intervention under the Enugu State Nigeria Erosion and Watershed Management Project. The erosion has destroyed large expanse of farmland and vegetation thereby depriving the community of their sources of livelihood.

The goal of this survey is to collect baseline data for the Nigeria Erosion and Watershed Management Project. The survey will elicit information on relevant socio-economic issues to be used for the preparation of the Environmental and Social Management Plan (ESMP) for the Gully Erosion intervention site.

Your co-operation is highly solicited in supplying answers to the questions contained therein. All information supplied is to be used strictly for the purpose of the ESMP.

Thanks for your anticipated cooperation.

ESMP Consultant

SECTION A: BIO-DATA SECTION

1. Name of Respondent:
2. Village:
3. Community:
4. L.G.A / State:
5. Age:
6. Phone Number:

7	Gender	Tick as applicable
7_1	Male	
7_2	Female	

8	Marital Status	Tick
8_1	Single	
8_2	Married	
8_3	Divorced	
8_4	Separated	
8_5	Widow	
8_6	Widower	

9	Level of Education	Tick
9_1	Primary	
9_2	Secondary	
9_3	Vocational/Technical	
9_4	Tertiary	
9_5	None	

SECTION B: HOUSEHOLD COMPOSITION

10	Family Size	Tick
10_1	1 – 5 persons	
10_2	6 – 10 persons	
10_3	11 – 15 persons	
10_4	16 – 20 persons	

12	Religion	Tick
12_1	Christianity	
12_2	Islam	
12_3	Traditional Practice	
12_4	Others	

11	Relationship to Household Head	Tick
11_1	Head	
11_2	Spouse	
11_3	Child	
11_4	Sibling	
11_5	Relative	
11_6	Others	

13. Number of people with disability in your household:

14	Type of accommodation/residence	Tick
14_1	Single room	
14_2	Flat	
14_3	Bungalow	
14_4	Duplex	

SECTION C: OCCUPATION & SOURCE(S) OF LIVELIHOOD

15	Activity	Tick
15_1	Civil Servant	
15_2	Crop Farming	
15_3	Animal Farming	
15_4	Horticulture	
15_5	Trading	
15_6	Artisan	
15_7	Student	
15_8	Agro Processing	
15_9	Transportation	
15_10	Private Sector	
15_11	Professional Discipline	
15_12	Public Servant	
15_13	Retiree/Retired	
15_14	None	
15_15	Others (specify)	

16	Monthly Income Status (₦'000)	Tick
16_1	Less than 5	
16_2	6 – 10	
16_3	11 – 15	
16_4	16 – 20	
16_5	21 – 25	
16_6	Above 25	
16_7	None	

17. What is your household average monthly expenditure on?
 Food.....
 Medical Services.....
 Utilities.....

SECTION D: LAND OWNERSHIP AND USES

18	How do you acquire land in your community?	Tick as applicable	
		Yes	No
18_1	Inheritance		
18_2	Gift		
18_3	Lease		
18_4	Outright Purchase		

19	What are the uses of the acquired land?	Tick as applicable	
		Yes	No
19_1	Farming		
19_2	Residential		
19_3	Commercial		
19_4	Others		

20	Farm products produced by your household	Tick	
		Yes	No
20_1	Vegetables		
20_2	Tuber crops e.g. yam, cocoyam, cassava		
20_3	Cereals e.g. rice, maize		
20_4	Tree crops e.g. oil palm, cashew		
20_5	Livestock e.g. poultry		
20_6	Aquaculture (fish pond)		

21	Types of Farming Practices	Tick	
		Yes	No
21_1	Mono cropping		
21_2	Alley cropping		
21_3	Mixed cropping		
21_4	Mixed farming		

22	Ways/Methods of land/soil restoration	Tick	
		Yes	No
22_1	Shift cultivation		
22_2	Crop rotation		
22_3	Continuous cropping		
22_4	Bush fallowing		
22_5	Compost		

23	Which of the following land use is closest to the Gully	Tick only one option
23_1	Farmland	
23_2	Residential	
23_3	Commercial	
23_4	School	
23_5	Church	
23_6	Health facility	
23_7	Market	
23_8	Others (specify)	

24	What distance is the closest land use to the Gully	Tick only one option
24_1	Less than 50m	
24_2	51m – 100m	
24_3	101m – 150m	
24_4	151m – 200m	
24_5	201m – 250m	
24_6	Above 250m	

25	What are the cultural/historical heritages to be protected within the area?	Tick as applicable	
		Yes	No
25_1	Shrines		
25_2	Forest Reserve		
25_3	Sacred Grooves		
25_4	Stream		
25_5	Others		

SECTION E: PHYSICAL INFRASTRUCTURES/SOCIAL FACILITIES IN THE COMMUNITY

26	Amenity	I	II	III	IV	V	VI	VII
26_1	Water	Pipe borne	Borehole	Rain water	Stream	Spring water	Water vendor	Well
26_2	Energy	Electricity	Generator	Gas lamp	Kerosene lamp	Wike Lamp	Solar panel	
26_3	Roads	Tarred/ Asphalt	Concrete paved	Graded road	Wide Earth	Foot path	Others	
26_4	School	Nursery/Kindergarten	Primary	Secondary	Vocational/ Technical	Tertiary	None	
26_5	Market	Built lock up stalls	Built open market	Unbuilt/open village market	Others			
26_6	Health	Hospital/Health Centre	Private Clinic	Maternity	Dispensary	Traditional Healing home	Patent Medicine Store	None
26_7	Recreational	Village square	Park	Town hall	Beach	Forest reserve	None	Others
26_8	Religious Institution	Churches	Mosques	Shrines	Sacred Grooves	None	Others	
26_9	Waste Management	Public legal dumpsite	Open dumpsite	Burying/burning	Dump into drainage/river	Recycling	Others	
26_10	Transportation	Tricycle (Keke)	Mini bus	Truck /Lorry	Motorcycle (Okada)	Car	Others	
26_11	Communication	Town crier	Mobile phones, internet	Radio set	TV Set	Newspaper		

SECTION F: CONDITION & ACCESS TO COMMUNITY FACILITIES

27	Facility	Condition		Time taken to reach..... (in mins)				
		Good	Bad	Less than 10	11 – 20	21 – 40	41 – 60	Above 60
27_1	Nursery							
27_2	Primary							
27_3	Secondary							
27_4	Vocational/ Technical							
27_5	Tertiary							
27_6	Hospital/Health Centre							
27_7	Private Clinic							
27_8	Maternity							
27_9	Dispensary							
27_10	Patent Medicine Store							
27_11	Pipe borne water							
27_12	Well							
27_13	Borehole							
27_14	Stream							
27_15	Spring water							
27_16	Built lock up stalls							
27_17	Open market							
27_18	Village Square							
27_19	Town hall							

