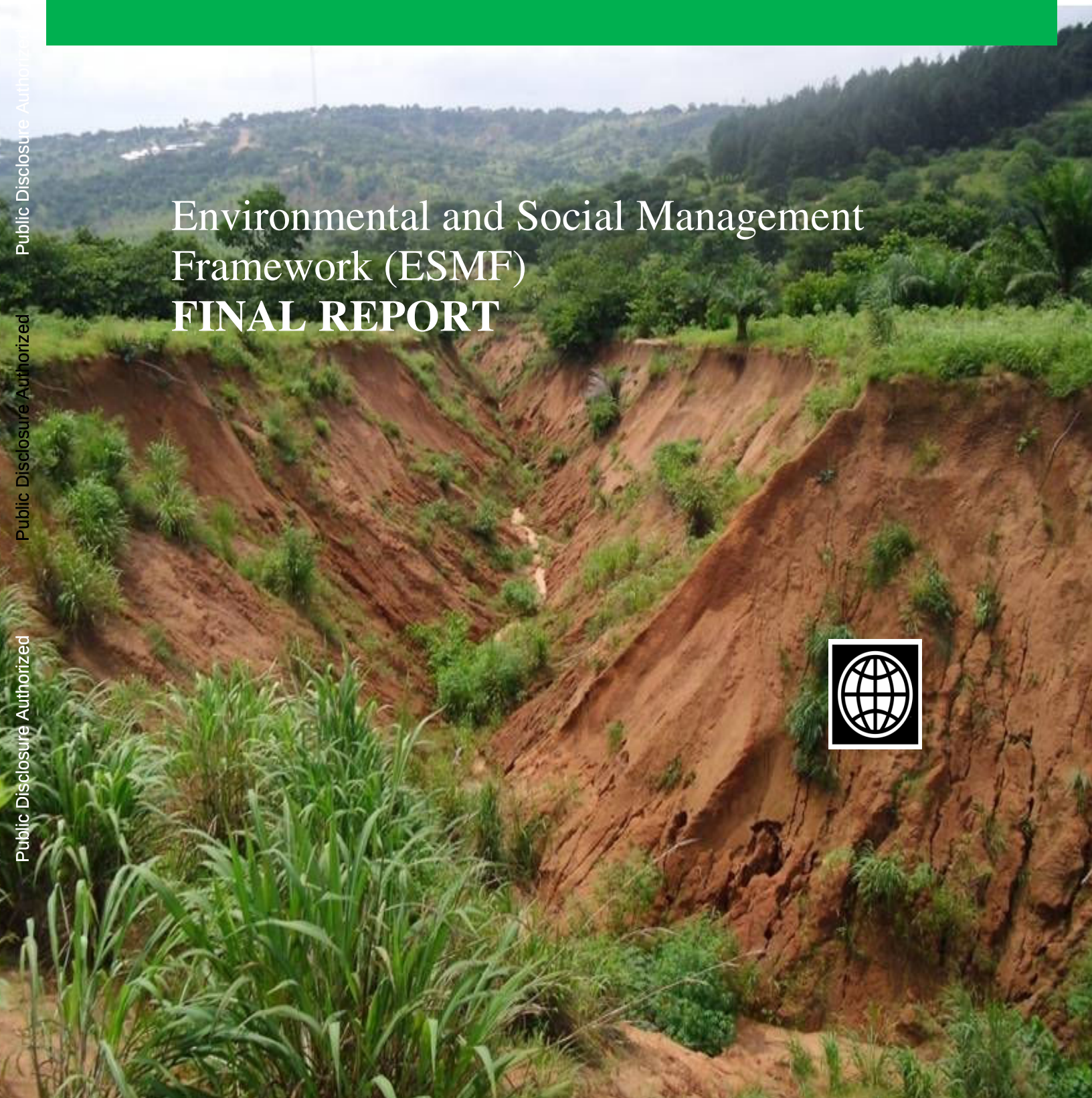
Nigerian Erosion and Watershed Management Project

NEWMAP



Environmental and Social Management Framework (ESMF)

FINAL REPORT

ENVIRONMENTAL AND SOCIAL MANAGEME WORK
Nigerian Erosion and Watershed Managem
NEWMAP

FINAL REPORT

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Acronyms and Abbreviations

AEAM	Adaptive Environmental Assessment and Management
AIDS	Acquired Immune Deficiency Syndrome
AP	Affected Person
ARAR	Applicable or Relevant and Appropriate Requirements
ASERNGO	Association of Enugu State Resident NGOs
ASUTECH	Anambra State University of Science and Technology
CBO	Community Based Organizations
CO	Cleaner Operation
DDI	Diversity and Disaster Initiative
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMS	Environmental Management System
EMSP	Environmental and Social Management Plan
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESSF	Environmental and Social Screening Form
ESUT	Enugu State University of Science & Technology
FCPF	Forest Carbon Partnership Facility
FGD	Focused Group Discussions
FMARD	Federal Ministry of Agriculture and Rural Development
FME/FMenv	Federal Ministry of Environment
FMW	Federal Ministry of Works
FMWR	Federal Ministry of Water Resources
GEF	Global Environment Facility
GIS	Geographic Information Systems
GM	Green Manager
GMC	Green Management Committee
GRC	Grievance Redress Committee
GRM	Grievance Re-dress Mechanism
HAP/HMP	Health Action Plan/Health Management Plan
HAZCOM	Hazard Communication Programs
HIA	Health Impact Assessment
HIV	Human Immunodeficiency Virus
HOD	Head of Department
HSE	Health Safety and Environment
IDA	International Development Association
IFC	International Finance Corporation
ILO	International Labour Organization
IMM	Impact Mitigation and Monitoring
IMT	Institute of Management and Technology
IPP	Indigenous Peoples Plan
IPPF	Indigenous Peoples Planning Framework
IRTCES	International Research and Training Centre on Erosion and Sedimentation
ITC	Instruction to Consultants