SECTION G: IMPACT OF PROPOSED INTERVENTION ON HOUSEHOLD

28	IMPACT	Tick as applicable	
		Yes	No
28_1	LAND		
28_1a	Virgin land		
28_1b	Economic trees		
28_1c	Forest trees		
28_1d	Crops & vegetables		
28_2	STRUCTURES		
28_2a	Residential		
28_2b	Agricultural		
28_2c	Commercial		
28_2d	Industrial		
28_2e	Religion (Shrine, Churches, Mosques)		
28_3	BUILDING COMPONENTS		
28_3a	Main building		
28_3b	Ancillary building		
28_3c	Fence walls		
28_3d	Shops		
28_3e	Concrete kerbs/pavement		
28_4	INCOME & LIVELIHOOD		
28_4a	Farm (economic trees, forest trees & food crops)		
28_4b	Rental income		
28_4c	Wage		
28_4d	Fees from apprentice		
28_4e	Trading		
28_4f	Artisans		
28_5	BENEFICIAL		
28_5a	Employment		
28_5b	Business boom		
28_5c	Increase in land value		
28_6	DISTURBANCE & DISRUPTION		
28_6a	Disconnection of utility services (electric poles, water pipes)		
28_6b	Temporal loss of customers & companions		
28_6c	Temporal loss of peaceful enjoyment of property (due to noise, dust etc).		
28_6d	Incurring removable expenses		

SECTION H: PROJECT AFFECTED PERSONS

29. Indicate the type of Project Affected Person(s)

	PERSON	Tick as applicable	
		Yes	No
29_1	Individual		
29_2	Household		
29_3	Vulnerable Persons/Groups		
	Internally displaced persons		
	Elderly		
	Person living with HIV/AIDS		
	Orphans		
	Widows/Widowers		
	Physically challenged		
29_4	Squatters & other land occupiers		

ANNEX 3

MINUTES OF MEETINGS HELD

S/N	ITEM	DESCRIPTION
1.	Project	NEWMAP ESMP of Agbaja Ngwo Gully Site
2.	Venue	Umuase Town Hall
3	Date	May 21 st , 2016
4.	Language of Communication	Igbo and English
5.	Introduction	The meeting started at 12.15 pm with opening prayer said by EzinnaAlloysiusNgwu after which a brief introduction of members of the Igwe in council and opinion leaders was done by Chief Nze Ferdinand Ude while the Lead Consultant introduced members of his team.
6.	Opening remarks/overview of the meeting	Chief Daniel Ugwu welcomed the team on behalf of the Igwe of Imeama Autonomous community. Other High chiefs as well as the chairman of the erosion committee also spoke and thanked the Government for their proposed intervention to ameliorate the Agbaja Ngwo gully site.
7a.	Description of the project by the Lead nt	The Lead Consultant Mr. Dennis Nebedum explained the purpose of the ESMP which is to identify the perceived potential impacts of the proposed project intervention and developing mitigation measures in order to address the impacts while enhancing the positive impacts. He informed them that in order to protect and create resilience to the affected community, World bank designed the ESMP, RAP, FNGO and other sister consultancies to complement the civil work at Agbaja Ngwo gully site.
b.	Community Questions and concerns.	If the proposed intervention work will be one of those projects that failed or abandoned? If NEWMAP can rehabilitate rural roads affected by flood? How the members of the community can be employed during the Engineering work?
c.	Responses to the concerns	In response, the Consultant informed the community that World Bank does not abandon projects provided the community ensures maximum support throughout the project implementation. In the issue of rural road rehabilitation, the Consultant opined that the question will be better handled by ENS-NEWMAP. On employment, the Consultant informed them that the engineering company will engage the community youths during the construction works.
8.	Community Perceptions about the Project	Members of the community were grateful to Enugu State Government and World Bank for selecting their community as one of the intervention sites in the state.
9.	Closing remarks	The chairman of erosion committee advised his people to be patient with NEWMAP and also pledge their support to the success of the project. The meeting came to an end by 3.30pm.

S/N	ITEM	DESCRIPTION
1.	Project	NEWMAP ESMP of Agbaja Ngwo Gully Site
2.	Venue	Ascort Hotels, Enugu
3	Date	June 9 th , 2016
4.	Language of Communication	Igbo and English
5.	Introduction	The meeting started at 11.30 am with an opening prayer said by Pastor Dan Ozoani. Brief introduction of some stakeholders' and members of the consultant's team was done by the Lead Consultant Dennis Nebedum.
6.	Opening remarks/overview of the meeting	Dr. H. O Eze (Environmental Officer) who also represented the NEWMAP State Project Coordinator informed the Stakeholders on the essence of the consultative forum. He emphasized on the need for the Gully Erosion Control which he said was to help reduce the destruction of lives and properties. He solicited for their support towards the success of the intervention project.
7a.	Description of the project by the Lead Consultant	The Lead Consultant Dennis Nebedum explained the purpose of the ESMP which he said was to identify the perceived potential impacts of the proposed project intervention and developing mitigation measures in order to address the impacts while enhancing the positive impacts. He further stated that the cause of the gully was man-made which was as a result of discharge/overflow from the Water Reservoir of the State Water Corporation. A Consultant's Engineer, Engr. Fred Igbochue further explained the various construction stages indicated in the engineering design and their merits.
b.	Community Questions and concerns.	If the installation of gabion has been implement in any gully site as a reference? Can the gabion mattresses become silted over time or stolen after the project completion?
c.	Responses to the concerns	In response, Engr Fred Igbochue informed them that gabion has been installed in Ajalli gully erosion site by NEWMAP. On siltation, he explained that it helps in reclaiming the eroded area and that installed gabion mattresses cannot be stolen.
8.	Comments and Contributions	Ozo Ramsey Onyia suggested the need for indicators at the control point of the Water Reservoir tank as well as routine maintenance of faulty valves by experts. Mrs Nneoma Chikaodinaka pledged the support of the women group provided the contractors are sincere by implementing the engineering design while Mrs Victoria Ozoalor complained that the water reservoir was destroying their farmlands instead of providing water for their village. She requested for a minimum of three water collection points. Ani Scholastica, a staff of NEWMAP suggested the need to have control on the magnitude of the flow from the water reservoir in order to avoid further gully. She also informed them that the World Bank has plans to reactivate the Okwojo water pipe. Mr Anukwo Mark, Director of Forestry commended NEWMAP for their early intervention at the gully site. He also opined the need for sustainability of the vegetation program at the gully site, fire resistant grasses and proper assessment of the design to avoid subsequent erosion. Chinwe Chime, the representative of the Commissioner of Environment and Mineral Resources emphasized on the need to use new vehicles and equipment in order to reduce pollution particularly air and noise. Engr Fred Igbochue advised members of the community to ensure that the contractor handling the project use sound equipment as well as ensuring that civil works are carried out according to specification.

		<p>Sir Matthias Nriji staff of Water Corporation informed the stakeholders that erosion has destroyed more than 12 boreholes sunk at Ngwo and that erosion is presently threatening the Ajalli Twin Tanks. He prayed that the construction works will be carried out perfectly and successfully and that comments and contributions made will be reported to the management. This he said will assist the Corporation avert future over flow of the water reservoir.</p>
9	<p>Questions by the Consultant to the community</p> <p>Response from the community</p>	<p>i. Will they ensure the security of equipment, machineries and vehicles parked in the site? ii. Will they work closely with the contractor to resolve all site conflicts on time and peacefully? iii. Will they appropriately discipline any erring youth reported by the contractor and project consultants? iv. Will they promptly change any member of the site committee whose activities are seen to be inimical to the success of the project?</p> <p>Ozo Ramsey Onyia and Sir George Onoh on behalf of the community promised to provide any form of assistance needed during the construction work.</p>
10	Vote of thanks	<p>Ozo Ramsey Onyia gave the closing remarks/vote of thanks on behalf of the community members. He expressed his joy for the proposed project. He assured the Lead Consultant, NEWMAP and other stakeholders that as long as the government of Enugu State/NEWMAP/World Bank is not tired, they will not be tired in giving their support.</p>
11	Closing prayers	<p>The meeting ended by 1:20pm with closing prayer said by Deaconess Chika Odinaka.</p>