IWRMC	Integrated Water Resources Management Commission
JHA	Job Hazard Analysis
LGA	Local Government Area
LOI	Letter of Invitation
M&E	Monitoring and Evaluation
MDA	Ministry Departments and Agencies
MSD	Musculoskeletal Disorder
MSDS	Material Safety Data Sheets
NEWMAP	Nigerian Erosion and Water Management Project
NEWMAP-PMU	Nigerian Erosion and Watershed Management Project
PMU	Project Management/Monitoring Unit
NGO	Non-governmental Organization
NHSA	National Hydrological Services Agency
NISP	Nigerian Institute of Safety Professionals
NPE	National Policy on Environment
NWRI	National Water Resources Institute
OHS	Occupational Health and Safety
OHSMP	Occupational Health and Safety Management Plan
OHSRA	Occupational Health and Safety Risk Assessment
OP/BP	Operational Procedures/Bank Procedures
PAP	Project Affected Person
PC	Pollution Control
PMU	Project Management/Monitoring Unit
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
RBDA	River Basin Development Authorities
RBDAs	River Basin Development Authorities,
RFP	Request For Proposal
SEMA	Safe Environment Movement for Abia
SFME	State Federal Ministry of Environment
SMARD	State Ministry of Agriculture and Rural Development
SMW	State Ministry of Works
SNEWMAP	State Nigerian Erosion and Watershed Management Project
SSA	Systematic Sequential Approach
STI	Sexually Transmitted Infection
TBD	To Be Determined
TOR	Terms of Reference
UNIZIK	Nnamdi Azikiwe University
UNN	University of Nigeria, Nsukka
VOC	Voice of Children
WHO	World Health Organization
WB	World Bank

EXECUTIVE SUMMARY

Background

Nigeria faces severe problem of soil erosion – both sheet and gully erosion – due to both natural and human causes. Over 6000km^2 of land are affected by erosion and about 3400km^2 are highly exposed. Erosion has a devastating effect on many peoples' lives and destroys essential infrastructure for economic development and poverty alleviation. Gully erosion contributes to environmental problems and damage estimated at over $100 million annually (mostly in South-Eastern Nigeria). This undermines economic growth and is a threat to the Federal Government of Nigeria's "Vision 202020". Recent assessment of the situation confirms that the scale of the problem transcends what communities, Local Governments, States and Federal Government can address without help from development partners. Consequently, the Federal Government of Nigeria (FGN) is seeking the support of the World Bank to tackle the age long but worsening problem of erosion and degraded watershed in southern Nigeria through an eight-year project titled "The Nigeria Erosion and Watershed Management Project (NEWMAP)". NEWMAP is aimed at rehabilitating degraded lands and reducing erosion and climate vulnerability in targeted areas. Specifically, NEWMAP would be implemented in seven States comprising Abia, Anambra, Cross Rivers, Ebonyi, Edo, Enugu and Imo.

The project has four primary components: (i) Investment in Erosion and Watershed Management; (ii) Institutional and Information Systems for Erosion and Watershed Management; (iii) Climate Change Adaptation and Mitigation; and (iv) Project Management. In particular, the activities in component one will involve sub-projects each of which may include construction and/or rehabilitation of various identified erosion or flooding sites. These activities may lead to environmental and social impacts, which must be mitigated in accordance with today's tenets of sustainable development. This Environmental and Social Management Framework seeks to provide a clear process including action plans to integrate environmental and social considerations into the Nigeria Erosion and Watershed Management Project.

A separate document provides Resettlement Framework to address possible involuntary physical and economic displacements by the program's sub-projects.

Rationale, Scope and Coverage of ESMF

At the time of project preparation, the specific sites that the project would be implemented in are not known in sufficient details. Therefore, there is a need for an environment and social management framework to outline the principles and procedures that would be followed to ensure that implementation of NEWMAP meets with the existing EIA law in Nigeria and World Bank Safeguards policies. To realize the objectives of this ESMF, the scope of work included a number of tasks as highlighted below.

- Task 1 - Environmental Screening and scoping
- Task 2 - Environmental Policy and Regulatory Framework
- Task 3 – Potential Environmental and Social Impacts
- Task 4 - Analysis of Environmental Impact Issues
- Task 5 - Development of Management Plan to Mitigate Negative Impacts
- Task 6 - Institutional Framework
- Task 7 - Training Needs
- Task 8 - Public Consultation

Policy and Regulatory Framework

There are several national and international environmental guidelines in Nigeria that are applicable to the operation of the NEWMAP. In Nigeria, the power to enforce all activities that might impact the environment is vested in the Federal Ministry of Environment (FMEnv). The ministry has a mandate to co-ordinate environmental protection and conservation of natural resources for sustainable development in Nigeria.

One of the most relevant legislation of interest in the NEWMAP project is the *Environmental Impact Assessment (EIA) Act No. 86 of 1992*. The act makes EIA mandatory for any development project, and prescribes the procedures for conducting and reporting EIA studies. It requires that development projects be screened for their potential impact. Based on the screening, a full, partial, or no Environmental impact assessment may be required. This is in tandem with the World Bank EA requirements for any development projects and her categorization (A, B, & C) of EA types. Furthermore, there are several relevant national and international environmental and social policies and regulations that are applicable to the NEWMAP and its sub-projects. A number of other government Ministries, Departments and Agencies (MDAs) have enabling laws, which support the objectives of this ESMF. Some of these laws also seek to eliminate or minimize environmental and social impacts of activities associated with their various functions.

Most of the project States have in place environmental regulations backed by State laws. Nigeria is signatory to a number of international treaties and conventions. These include those on climate, waste, oil and chemical pollution, labour and others.

Further, the World Bank provides a number of operational and safeguards policies, which aim to prevent and mitigate undue harm to people and their environment in any development initiative involving the Bank. The Nigerian EIA Act and the World Bank safeguard policies are similar. OP.4.01 and Nigerian EIA Act are also similar. World Bank EA Screening Category A is similar to Nigerian EIA Act category I, World Bank EA Category B is equivalent to Nigeria EIA Act Category II, World Bank EA Category C is equivalent to the Nigeria EIA Act Category III. However in the event of divergence between World Bank safeguard policies and the Existing Environmental laws in Nigeria during the implementation of the NEWMAP, the more stringent requirement will take precedence i.e., operationally, the World Bank may contact interested/affected parties to confirm the validity and determine whether or not the process and outcomes comply with OP 4.12Project Description

The Nigeria Erosion and Watershed Management Project (NEWMAP) is a World Bank supported initiative of the FGN to tackle the problem of Erosion and Watershed management in the targeted project area.

The project will seek to increase infrastructure service levels and quality through an 8year institutional development and PPPI financing program. The project will also contribute to strengthened institutional governance over key factor markets, improving risk and cost determinants.

The current financial packet available for the project is a $500 million IDA investment funds credit and GEF/FCPF grants. The Federal Government of Nigeria and the States have committed to make available counterpart funding in cash and kind to ensure the successful implementation of the project.

Potential Environmental and Social Impacts:

A although most of the planned activities are of category B in nature and scope, overall, the project is a Category A. The anticipated positive impacts of the project are significant including environmental, economic and social benefits and clearly out-way potential adverse impacts.

Positive Environmental Impacts

- Reduction in the phenomenon of erosion in the project area
- Reduction in the phenomenon of flooding in the project area

- Rehabilitation of degraded lands and their conversion into productive land
- Increase in the land area covered by vegetation
- Building resilience to climate change
- Biodiversity Conservation
- Increasing efficiency and speed in the ESIA process
- Reducing disaster risks in the project area
- Improved environmental performance and governance

Positive Social Impacts

- Employment generation
- Improved economic growth
- Community development programmes
- Increased opportunities for easy inter-state movement and business development.
- Initiation/ kick-off of rapid production systems and agricultural practices.
- Increase in social interactions
- Improved livelihood enhancing activities
- Increased urbanization
- Reduced level of land disputes and ethnic violence
- Increase in business/commerce during and after the construction works.
- Job creation opportunities.

Adverse Impacts

The corollary of analysis of the potential impact of the Nigeria Erosion and Watershed Management Project is that while many of the on-the-ground investment will have positive environmental and social impacts, there will be some adverse impacts. When taken together, the implementation of NEWMAP could have significant, sensitive, and commutative adverse impacts typical of EA category "A" projects requiring full Environmental Assessment. Adverse impacts have been identified for the project and also for sub-project activities. The associated and potential impacts will also be categorised under negative Environmental impacts and Social Impacts.

Adverse Environmental Impacts

- Increased Traffic
- Air and Noise Emissions
- Solid Wastes Generation and Handling
- Effluents
- Use of Natural Resources
- Earth movements such as Landslides, Earth flow, Mud flow, etc
- Occupational and Public Health issues
- Biodiversity Loss, Endangered and Exotic Species
- Flooding

Adverse Social Impacts

- Population Influx
- Loss of Cultural Resources

- Occupation of private lands during works;
- Land acquisitions/use resulting in involuntary resettlement and/or loss of livelihoods or access to economic resources.
- Social exclusion and poor ethnic/regional coverage
- Increased corruption and rent seeking

Mitigation Measures

Mitigation measures are actions taken to enhance positive impacts and minimize negative ones, have been recommended for NEWMAP.

Impact mitigation measures proffered in this report are general guidelines for dealing with program and sub-project impacts. In recommending mitigation measures as has been considered appropriate and practical, the following principles have been taken into consideration.

- Design changes
- Avoidance
- Preservation
- Minimization
- Rehabilitation
- Restoration
- Replacement
- Resource compensation
- Improvement
- Development
- Diversification

It is noted that the application of each mitigation measure will be affected by differences in project types, and environmental and social nuances. Moreover, some measures may be too costly or completely impractical to implement under certain conditions. In pursuing any of the proffered mitigation measures, therefore, it is important that for each sub-project component to assess the following also:

- Feasibility;
- Ease of implementation;
- Local suitability;
- Institutional requirements;
- Training requirements;
- Monitoring requirements;
- Cost (capital and operating); and
- Cost-effectiveness.

Implementing the ESMF

This ESMF document incorporates a number of elements into an overall Environmental and Social Management process for the NEWMAP and its sub-projects. The process involves distinct steps and associated activities that are linked to deliver a robust and veritable management framework in line with the stated objectives of the ESMF.

Project Screening, Scoping and Categorization

All potential project intervention sites will be screened for Environmental and Social (E&S) impacts prior to approval by the PMU. A designated officer and/or consultant of the PMUs can carry out the screening. The screening process will include robust assessment of the project to determine:

- The appropriate project categorization EA;
- Applicable World Bank environmental and social safeguards;
- Potential for environmental and social liability; and,
- Cultural or other sensitivities.

In addition, each project will be screened to identify relevant stakeholders and the nature and extent of engagement for each stakeholder category. The report of the screening exercise will be sent to the World Bank for review and approval after project proposal preparation has been completed and initial environmental examination (IEE/preliminary assessment has been conducted according to the Nigerian EIA Law (decree 86 of 1992). Following the review of the screening and scoping, the terms of reference (TOR) and the reports of the ESIA/ESMP that would ensue will be sent to the World Bank for review and approval prior to disclosure in Nigeria and at World Bank Info-Shop.

Environmental and Social Management Plan (ESMP)

The project and all sub projects shall be required to maintain comprehensive ESMP underpinned by an Environmental and Social Impact Assessment (ESIA) to achieve health, safety, and environmental regulatory compliance objectives, institutional responsibilities, and other related commitments. An ESMP is an important element of the NEWMAP's overall Environmental and Social Management strategy to ensure environmental, social, and health performance of the entire project and sub-projects. To this end, the ESMP focuses on policy, management personnel, competence building, communications with the public, and monitoring.

Environmental and Social Management Plans for each sub-project will be required at two stages. During the proposal stage, each intending State PMU will as part of its proposal, submit an overview of how environmental and social issues of the project will be addressed on a continuous basis. The plans will also specify standards proposed for the sub-project to ensure environmental sustainability and social acceptability. Standards and plans proposed to address social issues including involuntary resettlement and legacy issues (people who would have lost their houses, lands, livelihood and other assets to erosion prior to the commencement of NEWMAP) will be particularly important. ESMP will also, be required for the sub-projects construction and implementation stages.