ANNEX 4

LIST OF ATTENDANCE DURING CONSULTATION MEETINGS

CONSULTATION WITH COMMUNITY MEMBERS AND STAKEHOLDERS

Community: UME AMA L.G.A. ENAKPA - KOPPTH 2/D1

DATE: 21-05-2016 TIME: 12:15

VENUE: UMUASE TOWN HALL

ATTENDANCE

S/N	NAME	COMMUNITY/ VILLAGE	TELEPHONE	SIGN
1	NZE REYMOND ANI	UMUASE	08160969851	R. Ani
2	Nze GIDEON NNADI	UMUASE	07255193167	[Signature]
3	OZO LIVINUS ANI	UMUASE	08057588526	[Signature]
4	OHA GODWIN UDENGWU	UMUASE	07036594088	[Signature]
5	NZE FERDINAND UDE	UMUASE	08076737001	[Signature]
6	Ngwu JANIS	UMUASE	070301188713	[Signature]
7	NZE ADOLPHUS OSRODO	UMUASE	—	[Signature]
8	AGU ANTHONY	UMUASE	07033132314	AGU
9	NGWU ALOYSIUS	UMUASE	07085208539	[Signature]
10	NGWU MICHAEL IKEDULAW	UMUASE	070368255	[Signature]
11	UDENGWU VINCENT	UMUASE	080776322	[Signature]
12	NGWU PIUS	UMUASE	—	PIUS NGWU
13	ANIOZUGWU FRANCISCA	UMUASE	08074061195	[Signature]

14	ONYIA VINCENT	UMUASE	08182517869	[Signature]
15	ANIOZUGWU GABRIEL	UMUASE	08176128377	[Signature]
16	ONYIA ANTHONY	UMUASE	08177939070	[Signature]
17	NUOFE BEATRICE	UMUASE	—	[Signature]
18	ONYIA APAMUEFUNA	UMUASE	08093858711	[Signature]
19	NZE EDWIN ONYIA	UMUASE	08184825211	[Signature]
20	NGWU SOPHIE	UMUASE	—	[Signature]
21	UDE NNEZO	UMUASE	09025848264	[Signature]
22	NNADI BONIFACE A	UMUASE	08186533730	[Signature]
23	NUOFE ISAAC	UMUASE	08189826088	[Signature]
24	NZE MARTIN ALOR	UMUASE	07030192616	[Signature]
25	ONYIA MICHAEL	UMUASE	080081773404	[Signature]
26	NGWU FIDELIS	UMUASE	08034061219	[Signature]
27	ALOR AGNES	UMUASE	07081998898	[Signature]
28	ANIOZUGWU PHILIMINA	UMUASE	08174225044	[Signature]
29	ONYIA AUGUSTINA	UMUASE	07040555764	[Signature]
30	ALOR JOHN A.	UMUASE	080223084841	[Signature]
31	ANI CHRISTIANA	UMUASE	08058119773	[Signature]
32	ANI CHINIEDU INNOCENT.	UMUASE	08079768831	[Signature]
33	AGU CORDELIA	UMUASE	08074230621	[Signature]
34	NNADI HELEN	UMUASE	08097757211	[Signature]
35	OFFOR NNEKA	UMUASE	09025650967	[Signature]

36	DAVID FREDRICK	UMUASE	0818450780	Levy
37	ANI VICTOR L	UMUASE	0806608082	Levy
38	ALOR CHINYELU	UMUASE	0703308572	Levy
39	UGWU CHIDUBEM - C.	UMUASE	0908381327	Levy
40	ANIDRUGWU CYSMAS	UMUASE	0818015804	Levy
41	ANIDRUGWU PETINA	UMUASE	0818499213	Levy
42	UDE ROSALINE	UMUASE	—	Levy
43	ANI Tochulgwu E.	UMUASE	0817262451	Levy
44	ANI Sabastine N	UMUASE	0703082240	Levy
45	Ngwu Emmanuel J.	UMUASE	09080025609	Levy
46	Offor Chidozie S.	UMUASE	07088954028	Levy
47	ANI MODESTA	UMUASE	07082196254	MN AN.
48	ANI LAWRENCE	UMUASE	—	Levy
49	ALOR BENSON	UMUASE	0810346842	Levy
50	NGWU GLADYS	UMUASE	0617314481	Levy
51	ALOR IBE	UMUASE	0703308572	Levy
52	ALOR HENRY J.	UMUASE	0709412377	Levy
53	NUOROD CHIDUBEMUKA	UMUASE	0708267460	Levy
54	AGWU PETER C.	UMUASE	0809463437	Levy
55	UDE FELICHI MARIA	UMUASE	—	Levy
56	ANI JOSEPHINE	UMUASE	0706599235	Levy
57	UGWU RENEDETTA	UMUASE	0806576245	Levy

1

58	NZE SUNDAY ANI, N.	UMUASE	08068513385	Levy
59	LOLO FLORENCE ANI	UMUASE	08165054898	Levy
60	LOLO JUSTINA UOE	UMUASE	0807772228	Levy
61	OSRORO EVELYN	UMUASE	—	Levy
62	ANI CAROLINE	UMUASE	—	Levy
63	ANI CHIKASUERUKA	UMUASE	0708944545	Levy
64	OFFOR CHARLES	UMUASE	0701171524	Levy
65	ALOR miracle Ifeanyi Chukwura	UMUASE	08113483724	Levy
66	Mrs Mercy Nwadi	UMUASE	07055193167	Levy
67	ALOR Obinna	UMUASE	09030400237	Levy
68	NWADI FIDELIS	UMUASE	—	Levy
69	OSRORO CHARLES	UMUASE	09021750857	Levy
70	ALOR CHIKASIEMBI	UMUASE	0703253771	Levy
71	ALOR GRACE	UMUASE	—	Levy
72	NWADI CELESTINA	UMUASE	0805315522	Levy
73	ALOR STANLEY	UMUASE	09086508297	Levy

CONSULTATION AT OKWOJO COMMUNITY 3:00 Pm 25/05/2016

	Name	Village/Office	PHONE NO	Sign
1	Okoli Ebele Vivien	Consultant team	08037753127	
2	Dr. Eze Hyacinth O.	NEWMAP	08034962376	
3	Ani Scholastica NKECHI	EN-NEWMAP	08064645359	
4	Agbo, Benedict Oking	EN-NEWMAP	08036624474	
5	Dennis Nwobodo	Consultant	08033410972	
6	Chief Lamit C. Ugwu	Okwojo	08033423588	
7	Ozomi Angelina	Okwojo	07067382678	
8	Ugwu Angelina O	Okwojo	08037948572	
9	Ugwu Mary	Okwojo	08185529730	Ugwu
10	Ogochukwu Udeh	Okwojo	08031360006	
11	Udeh Davis	Okwojo	08066859806	
12	Orongwu Helen	Okwojo	08069409706	Orongwu
13	Ozorator Victoria	Okwojo	08032186472	
14	Onoh Abigail	Onoh	07036795274	
15	Ugwu Theresa N.	Okwojo	070316541120	
16	Ugwu Joy	Okwojo	07015676396	U.J
17	Ogbedo Angela			O.A
18	Ogbedo Grace			O.G
19	Felicia Onoh	Okwojo	07062435868	
20	Ani Hope	Okwojo	08136577370	
21	Ugwu Elizabeth	Okwojo	07035284644	
22	Ugwu Joyce	Okwojo	09024781526	