Capacity Building and Training

In order to achieve the goal of the ESMF, there is an urgent need for capacity building and strengthening of relevant competencies on environmental and social management at Federal, States, LGAs and community levels including contractors. To this end, capacity building should be viewed as more than training. It is human resource development and includes the process of equipping individuals with the understanding, skills and access to information, knowledge and training that enables them to perform effectively. It also involves organizational development, the elaboration of management structures, processes and procedures, not only within organizations but also the management of relationships between the different organizations and sectors (public, private and community).

Given the nature of the environmental and social management requirements and provisions outlined in this ESMF, competencies and capacity building will be required in the following areas:

- Environmental Impact Assessment Process - Screening, scoping, impact analysis, mitigation measures and monitoring, reviewing EIA Reports

- Environmental Due Diligence - Types of due diligence, screening projects for liabilities, scoping due diligence investigations and reviewing due diligence reports
- Monitoring and Evaluation - Understanding the importance of M&E in project implementation, M&E requirements for environmental and social sustainability of projects

Budget to Implement ESMF

An indicative budget of US$ 8,030,000 has been prepared for the implementation of the ESMF bearing in mind the elements that make up the implementation process. Assumptions to provide clarity on the basis of the budget have also been given. The budget covers:

S/N	ESMF activity	Cost $ (USD)
1.	Trainings	650,000
2.	ESIA/ESMP(including production of Safeguards manual)	7,120,000
3.	Monitoring	260,000
	Total	**8,030,000**

- Routine E & S duties of the PMU;
- Capacity Building for the PMU and other stakeholders;
- Engagement of Environmental and Social Specialists
- Environmental and Social Due Diligence investigations and or Audits;
- Environmental and Social Impact Assessment (ESIA) Studies commissioned directly by the PMU of the participating States and by the PMU at the Federal level
- Monitoring and evaluation activities of the PMU

The total estimated budget for implementing the ESMF is given below.

Delimitation of NEWMAP Boundaries

In some cases, the Borrower may initiate the preparation of detailed safeguards assessments and plans for specific sites. The project ESMF and RPF will guide the preparation of environmental and social impact assessments (ESIAs)/environmental and social management plans (ESMPs), resettlement action plans (RAPs), and/or other safeguards instruments that will be prepared for NEWMAP, some of which will may be financed by the Bank.

Translations into Major Languages in the Project Area

In order to ensure that communities in the project area especially “potential project affected persons (PAPs)” understand the involved issues, the executive summary of the report was translated into the three major languages in the sub-projects area (Igbo, Edo and Efik).

Disclosure

The ESMF has been prepared in consultation with the Federal level PMU, State MDAs, CBOs/NGOs and some community groups. The ESMF is expected to be disclosed publicly as a separate and stand alone document for review and comment through the Federal/State

Ministries of Environment at designated locations at Federal and in the participating States, and in World Bank Info-Shop. Individual EIAs/EMPs will be prepared for each sub-project based on the guidelines and procedures highlighted in this ESMF and would be disclosed in like manner.

TRANSLATION IN IBO LANGUAGE

Nchikota Maka Onyeisi

Mmalite

Nsogbu mbuze di oke egwu na-echere Nigeria aka mgba. Ha di n'udi di iche iche a kporo aha na bekee (sheet and gully erosion).

Odachi okike uwa na ihe aka mere so n'ihe ndi na-ebute mbuze. Ihe kariri puku km isii uzo abuo (6000km2), bu obosara ala mbuze bigoro aka, ebe egwu ka dikwa na obosoara ala kariri puku km ato na nari ano uzo abuo (3,400km2). Mbuze na-emebi otutu ihe obodo ji aga n'iru n'inweta akunauba na ichu ubiam. O kachasi na Ndida owuwu Anyanwu Nigeria, (SE Nigeria) oha ka otu nari nde dola (N$ 100m) na-ala n'iyi kwa afo site n'ike mbuze na-akpa na gburugburu. Nke a wee na-adoghachi aka elekere azu n'igba mbo Gomenti etiti Nigeria isonye na mba uwa iri abuo kacha nwee mmepe, tupu afo puku abuo nya bu (vision 20-20-20).

E mere nchoputa n'isi nso a, nke gosiri na nsogbu mbuze akariala ihe naani Obodo di iche iche, Goomenti ime Obodo, nke steeti na nke Etiti Nigeria ga-eme ihe gbasara ya, na-enweghi nkwado otu enyemeka ndi mba uwa. Nke a mere goomenti etiti Nigeria ji wee na-acho nkwado Ulo Obaego mba uwa (World Bank), iji bue agha megide nsogbu mbuze a tagoro oji, ma na-akawanye njo na Ndida ala Najiria site na olu a ga-alu afo asato, isi okwu ya bu na bekee, (the Nigeria Erosion and Watershed project NEWMAP). Ebumnobi NEWMAP bu ihazighari ala ndi ahu mbuze lagoro n'iyi, ya na ibenata onodu mbuze na mgbanwe ubochi ji akpadebe ike na steeti ndi a kporo aha bu, Abia, Anambra, Cross River, Ebonyi, Edo, Enugu na Imo.

E KERE ORU A GA-ARU UZO ANO:

i. Itinye ego n'olu ihazi mbuze na owara mmiri
ii. Ihazi onodu nchikota ozi maka mbuze na owara mmiri.
iii. Isonye n'etu ubochi si agbanwe, ibenata ihe isi ike so ya na
iv. Ihazi ka olu ga-esi gaa.

Otutu olu ndi a ga-alu na nke mbu nwere ike ibute onodu di iche iche na gburugburu anyi n'Obodo, nke aghaghi idozi n'usoro ejirimara nke mmepe ga-ato ato. Ihazi gburugburu a ga etinye nime olu, ihazi mbuze na owara mmiri nke Nigeria, usoro doro anya, olu ga esi wee gaa, nke ga eleba anya n'izugbe, ka o si metu gburugburu na mmekorita mmadu na ibe ya.
Akwukwo ozo e dere gosiri etu a ga-esi kwaghariara ha obi, bu ndi olu ndi ahu a ga-alu nwere ike ibutere nkwaghari obi.