SH ATTENDANCE

Sl#	Name	PHONE NO	SIGNATURE	
1	Okoli Ebele Vivien	NewMap Team	08037753127	
2	Ani Scholastica NKECHI))))	
23	ONOH GLORY	Okwojo		
24	Amal Ogbedo	Okwojo		C.D
25	Chikem Eze L.	Okwojo	08066397680	
26	Ugwu Josephine A.	Okwojo	08124811242	
27	Ugwu Grace	Okwojo	08132097977	U.G
28	Onoh Cordelia	Okwojo	07061200006	C.N.O
29	Ugwu HEOMA	Okwojo	08038507037	
30	Ugwu Annetta	Okwojo	01166186549	
31	Ugwu Chibuzor	Okwojo	09090973410	
32	Nkechi Ogiwe	Okwojo	07013550804	
33	Anndabi Chinasa	Okwojo		
34	Okwud Ukanaka C	Okwojo	0706077781	
35	Ogisa Kenneth	Okwojo	09077159565	
36	Egndy Geraldine	Okwojo	08037388842	
37	Pat Amy Oyeami	✓	08059300473	
38	Ogwu Patricia A.	✓	0804267087	
39	Onia Eucharika O	Okwojo	08135277403	
40	Ugwu Louisa HEOMWA	✓	08034894544	
41	Ogobo Evelyn	✓	07087201106	
42	Ugwu Bartholomew	✓	08063977349	

43	Oyedikachi Ndikata	Okwaja	07034372466	
44	Udeh Roseline	Okwaja	09065389644	Hotel
45	Opara Dorothy	Okwaja	07033480758	o.p
46	Ani Margaret	Okwaja	08166313280	inf.
47	Ani Bridget	Okwaja	07061360229	A.B
48	Felicia Onoh	Okwaja	07062435868	Y.L.
49	Onoh Beat. Fuchani	Okwaja	0813751553	OKW
50	Ani Perpetua	Okwaja	08177295093	A.P
51	Ogwuke Eugenia	Okwaja	08136131433	E.U. Ogwuke
52	Ngwu Blessing	Okwaja	08072027878	B.ck
53	UDE FELICIA -U.	Okwaja	08037348002	
54	OGBODO SRETA	Okwaja	07081462771	S.I. Ogbodo
55	Onoh Promise	Okwaja	0803440966	
56	Engo Sam Opani	Okwaja	0814885276	Engo Sam Opani
57	Nkechi Ozioma	Okwaja	07013550304	
58	Anidibia Chirisa			
59	Okwaja Utamska	Okwaja	07060787781	inf.
60	Egudu Geraldine	Okwaja	08037388841	Inf.
61	OGBODO NICTOPHEMUS -I.	Okwaja Ngwo	07062834079	Inf.
62	Opani Chinedu -D.	Okwaja Ngwo	08039550689	Inf.
63	OTUOMASILI Chikwara	Okwaja Ngwo	08139654194	Inf.
64	Uenny LOUISA IFENINWA	Okwaja Ngwo	08034894544	Inf.

65	NWANGWU Theresa	Okwaja	07067100485	
66	Onia Eucharis O	Okwaja	08135277403	Inf.
67	Ogbodo Evelyn	Okwaja	07082701106	Inf.
68	Ngwu Bartholomew	Okwaja	08063977549	Inf.
69	Bridget Egbueta	Okwaja		Riddy
70	Daniel Nwagwu	Okwaja		Nwagwu
71	Theresa Ogbodo	Okwaja	091050521	Ogbodo
72	Theresa Ogbodo	Okwaja	07067100485	Ogbodo
73	Sonpa Onoh	Okwaja	08156944762	Inf.
74	Funko Martin	Okwaja	0803331636	Inf.
75	Ngwu Raphael	Okwaja	07057118481	Inf.
76	Ahew Christian	Okwaja	08066639176	Inf.
77	Izuchukwu Elinozor Juliet	Okwaja	08140230886	Inf.
78	Omya Benedict	Okwaja	08134656311	Inf.
79	Oyedikachi Ndikata	Okwaja	07034372466	Inf.
80	Paw Anyanwu	Okwaja	09090756942	Inf.
81	OPARA Dorothy	Okwaja	07033480758	Inf.
82	Udeh Opechukwu	Okwaja	08065261191	Inf.
83	Ogbodo Nwanneke	Okwaja	08091565991	Inf.
84	Udeh Sunday C. (mr.)	Okwaja		Inf.
85	Juliana Udeh	Okwaja	08139223008	S.I. Udeh
86				

CONSULTATION WITH COMMUNITY MEMBERS AND STAKEHOLDERS

Community... Okweso Community L.G.A... Idi L.G.A

DATE: 20/05/2016 TIME: 11am

VENUE: AGBAJA NGWO GULLY SITE OKWESO AT INUGU STATE WATER RESERVOIR

ATTENDANCE

S/N	NAME	COMMUNITY/ VILLAGE	TELEPHONE	SIGN
1	Ozo Kany KEY S. ONYIA	OKWESO - NGWO	08033100104	<i>[Signature]</i>
2	SUR OZO NICHOLAS ALUDE	✓ ✓	08057222432	<i>[Signature]</i>
3	HON IGNATIUS C. USUAL	✓ ✓	05035496573	<i>[Signature]</i>
4	UGHEM SILVESTER A.	✓ ✓	07021602767	<i>[Signature]</i>
5	Onoh Evarist M.	✓ ✓	08052467899	<i>[Signature]</i>
6	UPEH SUNDAY C.	✓ ✓	08181802653	<i>[Signature]</i>
7	OYIBE EPHRAIM	✓ ✓	09087250467	<i>[Signature]</i>
8	OGBODO Zebede	✓ ✓	08178203269	<i>[Signature]</i>
9	Onoh Augustina	✓ ✓	08111587675	<i>[Signature]</i>
10	Onoh Eugenia	✓ ✓	08166602647	<i>[Signature]</i>
11	Ozongis Hope	✓ ✓	08031391371	<i>[Signature]</i>
12	Ugwu Louis J.	✓ ✓	08034894544	<i>[Signature]</i>
13	Ozongis Moses	✓ ✓	0703189007	<i>[Signature]</i>

14	ANTHONY ONOH	O.B OKWESO	0815925022	<i>[Signature]</i>
15	OXONYIA Jolita	UKEHE OKWESO	07069393808	<i>[Signature]</i>
16	Nyama H Okorie	UKEHE OKWESO	08107476451	<i>[Signature]</i>
17	Ude Oliver A	Amachalla Okweso	08035801016	<i>[Signature]</i>
18	Matthew Ozongu	Ukehe Okweso	07035817647	<i>[Signature]</i>
19	Chief James N. Ozongia	Ukehe Okweso	08037443646	<i>[Signature]</i>
20	Moses C Ude	Amachalla	08072218747	<i>[Signature]</i>
21	Nhade Geoffrey	Obinany	07038310897	<i>[Signature]</i>
22	Patriek Oyoze	Imuodo	08066705558	<i>[Signature]</i>
23	Theresa Ozongu	Ukehe Okweso	07067100438	<i>[Signature]</i>
24	Ekwudasi Chantle	Imuodo Okweso	08058826044	<i>[Signature]</i>
25	Ani Perpetua	Ukehe	0817295093	<i>[Signature]</i>
26	Bridget Ogburn	Ukehe	-	<i>[Signature]</i>
27	Ugwu Madester J.	Ukehe Okweso	08057745027	<i>[Signature]</i>
28	Ugwu Gloria	Ukehe Okweso	07035962062	<i>[Signature]</i>
29	Udeh Gloria	Ukehe Okweso	-	<i>[Signature]</i>
30	Ozongadi Marybenedicta	Ukehe Okweso	08054729835	<i>[Signature]</i>
31	Nwani Veronica	Okpatu Okweso	08130177925	<i>[Signature]</i>
32	Ogbodo Evelyn	Amachalla Okweso	07087701106	<i>[Signature]</i>
33	Alex Ferdinand	Umure	0810224334	<i>[Signature]</i>
34	Onoh Augustina	Umureze	09108306036	<i>[Signature]</i>
35	Ngwu Janet	Ukehe Umure Okweso	-	<i>[Signature]</i>

36	Orongwu Forster -U.	Okwajo, Okwajo-ugo	08135058978	AFR
37	Orongwu Helen	Okwajo	08069409766	Orongwu
38	Ugwu TOPIOM AIAEGBU	Okwajo	08135530076	Orongwu
39	Ugwu KENZCHUKWU C	Okwajo	08166743386	Orongwu
40	Ugwu Chibukem. E.	Okwajo	08127699798	Orongwu
41	Nnamdi Agbo	Okwajo	090236266410	Orongwu
42	Ugwu Muzant Anze	Okwajo	0703080245	Orongwu
43	Obiana Ani	Okwajo	090931252695	Orongwu
44	Ugwu Chimezie Offor	Okwajo	07034615112	Orongwu
45	Amelia Osamu	Okwajo	09093558257	Orongwu
46	Ami Satorosa	✓	08036872552	Orongwu
47	Ebela Onoh	Okwajo	0812440457	Orongwu
48	Onoh Samuel	✓	08096345817	Orongwu
49	Osama NAPI Edwin	✓	07039972536	Orongwu
50	Osama Ifeanyi	✓	08065794335	Orongwu
51	Nwanjiru Willson	✓	08065743848	Orongwu
52	Oronmi AKEZI	Okwajo	0802744466	Orongwu
53	Ikokuken Ifeanyi	Okwajo	07032565309	Orongwu
54	Onoh Chimezie	Okwajo	07060906408	Orongwu
55	ONOH CHIAOZIE	Okwajo	08032792052	Orongwu
56	Godwin Mewu	Okwajo	080592443	Orongwu
59	Nwan Blessing	✓	080722188	Orongwu

56	OGBODO Fidelis	Okwajo	07012827233	Orongwu
59	Ugwu Mawreen	Okwajo	08064113962	Orongwu
60	Pius Ogbodo	Okwajo	08037794723	Orongwu
61	Ugwu Offor	✓	0915088561	Orongwu
62	Benadict Igwe	Okwajo	08132272261	Orongwu
63	Oronmi Christian	Okwajo	08038271409	Orongwu
64	Oronmi ELIAS	Okwajo	08168822882	Orongwu
65	Ugwu Cyprian Ogbodo	Okwajo	08167924924	Orongwu
66	Oronmi PROMISE	Okwajo	✓	Orongwu
67	Nwani Vivien U.	✓	08176252559	Orongwu
68	Veronica Orongwu	Okwajo	07031217684	Orongwu
69	Cecelia Udeh	Okwajo	08038819402	Orongwu
70	Angella Ogbodo	Okwajo	0806868	Orongwu
71	Ugwu Chidiebere	✓	07035260716	Orongwu
72	Nwadi Promise	✓	07063594655	Orongwu
73	Ogbute Eugenia	✓	08136137433	Orongwu
74	Oronmi Ugwu	✓	07063558639	Orongwu
75	Ugwu Solomon	✓	08062484536	Orongwu
76	Nwani Michael U.	✓	08056941555	Orongwu
77	Oronmi Nebechi	✓	07067358023	Orongwu
78	Oronmi Josephine	✓	08165456155	Orongwu
79	Nwanjiru Elizabeth	✓	08066614670	Orongwu

STAKEHOLDERS CONSULTATIVE FORUM ON THE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN FOR AGBAJA NGWO GULLY EROSION SITE.

VENUE: ASCORT HOTELS, ENUGU

DATE: 9TH JUNE, 2016 TIME: 10:00AM

ATTENDANCE

S/N	NAME	MDA/ORGANIZATION /VILLAGE	TELEPHONE	SIGN
1	Sr. MATTHIAS C. NKWU, JP	WATER CORP.	08060246302	[Signature]
2	Ugwu Michael C	ENSWC	07034957383	[Signature]
3	UGWU SAMUEL IBE	OKWUJO	08036077136	[Signature]
4	Mr. Dan Ogasani	✓	08032340273	[Signature]
5	MOSES UDE	✓	08038187469	[Signature]
6	L. I. ELE	MINISTRY OF AGRIC.	08037464419	[Signature]
7	Sir George Best Onoh	Chairman Okwojo	08066974624	[Signature]
8	Offor Eugene Uche	Okwojo	07034658849	[Signature]
9	OZONGWU OBUMNEME	✓	07037972555	[Signature]
10	Ogboodo Pius	✓	08037795723	[Signature]
11	Ugwu Louisa I.	✓	08034854574	[Signature]
12	Ugwu Kamsi Ugoji	Team Okwojo	08033100104	[Signature]
13	Ude, Felicia J.	Okwojo (Women's League)	08039848002	[Signature]
14	Engr. Fred Japoduche	Consulting Team	08037418222	[Signature]

15	Prof. X. M. Efeoghene Essighah	Consultant Team	08132635202	[Signature]
16	Ani Chukwuma	Consultant Team	08065544107	[Signature]
17	Ani HOPE	Okwojo (Secretary)	08136572720	[Signature]
18	Ugwu Grace	Okwojo	08132097977	[Signature]
19	Ogboodo Victoria	Okwojo	08032186492	[Signature]
20	Ugwu Angelina O.	Okwojo	08037948522	[Signature]
21	Boniface Ukanu	Okwojo	0803810185004	[Signature]
22	Paul Anyanwu	Okwojo	09090756922	[Signature]
23	Dr. Okonkwo Ifeoma J.	Consultant Team	08034055803	[Signature]
24	Nne Oma Chikodinaka Ani	Okwojo Chair person	08038021048	[Signature]
25	Ogboodo Amaka F.	Okwojo	08036704830	[Signature]
26	Anukwo Mark	forestry Commission	08052567426	[Signature]
27	Ogboodo Izuchukwot	Okwojo	08075235247	[Signature]
28	Ogboodo Edwina	Okwojo	07039992536	[Signature]
29	Engr. Chibuzanukwu H. C.	HOS WKS UDI	08035486506	[Signature]
30	Blair Ugwu Onyedikwa S.	Okwojo	07035211351	[Signature]
31	Chinwe Chime	Enugu State Abngofev	09033617922	[Signature]
32	Dr. H. O. Ele	Enugu NEWMAP	08014962376	[Signature]
33	Ani Scholastica Nkechi	Enugu NEWMAP	0806060385	[Signature]
34	Ugwu Pamela N.	Enugu NEWMAP	08037128254	[Signature]
35	Engr. Ngazi Ogboodo Chikeke	Enugu NEWMAP	08037109188	[Signature]
36	Agbo, Benedict Obinwa	✓	08035662474	[Signature]

ANNEX 5

Summary of World Bank Environmental and Social Safeguard Policies (10+2)

Use of Country Systems (OP 4.00). The Bank's environmental and social ("safeguard") policies are designed to avoid, mitigate, or minimize adverse environmental and social impacts of projects supported by the Bank. The Bank encourages its borrowing member countries to adopt and implement systems that meet these objectives while ensuring that development resources are used transparently and efficiently to achieve desired outcomes.