MKPA O DI NA EBE OLU ESMF GA-ALU

N'oge a na-akwadobe olu a, adighi ama ihe niile gbasaara ebe ndi ahu a ga-alu nya bu olu. O wee di mkpa iweputa usoro a ga-eso wee mejuputa ihe di n'olu NEWMAP n'usoro iwu di adi maka ileba anya n'ihe metutara gburugburu, nya bu, (Iwu EIA) nke Najiria, ya na atumatu nchekwa nke Ulo Obaego Uwa. Iji nweta ebumnobi nke ESMF, olu ndi a ga-alu bu:

Nke mbu: Inyocha gburugburu na imara ebe olu ga-elu
Nke abuo: Atumatu na usoro iwu metutara gburugburu
Nke ato: Ihe o nwere ike iputara gburugburu na mmekorita mmadu na ibe ya.
Nke ano: Ileba anya n'ihe o ga-aputara gburugburu
Nke ise: Ihazi atumatu a ga-eji belata ihe ojoo ga-adaputa
Nke isii: Iweputa usoro oru
Nke asaa: Ihe a choro maka ozuzu
Nke asato: Ijuta oha mmadu

ATUMATU NA USORO IWU

Ha di otutu na Naijiria, bu usoro ime ihe gbasaara gburugburu, bu nke e weputara maka ala anyi nakwa nke metutara mba na ibe ya, gbasara olu nke NEWMAP. Na Naijiria, o bu Ministri Etiti na-ahu maka gburugburu, ka e nyere ikike itinye iwu na usoro ndi a n'oru, Ministri a nwere oru ikpokota oru niile gbasaara i chekwaba akunauba onatarachi, maka mmepe ga-ato ato na Naijiria. Otu nime iwu kacha mkpa n'oru NEWMAP bu iwu ilenye anya etu ihe a na-eme si emetuta gburugburu nke a kporo Environmental Impact Assessment (EIA) Act N0 86 nke 1992.

Nke a mere ka o buru iwu na olu mmepe obula ga-elebariri anya n'etu o si metuta gburugburu, ma weputakwa usoro a ga-eji na-eme nchocha ma na-enye nkowa. Enyochaakwa olu mmepe obula a ga-alu iji mara ma aga-elenye anya n'uju, maobu ntakiri etu o si metuta gburugburu ma obu na agaghi eme ya.

Ulo oru Goomenti di iche iche (MDAs) nwekwara iwu na-akwado ebumnobi a dabara n'ihe Ulo Obaego mba uwa choro maka olu mmepe obula.

Otutu Steeti ndi a ga-alu olu NEWMAP na ha nwekwara iwu di otu ahu. Naijiria so wee binye aka na nkwekorita otu mba uwa di iche iche gbasara etu ubochi si di, ihe ndi ejizighi eme ihe, igwoto mmiri, ikuku na ala a site na ngwoko kemikal na olu di iche iche, w.d.g. Ulo Obaego mba uwa nwekwara iwu di iche iche ichekwaba na ibelata ihe ojoo idakwasa ndi mmadu na gburugburu site n'olu mmepe obula a na-alu.

IWU NDI AHU NA NDI E NWERE NA NAIJIRIA YIWERE IBE HA

Ka osinadi, e nwee ndiiche obula di n'etiti iwu ndi nke Naijiria na Ulo Obaego mba uwa, e were iwu nke sikariri ike wee ruo oru.

NEWMAP bu atumatu oru ihazi ihe gbasara mbuze na owa mmiri na Naijiria, nke Ulo Obaego mba uwa na-akwado. Nke a ga-akwalite ije ozi nke itinyegasi ihe ndi eji e nyere ndu aka nime afo asato, a ga alu olu mmepe, na itinye ego n'atumatu ego akporo (PPPI). O ga-atunyekwa utu ihu na e mere ka nchikwa kwudosie ike.

Ego e nwere ugbua maka ya bu olu bunde dola ise ga-esi n'aka otu enyemaka mmepe mba uwa ($500m, IDA). Gomenti Etiti Naijiria na steeti ya gasi ekwela ituta utu ego na utu ndi ozo nke ha, iji mee ka ya bu olu gazie.

IHE NWERE IKE IDAPUTA NA GBURUGBURU NA IBI NDU N'OBODO

E nwere ihe ndaputa ndia di mma nke gunyere mmetuta nke gburugburu, akunauba na mmekorita mmadu na ibe ya.

NDI DI MMA METURU GBURUGBURU

- Ibelata mbuze ebe ndi ahu olu na-aga
- Ibeiata ide ebe ndi ahu olu na-aga
- Ihazighari ala ndi etetosiri meekwa ka ala na-emeputa nri
- Mbawanye ala ahihia na osisi na-eto
- Irunye ihe ndi ga na-esonye n'etu ubochi si agbanwe
- Ichekwaba udi di iche iche nke ihe na-eku ume
- Imawaga etu e si eme ngwangwa n'usoro nke ESIA
- Ibelata ihe ga-ebute odachi n'ebe olu na aga.
- Ime ka gburugburu na nchikwa kawanye mma.

NDI DI MMA METURU MBIKORITA OHA MMADU:

- Inye oru
- Ito eto nke akunauba
- Mmepe Obodo
- Idi mfe nke njekorita site n'otu steeti na nke ozo na agamnihu nke ichu nta ego.
- Mmalite nke usoro omengwangwa n'imeputa ihe, na olu ugbo
- Mbawanye nke mmekorita mmadu na ibe ya.
- Nkwalite nke ihe ndi na enyere ibi ndu aka
- Mbawanye nke nnukwu obodo gasi.
- Mbelata nke izo ala na ogbaaghara agburu na ibe ya.
- Mbawanye nke ichu nta ego na azumaahia, ya na ma olu kuru onu
- Ohere inye oru

IHE NDAPUTA NDI DI NJO

Ka e si nwee ihe ndaputa ndi di mma n'olu NEWMAP, bu ka e si nweekwa ndi di njo. A ga-ekewakwa ha gbado isi n'etu ha si metuta gburugburu nakwa mbikorita oha mmadu.