Environmental Assessment (OP 4.01). Outlines Bank policy and procedure for the environmental assessment of Bank lending operations. The Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of EA process. This environmental process will apply to all sub-projects to be funded.

Natural Habitats (OP 4.04). The conservation of natural habitats, like other measures that protect and enhance the environment, is essential for long-term sustainable development.

Pest Management (OP 4.09). The policy supports safe, affective, and environmentally sound pest management. It promotes the use of biological and environmental control methods. An assessment is made of the capacity of the country's regulatory framework and institutions to promote and support safe, effective, and environmentally sound pest management.

Involuntary Resettlement (OP 4.12). This policy covers direct economic and social impacts that both result from Bank-assisted investment projects, and are caused by

- a. The involuntary taking of land resulting in
 - I. Relocation or loss of shelter;
 - II. Loss of assets or access to assets, or
 - III. Loss of income sources or means of livelihood, whether or not the affected persons must move to another location; or
- b. The involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on the livelihoods of the displaced persons. The ESMF and RPF reports discuss the applicability of this policy in detail.

Indigenous Peoples (OD 4.20). This directive provides guidance to ensure that indigenous peoples benefit from development projects, and to avoid or mitigate adverse effects of Bank-financed development projects on indigenous peoples. Measures to address issues pertaining to indigenous peoples must be based on the informed participation of the indigenous people themselves. Sub-projects that would have negative impacts on indigenous people will not be funded

Forests (OP 4.36). This policy applies to the following types of Bank-financed investment projects:

- a. Projects that have or may have impacts on the health and quality of forests;
- b. Projects that affect the rights and welfare of people and their level of dependence upon or interaction with forests; and
- c. Projects that aim to bring about changes in the management, protection, or utilization of natural forests or plantations, whether they are publicly, privately, or communally owned. The Bank does not finance projects that, in its opinion, would involve significant conversion or degradation of critical forest areas or related critical habitats.

Physical Cultural Properties (OP 4.11). Assist in preserving physical cultural resources and avoiding their destruction or damage. PCR includes resources of archaeological, paleontological, historical, architectural, religious (including graveyards and burial sites), aesthetic, or other cultural significance..

Safety of Dams (OP 4.37). For the life of any dam, the owner is responsible for ensuring that appropriate measures are taken and sufficient resources provided for the safety to the dam, irrespective of its funding sources or construction status. The Bank distinguishes between small and large dams.

Projects on International Waterways (O 7.50). The Bank recognizes that the cooperation and good will of riparians is essential for the efficient utilization and protection of international waterways and attaches great importance to riparians making appropriate agreements or arrangement for the entire waterway or any part thereof.

Disputed Areas (OP/BP/GP 7.60).Project in disputed areas may occur in the Bank and its member countries as well as between the borrower and one or more neighbouring countries. Any dispute over an area in which a proposed project is located requires formal procedures at the earliest possible stage.

Disclosure Policy (OP 17.50). Supports decision making by the Borrower and Bank by allowing the public access to information on environmental and social aspects of projects. This policy is mandated by six safeguard policies that have specific requirements for disclosure in country (Before project appraisal in local language and in English) and World Bank INFO-Shop (Before project appraisal in English). Documents can be in draft but must meet WB standards).

ANNEX 6

GENERAL ENVIRONMENTAL MANAGEMENT CONDITIONS FOR CONSTRUCTION CONTRACTS/CIVIL WORK

This section deals with the purpose and structure of the Contract. It allocates responsibilities and sets up the procedures for making the Contract work. Underlying it are the basic principles of clear definition of roles, responsibility for outcomes, and promoting best practice. The management conditions for construction contracts detailed here have been extracted and modified, as appropriate for the gully erosion intervention project, from the Environmental and Social Management Framework for State and Local Governance Reform (SLOGOR) Project of the Federal Government of Nigeria (2013) and the New South Wales (Australia) Government General Conditions of Contract (GC21; 2013).

General responsibilities to the Contractor must:

Construct the Works in accordance with the Contract; and Perform and observe all its other obligations under the Contract. The Principal (herein also referred to as ENS-NEWMAP PMU) must: Pay the Contractor the Contract Price for its performance, in accordance with and subject to the Contract; and Perform and observe all its other obligations under the Contract. The ENS-NEWMAP PMU may give instructions to the Contractor concerning the Works and anything connected with the Works, and the Contractor must comply at its own cost unless the Contract expressly provides otherwise.

Contractor's Authorised Person The Contractor must ensure that, at all times, there is a person appointed to act as the Contractor's Authorised Person. The Contractor's Authorised Person acts with the Contractor's full authority in all matters relating to the Contract. The Contractor must promptly notify the Principal of the name and contact details of the Contractor's Authorised Person and of any change in those details. If the Principal reasonably objects to the Contractor's Authorised Person at any time, the Contractor must replace that person.

Principal's Authorised Person:

The Principal must ensure that, at all times, there is a person appointed to act as the Principal's Authorised Person. The Principal must promptly notify the Contractor of the name and contact details of the Principal's Authorised Person and of any change in those details. The Principal's Authorised Person does not act as an independent certifier, assessor or Valuer. The Principal's Authorised Person acts only as an agent of the Principal. The Principal's Authorised Person may delegate any of its contractual functions and powers to others by written notice to the Contractor. Co-operation the parties must do all they reasonably can to co-operate in all matters relating to the Contract, but their rights and responsibilities under the Contract (or otherwise) remain unchanged unless the parties agree in writing to change them. Duty not to hinder performance each party must do all it reasonably can to avoid hindering the performance of the other under the Contract.

Early warning each party must promptly inform the other if it becomes aware of anything that is likely to affect the time for Completion, or the cost or quality of the Works. The parties must then investigate how to avoid or minimise any adverse effect on the Works and Scheduled Progress. Evaluation and monitoring as the Contract proceeds, regular meetings (usually monthly) allow the parties and selected stakeholders to evaluate performance and identify priorities for improvement. The parties must meet regularly to evaluate and monitor performance of the Contract. The parties must decide jointly who will participate in the meetings. Participants may include Subcontractors, Suppliers, Consultants and, if appropriate, representatives of government authorities, end users and local communities. Participation in meetings does not give the participants any additional rights or responsibilities. Participants in the evaluation and monitoring meetings must meet their own costs for attendance, and the parties must share equally the other costs. The Contract is formed by the Principal sending a Letter of Award to the Contractor, unless the Principal requires the Contract to be formed by execution of a formal agreement or deed. The Contract is made up solely of the Contract Documents, which supersede all understandings, representations and communications made between the parties before the Date of Contract in relation to the subject matter of the Contract. The Contract Documents must be read as a whole, and anything included in, or reasonably to be inferred from, one or more documents must be read as included in all other documents, unless the context requires otherwise. The terms of the Contract cannot be amended or waived unless both parties agree in writing. Even where a Letter of Award has been used to form the Contract, the Principal may require the Contractor to execute a formal agreement or deed on terms no different from those contained in the existing Contract Documents. If required, the Contractor must execute and return to the Principal two copies of the agreement or deed within 14 days after the Principal's written request for their execution. The Principal will return an executed copy to the Contractor. Scope of the Works, Temporary Work