KA HA Si METUTA GBURUGBURU

- Nkwoko ugboala ga-akari
- Ihe ojoo, mkpotu di iche iche ga-ejuputa n'ikuku
- Ihe ndi di okpurukpu ejizighi emeihe
- Ihe ndi di mmiri ejizighi eme ihe ga-ejukwa
- Itinye akunauba onatarachi n'olu
- Ozizo ala na ihe ndi so ya
- Okwu gbasaara olu na ahuike
- Ila n'iyi nke ndu di iche iche
- Ide mmiri

KA IHE NDAPUTA OJOO SI METUTA MBIKORITA OHA MMADU:

- Mbawanye onuogu mmadu
- Nfunari nke onatarachi njirimara ndi
- Nnochi ala mmadu n'oge olu
- Iweghara ala nke ga-ebute nkwaghari obi na nfunari nke ihe ndi e ji ebi ndu na akunauba.
- Mkpachapu na ejejughi agburu na ogbe
- Mbawanye ime mpu na i na ego n'ike

ATUMATU IBELATA NSOGBU

E nwere atumatu di iche iche iji belata ihe nadaputa ojoo na ikwalite ihe oma, NEWMAP wetara. Ihe ndi e lebara anya wee weputa atumatu ndia bu:

- Mgbanwe nke nhazi olu
- Izere ihe
- Nchekwaba
- Mbelata
- Nhazighari onodu
- Mwechighata
- Ndochikwa
- Ikwu ugwo Itiaka n'obi (Resource Compensation)
- Nkwanite
- Mmepe
- Mgbasapuaka

N'ihi nghota na ufodu usoro a nwere ike i nwe mmetuta nke udi, olu a na-alu, na gburugburu na mbikorita n'obodo, otutu nime ha nwere ike isi ajo ike ma o ruo n'omume, o di mkpa na e tinyekwara anya n'usoro ndia.

- Ikwe omume
- Idi nfe omume
- Nkwugide
- Akorongwa a choro
- Akorongwa maka ozuzu
- Akorongwa iledo olu anya
- Ego o ga-ewe
- Ndaba onu ego

IMEJUPUTA IHE DI NA ESMF.

Ihe e dere n'akwukwo gbasara ESMF nwere otutu ihe dabara n'izugbe gabsaara gburugburu na ihazi usoro mbikorita nke NEWMAP.

INYOCHA OLU, IDEBE NJEDEBE NA IKESA HA N'UDI OBULA

A ga-enyeocha ebe dum a ga-alu olu i mara ka o ga-esi metuta gburugburu na mbikorita tupu enye ya nkwado si n'aka otu na-eledo anya ka olu si aga, bu PMU. Nke a bu ka e wee matasia:

- Etu a ga-esi hazie olu n'udi ha
- Usoro nchekwa Ulo Obaego Uwa gbasara gburugburu na mbikorita

- Ihe ndi nwere ike ibute nsogbu na gburugburu na mbikorita oha mmadu
- Odinala ma o bu ihe ndi ozo di mkpa

Ozo bu na a ga-enyocha olu ndi ahu iji mata ndi o gbasaara, udi ha di na etu a ga esi tinyedebe ha aka n'olu. A ga-ezigara ulo Obaego mba uwa mputara nke nyocha ndi ahu, ka ha leba ya anya, nye nkwado. Nke a ga abu ma e deputachaa ebumnobi maka ya bu olu, ma mee mmalite nke inyocha gburugburu, dika iwu EIA (decree 86, 1992) si debe ya. Elebachaa anya na nnyocha na ihe e kwuru ka a luo, ya na etu olu ESIA/ESMP si gaa, a ga-eziga ha n'Ulo Obaego mba uwa maka nleba anya na nkwado, tupu e mee ka o puta ihe na Naijiria, nya na odu akuku Ulo Obaego mba uwa.

ATUMATU MAKA IHAZI GBURUGBURU NA MBIKORITA MMADU NA IBE YA (ESMP)

Oru obula ga-enwe atumatu ihazi gburugburu na mbikorita, gbadoro isi n'ileba anya etu o si metuta gburugburu na mbikorita, ka e wee nweta ahuike, nchekwa na ime ihe n'usoro, nke ebumnobi ya bu ihazi gburugburu, olu e nwere ilu na ihe ndi ozo. Atumatu a di mkpa nke ukwuu na NEWMAP, iji hu na olu ndi a ga-alu nwetara ihe achoro gbasara gburugburu, ahu ike na mmekorita ndi mmadu. N' ihi nke a a na-eledo anya n'atumatu, nchikwa, ndi olu, iwunite onodu ima ihe a na-eme, mkparita ubobo ga-emetuta oha mmadu na nledo anya n'olu a na-alu.

A ga-acho atumatu ESMP nke olu obula na nkebi abuo. N'oge ikowaputa ebumnuche maka ya bu olu, ndi na-ezube iso n'otu iledo anya ka olu si aga bu (PMU), ga-etinyekwa ihe ga-egosi etu aga-esi elekota anya kwa oge, etu olu ahu si metuta gburugburu na mmekorita, tinyere otu a ga-esi kwagharia obi maka ndi aga-anapu ebe obibi ha, ala na ihe ha ji ebi ndu, n'ihi mbuze. Aga-eme ihe ndi a tupu ebido olu NEWMAP. A ga-achokwa ESMP n'oge olu ga na-aga n'iru.

INYE OZUZU

O di mkpa ime ngwa ngwa n'inye ozuzu n'etiti steeti, ochichi ime Obodo nakwa Obodo di iche iche, ka ndi oru wee mara ihe a ne-eme n'oru ihazi gburugburu na mbikorita. Ndi oru ngo ga-esokwa nweta nya bu ozuzu. N'ihi nke a, e kwesiri ihuta ozuzu a dika ozuzu ka ibe ya. Obu ikwado ndi mmadu aga-eji ruo ya bu oru nke oma, nke gunyekwara ime ka ha nwee ezi ngbota, mata ka esi aru ya bu oru nakwa etu a ga-esi na-nweta akuko, amamihe na ozuzu ga-eme ka ha ruo oru nke oma.

O metukwara ikwado otu oru, ime ka obuwanye ibu, bu usoro nchikwa, na usoro di iche iche abughi maka ya bu otu oru, kama na obukwa ichikota mmekorita di n'etiti oru di iche na mpaghara di iche iche (obu nke gomenti, nke ndi nnooro onwe, ka obu nke otu Obodo). Eweputara udi ozuzu a ga-acho nke gbadoro isi n'ihe ndi edeputara na ESMF. Ha bu ndia:

- Lee ihu akwukwo nke isii n'akwukwuo a na-atughari

IMAPUTA EGO OLU

Ego di nde dola Amerika asato na puku iri ato (US$ 8,030,000), ka akwadoro maka olu ESMF, buru n'obi ihe nile a ga-aru n'oru ahu.

E werekwaara ya na emeela ka ihe dum doo anya na ya bu amuma ego oru. Ihe ndi a ga-eji ego ruo bu:

- Olu mgbe mgbe gbasara ihazi gburugburu na mbikorita, nke ngalaba na-eledo oru anya (PMU) ga na-aru.
- Inye ozuzu maka ndi na-eledo oru anya na ndi ozo o gbasara.
- Ikpobata n'oru nke ndi okachamara n'oru
- Ileba anya maka ikpachapu anya n'oru
- Ileba anya ka ihe ana-aru si metu gburugburu na mbikorita ESIA, nke a ga-enye oru ya site n'aka ndi na-eledo anya na Steeti, na ndi nke Etiti.
- Iledo oru anya na imata ebe aludebere nke ndi na-eledo olu anya (PMU).

EGO NILE E ZUBERE IJI LUO ESMF BU NKE A:

1	Oz uzu	650 650,000
2	ESI ESIA/ESMF, (tinyere ibiputa akwukwo ma ka usor o nchekwa)	7,12 7,120, 000
3	Il ed Iledo oru anya	260 260 0,000
	Mkpokota	**88 8,030,000**

IKABI NJEDEBE NEWMAP

Otutu oge obu ndi na-ebiri ego ga-amanite ikwadobe ilenye anya na nchekwa ya na itu atumatu maka ebe ndi aga-alu olu n'udi n'udi. Aga-elekwasa anya na (ESMF na RPF) wee kwadobe (ESIAs), (ESMPs) na (RAPs) na usoro nchekwaba ndi ozo nke obu Ulo Obaego a ga-eweta ego ha ufodu.

TRANSLATION IN EDO LANGUAGE

Olika-Omwe Evbategben

Ekene ẹmwẹ Ke Dee:

Otọ Nigeria kakabọ mię ọlọghọmwa ne ọ rre ẹmwẹ orogho-ke ne ọ dinmwi ke ne ọ ma dinmwi gbe zẹ vbe inwina Osa kevbe inwina ọmwa kẹkan. Otọ ne ọ gberra ekilogramu vbe iheva ẹre orogho mu. Uwe evba ẹ re otọ ne ọ rrię ekilogramu uri eva yan ẹbo eha vbe iheva ẹre orogho kakabọ kpe kua. Orogho mwe ẹtin kakabọ ne ọ ya si ẹti vbe idobo ye edagbọn ọghe emwa nibun. Erriọ ọ vbe rria emwi alaghodaro ọghe ẹki vbe aguakpa ne ọ rre ẹvbo. Orogho ne ọ dinmwi debaa usun ọlọghọmwa ne ikinkin ẹvbo ne re rria ne igho ọghe gberra ebo iyisẹn vbe igho ebo vbe ukpo-ukpo (katekate vbe abọ ahọ-ekẹn vbe Nigeria). Ena deba idobo ne aguakpa ọghe ẹki ne arriọba ọghe otọ Nigeria mwẹẹ ne "ukpo 2020".

Edanmwẹ osẹ emwi yehe ne ọ ma re kpẹẹ gbe na, khare wẹẹ idobo na i re ne ivbiẹvbo kherhe, okpẹvbo, ra arriọba Nigeria gha sẹtin a ru vbene iyobọ ma na kẹ obọ ẹvbo ni sekpe vbe ne ẹvboebo ye rre.

Rhumwuda ọna nia, te ọkarriọba Nigeria re gualọ iyobọ khian vbe obọ owa aza igho otagbọnhia. Ne irẹn ma sẹtin khọn okuo ẹmwẹ ame-orogho ne ọ kpagbọn nẹ. Ọna ọ zẹ ne Nigeria na suẹ otu na tiẹre "NEWMAP" – The Nigeria Erosion and Watershed Management Project ne ọ khian ye ukpo erẹnrẹn ya nwina. Inwina iran gha kaan adọlọ kevbe ikię ọghe otọ ne orogho murria ran e orogho gha sẹtin murria. Sehia, NEWMAP gha musẹ vbe ẹvbo ihinrọn nọkhua vbe Nigeria katekate: Abia, Anambra, Cross-Rivers, Ebonyi, Ẹdo, Enugu kevbe Imo.

- Inwina na ghaa egbe ye abọ enẹ:
- Evbamuyi ne ọ kaẹn orogho vbe amẹ ikpe mwamwa
- Iruẹmwi orogho vbe amẹ ikpe mwamwa
- Emwamwa ọghe afiwerrię kevbe ediae ẹghẹ ọghe ẹdẹ
- Emaọmwa Inwina

Gelegele, emwamwa nokaro gha kaẹn ivbie inwina ughughan nii ya kaẹn ubọmwẹ ra afiwerrię ihowa ne orogho murria. Inwina na hia sẹtin vbe sie akugbe vbe ẹdogbo ẹvbo. Ena a khian rhumwuda ẹre sii yo zẹvbe ne aguakpa ne ọ khere ghi khara vbe ẹdẹnẹre. Emwamwa ọghe akugbe vbe ẹdogbo ẹvbo gualọ odẹ nọhiarẹn ne iran gha na kugbe mudia nwina ye ẹmwẹ orogho vbe amẹ ikpe vbe akharhe "NEWMAP" ne a tiẹre Nigeria Erosion and Watershed Management Project.