and work methods The Contractor acknowledges that: it is both experienced and expert in work of the type, complexity and scale of the Works; it has made full allowance in the Contract Price for the matters referred to in the contract document; unless the Contract expressly provides an entitlement to payment, everything required to be done by the Contractor under the Contract is to be done at the Contractor's own cost. The Contractor acknowledges that Variations instructed by the Principal may change the scope of the Works. Unless the Contract specifies, or the Principal instructs, that the Contractor use a particular work method or perform particular Temporary Work, the Contractor is solely responsible for determining the work methods and the requirements for all Temporary Work. If requested in writing by the Principal, the Contractor must, within the time specified in the request, advise the Principal of: its price (excluding all costs of delay or disruption) for any proposal by the Principal to use a particular work method or perform particular Temporary Work proposed by the Principal or to change a work method or Temporary Work specified in the Contract; the anticipated effect of the Principal's proposal on achieving Completion; and the effect of the Principal's proposal on any other matter specified by the Principal. If the parties agree in writing on the effects of the Principal's proposal and the Principal instructs the Contractor to carry out the proposal, any affected Contractual Completion Dates and the Contract Price must be adjusted as agreed. Assignment The Contractor must not assign a right or benefit under the Contract without first obtaining the Principal's written consent. Governing law of the Contract the Contract is governed by World Bank Operational Directives, the laws of Nigeria and Enugu State, and the parties submit to the non-exclusive jurisdiction of the courts of Cross River State. Subcontractor relationships The Contractor is solely responsible for all Subcontractors and is liable for their acts and omissions as if such acts or omissions were those of the Contractor. Subcontracting of any obligation under the Contract does not affect the Contractor's obligations or liability under the Contract. The Contractor indemnifies the Principal against all claims (including Claims), actions, loss or damage and all other liability arising out of any acts or omissions of Subcontractors. The Contractor must include in every Subcontract details of the Contractor's obligations in connection with the Contract which are to be carried out by the Subcontractor; consent for the Subcontract to be notated to the Principal or its nominee, if required by the Principal; and when possible, a right of termination for convenience.

Contract Provisions for Civil Works:

Environmental and Social Impacts 1:

General Provisions and Precautions The contractor shall take all necessary measure and precautions and otherwise ensures that the execution of the works and all associated operations on the work sites or off site are carried out in accordance with the World Bank's Performance Standards and the requirements of applicable legislation and environmental requirement of Nigeria. The contractor shall take all measures and precautions to avoid any nuisance or disturbance arising from the execution of the work. This shall, wherever possible, be achieved by suppression of the nuisance at source rather than abatement of the nuisance once generated. In the event of any soil or debris or silt from the work sites being deposited on any adjacent land, the contractor shall immediately remove all such spoil debris or silt and restore the affected area to its original state to the satisfaction of the responsible authorities.

Water Quality:

The following conditions shall apply to avoid adverse impacts to water quality:

- (a) The contractor shall prevent any interference with supply to, or abstraction from, water resources and the pollution of water resources (including underground percolating water) as a result of the execution of the works.
- (b) The contractor shall not discharge or deposit any matter arising from the execution of the work into any waters except with the permission of the regulatory authorities concerned.
- (c) The contractor shall at all times ensure that all existing stream courses and drains within and adjacent to the site are kept safe and free from any debris and any material arising from the works.
- (d) The contractor shall protect all water courses, waterways, ditches, canals, drains, and the like from pollution, silting, flooding or erosion as a result of the execution of the works.

Air Quality:

The following conditions shall apply to avoid adverse impacts to air quality:-

Open burning will be prohibited.

In periods of high wind, dust- generating operations shall not be permitted within 200 meters of residential areas having regard to the prevailing direction of the wind.

Asphalts and hot- mix plants sites shall be located at least 500 meters away from the nearest sensitive receptor (e.g. schools).

Water sprays shall be used during the delivery and handling of materials when dust is likely to be created and to dampen stored materials during dry and windy weather.

Stockpiles of materials shall be sited in sheltered areas or within hoarding, away from sensitive areas. Stockpiles of friable material shall be covered with tarpaulins.

Vehicle with an open load – carrying area used for transporting potentially dust- producing material shall have proper fitting side and tailboards. Materials having the potential to produce dust shall not be loaded to a level higher than the side and tail boards, and shall be covered with a clean tarpaulin in good condition. The tarpaulin shall be properly secured and extend over the edges of the side and tailboards.

In periods of adverse weather adverse, impacts to adjacent residents or site employees during construction will be mitigated by either discontinuing until favourable conditions are restored, or, if warranted, sites may be watered to prevent dust generation.

Machinery and equipment will be fitted with pollution control devices, which will be checked at regular intervals to ensure that they are in working order. Best available pollution control technologies will be used.

Protection of soils:

Borrow pits:-

The following conditions shall apply to borrow pits:

Borrow areas will be located outside the ROWs.

Pit restoration will follow the completion of works in full compliance of all applicable standards and specification.

The excavation and restoration of the borrow areas and their surroundings, in an environmentally sound manner to the satisfaction of regulatory authorities is required before final acceptance and payment under the terms of contracts.

Borrow pit areas will be graded to ensure drainage and visual uniformity, or to create permanent tanks\dams.

Topsoil from borrow pit areas will be saved and reused in re-vegetating the pits to the satisfaction of regulatory authorities.

Additional borrow pits will not be opened without the restoration of those areas no longer in use.

To avoid potential adverse impacts due to erosion, the contractor shall:-

- (a) Line spillage ways with riprap to prevent undercutting.
- (b) Provide mitigation plantings and fencing where necessary to stabilize the soil and reduce erosion.
- (c) Upgrade and adequately size, line and contour storm drainage to minimize erosion potential.
- (d) To avoid erosion and gulling, the contractor should reduce his earthworks during the peak of rainy seasons, use gabions and mitre drains.

Avoidance of Social Impacts:

To avoid adverse social impacts, the Contractor shall:-

Coordinate all construction activities with neighbouring land uses and respect the rights of local landowner. Written agreements with local landowners for temporary use of the property will be required and sites must be restored to a level acceptable to the owner within a predetermined time period.

Maintain and cleanup campsites.

Attend to health and safety of their workers by providing basic emergency health facilities for workers and incorporate programs aimed at the prevention of sexually transmitted diseases as a part of all construction employee orientation Programs.

Obtain approval of all diversions and accommodation of traffic. The Contractor shall provide a written traffic control plan which is to include when and where flagmen shall be employed and when and where traffic cones or other devices such as barricades and \or lights will be used.

Noise:

To avoid adverse impacts due to noise, the contractor shall:-

Consider noise as an environmental constraint in planning and execution of the works.

Use equipment conforming to international standards and directives on noise and vibration emissions.

Take all necessary measures to ensure that the operation of all mechanical equipment and construction processes on and off the site shall not cause any unnecessary or excessive noise, taking into account applicable environmental requirements.

Maintain exhaust systems in good working order; properly design engine enclosures, use intake silencers where appropriate and regularly maintain noise-generating equipment. Schedule operations to coincide with periods when people would least likely be affected and by the contractor having due regard for possible noise disturbance to the local residents or other activities. The contractor must observe statutory requirements which regulate working hours and working days (-Construction activities will be strictly prohibited at night).

Incorporate noise considerations in public notification of construction operations and specify methods to handle complaints. Disposal sites and routes will be coordinated with local officials to avoid adverse traffic noise.

Protection of Utilities:

To avoid potential adverse impacts to utilities, the Contractor shall:-

Ascertain and take into account in his method of working the presence of utility services on and in the vicinity of the site.

Take into account the periods required to locate, access, protect, support and divert such services, including any periods of notice required to effect such work in consultation with authorities operating such services.

Assume all responsibility to locate or to confirm the details and location of all utility services on or in the vicinity of the site.

Exercise the greatest care at all times to avoid damage to or interference with services.

Assume responsibility for any damage and \or interference caused by him or his agents, directly or indirectly, arising from actions taken or a failure to take action, and for full restoration of the damage.

Waste Disposal and Hazardous materials:

Water and waste products shall be collected, removed via suitable and properly designed temporary drainage systems and disposed of at a location and in a manner that will cause neither pollution nor nuisance.

Insofar as possible, all temporary construction facilities will be located at least 50 metres away from a water course, stream or canal. The contractor shall not dispose of used cement slurry or material in the bush or road side, nor in water courses or wetlands. Such material shall be utilized or disposed of in places approved by the ENS Min. of Environment and Natural Resources.

Environmental monitoring or direct impact will be carried out by ENS NEWMAP and Ministry of Environment and will include, but not restricted to, the following concerns:

Erosion along highway segments and borrow sites during and after construction

Silting and increased sediment loads to streams.

Verification that proper waste disposal at construction sites and base camps is done;

Assurance that construction sites and base camps are cleaned after construction and

Inspection of vegetation covers (removal and re- growth) on the basis of field examinations.

Scheduled Progress

The Contractor must carry out all work in connection with the Contract so as to achieve Scheduled Progress.

Whenever requested, the Contractor must demonstrate to the Principal that it is achieving Scheduled Progress.

Care of people, property and the environment, indemnities and limitations (Obligations of Care)

The Contractor is responsible for all of the following:

Preventing personal injury or death;

Preventing loss or damage to the Site and the Works;

Preventing loss or damage to adjoining and other properties and the environment arising in connection with carrying out the Works;

Locating and caring for existing services;

Repairing or making good loss or damage to the Works and the Site; and bearing the cost of repairing, or making good, loss or damage to adjoining and other properties and the environment arising in connection with carrying out the Works.

If, in the opinion of the Principal, urgent action is required to avoid death, injury, loss or damage, and the Contractor does not take the necessary action immediately when the Principal requests it, the Principal may take the action (without relieving the Contractor of its obligations), at the Contractor's cost, and the Principal's costs of doing so will be recoverable as a deduction from the Contract Price.

Indemnities for property, personal injury or death.

The Contractor indemnifies the Principal against loss or damage to: the Works, from the date the Contractor begins carrying out the Works; and the Site and anything brought onto the Site for the purposes of the Contract from the date the Contractor is given access to the Site, or the relevant part of the Site, until and including the Actual Completion Date of the whole of the Works except that, in respect of any part of the Works which is occupied or taken into use by the Principal, this indemnity ceases when that part is occupied or taken into use and the indemnity then applies as if the Actual Completion Date had been achieved with respect to that part.

After the Actual Completion Date of the whole of the Works, the Contractor indemnifies the principal against loss or damage to the Works, the Site, and anything brought onto the Site for the purposes of the Contract: Arising out of carrying out its obligations under the Contract, including carrying out Variations, making good Defects and removing materials from the Site.

ANNEX 7

GPS COORDINATES OF SOME FACILITIES AROUND THE STUDY AREA

S/N	FACILITY	GPS CO-ORDINATION		
		N	E	ELEVATION
1	Motorised Borehole, Ngwo umuaseAsaa	6° 25' 9.6"	7° 25' 37.1"	1385
2	Assemblies of God Church, umuase	6° 25' 9.6"	7° 25' 37.7"	1385
3	Deeper Life Church, umuase	6° 25' 6.2"	7° 25' 21.8"	1448
4	Peace Nursery/Primary school, umuase	6° 25' 17.2"	7° 25' 13.1"	1451
5	Our Saviour Anglican Church, umuase	6° 25' 18.7"	7° 25' 13"	1448
6	Full love Christian Assembly, umuase	6° 25' 20.7"	7° 25' 30.8"	1333
7	St Anthony's parish, umuase (Catholic)	6° 25' 27.3"	7° 25' 44.1"	1323
8	Assemblies of God, Okwojo/Amabor	6° 25' 27"	7° 25' 48.1"	1313
9	Maratha Nursery/Primary Sch, Okwojo	6° 25' 48"	7° 25' 38.7"	1291
10	St Peters Church Parish, Okwojo	6° 25' 35.5"	7° 26' 3.6"	1250
11	St Peters Primary School, Okwojo	6° 25' 33.1"	7° 26' 4"	1249
12	ESSPIN/ENRUWASSA Borehole, Okwojo	6° 25' 32.5"	7° 26' 5.3"	1251
13	Divine Favour Nursery/Primary, Okwojo	6° 25' 32.9"	7° 25' 56.9"	1244
14	Chikodinaka Maternity Home, Okwojo	6° 25' 32.2"	7° 25' 55.2"	1243
15	Amabor Primary School, Ngwo	6° 25' 18.9"	7° 26' 4.1"	1339
16	St Patrick Out Station, Amabor	6° 25' 19"	7° 26' 4"	1339
17	Private Borehole, Amabor	6° 25' 18.2"	7° 25' 57.1"	1345
18	Emmanuel Anglican Church, Amabor	6° 25' 15.5"	7° 25' 46.7"	1350
19	AfiaOfun (Umuase Market Square)	6° 25' 9.9"	7° 25' 36.6"	1370
20	AfiaOgwe, Okwojo (Evening Market)	6° 25' 32.9"	7° 25' 56.9"	1362
21	El-shaddai Clinic, Umuase	6° 25' 20.1"	7° 25' 33.4"	1320
22	Okwojo Village Square	6° 25' 34.1"	7° 25' 55.4"	1243
23	Afia Four-Corner, Okwojo	6° 25' 28"	7° 25' 48"	1255
24	Assemblies of God Church (Chapel of Refuge), Okwojo II –	6° 26' 3.2"	7° 26' 6.1"	1229
25	Borehole near H.R.H Rt. Col. IgweUde's residence	6° 25' 37.3"	7° 25' 38.2"	1248
26	AVE Maria Schools	6° 25' 55.1"	7° 25' 55"	1139
27	ST Mary's Catholic Church	6° 25' 54.3"	7° 25' 57"	1141
28	Divine Favour Chemist	6° 25' 51.9"	7° 25' 58"	1172
29	Health Post (Ngwo Asaa Dispensary)	6° 26' 7.1"	7° 26' 3.7"	1217
30	Girls' Secondary School, Ngwo	6° 25' 51.1"	7° 26' 9.7"	1208
31	Private Borehole I (Functional)	6° 25' 50.3"	7° 26' 12.1"	1211
32	Private Borehole II (Functional)/Zoe table water	6° 25' 50.6"	7° 26' 14.6"	1220

Source: Field Survey, May 2016

ANNEX 8

PHOTOGRAPHS TAKEN DURING CONSULTATION