Ebe ughẹn gbẹnẹ uviẹn adọlọ ne a khian loo ya san ẹse ne emwa ne ekhọe iran ma mwẹ ne a khulo fua tin otọ owa ra ẹki iran rre.

Ode ọwara, asegẹn kevbe ẹdogbo ọghe ESMF: ẹghẹ imuẹgbe inwina, ihowa nii kee ne inwina na musọ ma re gia rẹn dinmwi. Rhumwuda ọna, ọ khẹke ne a gha mwẹ emwamwa akugbe vbe ikinkin ẹvbo ne a mię ehe na mwamwa odẹ ne a gha lele ya mu ẹmwẹ inwina na su. Ọ khẹke ne emwamwa omusọ ọghe otue NEWMAP kue ye iyi ELA vbe Nigeria vbe owa

aza-igho otagbọnhia khare. Ne a sẹtin rrie obọ ye vbe ne ESMF khare, inwina iran vẹẹ lele esọn ne a khian ye unu kaẹn na:

Ẹsọn II: Iyi vbe ilele inwina ne ọ kaẹn ẹdogbo ẹvbo
Ẹsọn III: Akugbe ẹvbo vbe ẹdogbo ẹvbo vbe ẹghẹ gha rriẹ ota
Ẹsọn IV: Ezanzan ne ọ kaẹn ẹmwe okhian ẹdogbo ẹvbo
Ẹsọn V: Aguakpa ọghe emwamwa ne ọ kaẹn iro umamwẹ ne a ya biegbe okhian idobo
Ẹsọn VI: Emwamwa ne ọ kaẹn owa iruẹmwi
Ẹsọn VII: Egualọ ọghe imamwamwi
Ẹsọn VIII: Iyobọ ẹmwẹ ikẹbikẹvbo

<u>IYI ARRIỌBA KEVBE ILELE INWINA:</u>

Avbie dọmwadẹ ilele arriọba ọ re Nigeria kevbe ọghe ẹvboebo hia ne ọ kaan ikinkin ẹvbo ne ọ gha gia loo vbe a gha ru inwina NEWMAP.

Vbe Nigeria, ẹtin ne a yam u ẹmwẹ inwina hia sẹ keg hi rre obọ Oka-arriọba ikinkin ẹvbo ne a tiẹre-Federal Ministry of Environment (FMENU).

Arriọba ọghe ikinkin ẹvbo na, ọ luẹ ẹtin hia kugbe ne a ya gbe aro ghee, vbe dia inwina Osa hia ne a ya dọlọ otọ Nigeria hia yi.

Iyi ọkpa kpataki ne ọ yẹẹ otue NEWMAP ọ re "Ezanzan ọghe vbe ne ikinkin ẹvbo khare" (Environmental Impact Assessments (ELA) iyi olaba, 86 ọghe ukpo 1992 (Act 86 of 1992). Iyi na ru sẹrriọ wẹẹ "Ezanzan ọghe vbe ne ikinkin ẹvbo khare" (ELA) ọ re gbe asẹ ye inwina aguakpa na, vbe khare odẹ ughughan ne a yak hare vbe gbẹn yan iruẹmwi ezanzan ọghe ikinkin ẹvbo. Ọ khare wẹẹ ọ khẹke ne a kakabọ gualọ otote inwina aguakpa na rhumwuda a ma rẹẹn evba ye emwi ru vbe ẹghẹ gha rrie ota.

Zẹvbe egualọ ne ọ kaan ẹmwẹ ikinkin ẹvbo, ezanzan ọghe vbe ne emwi ye he saba ladian. Ọna yegbeba ilele ne aza-owa-igho ọghe otagbọn gualọ a ke miẹ wẹẹ a mu inwina aguakpa rrọkpa sẹ. Ilele na ọ re a tiẹre EA.

Levbasevba, avbe iyi arriọba Nigeria vbe ẹvboebo ne ọ kaan ikinkin ẹvbo akugbe ẹvbo ne ọ guaan kaan inwina otuẹ NEWMAP vbe out nii rre ototọ ọre. Erriọ vbe ne avbe Okaarriọba ọvbe hia ne ghaa abọ ye ihe ughughan, katekate (MDAs) ni mwẹ iyi ne iran ya rrie obọ baa inwina otuẹ ESMF. Eso vbe ne iyi mudia yo ne a wabua kevbe ne a sikaan ghe ẹmwẹ ikinkin ẹvbo vbe akugbe ẹvbo ne ọ kaan inwina ughughan ne iran ru.

Nibun vbe ẹvbo ne a khian na nwina inwina na mwẹẹ ọre ne vbe ilele ẹvbo iran. Otọ Enaigirria (Nigeria) ọre ọ mu obọ asẹ ye dọmwadẹ arrilo vbe okugba ọghe ẹvboebo. Ena ya debaa eni kan vbe ne ẹdẹ ye hẹ, evbamufua, ofigbọn kevbe omurria ọghe ekenika, ẹsọn kevbe enibun hia.

Ya deba ena hia, owa aza igho ẹvbo hia gele viọ iyi imiẹfan hia nibun ladian, ne a ya rrie hiẹn idobo vbe akhiẹ emwa vbe aguakpa ọghe ikinkin ẹvbo ra ẹdogbo ẹvbo rre. Otuẹ EIA ọghe
Enaigirria (Nigeria) vbe iyi imiẹfan ọghe owa-aza-igho otọ agbọn hia vbe ye egbe khọe O.P. 4.01 vbe iyi EIA ọghe Enaigirria (Nigeria). Egulọ EA ọghe owa-aza-igho otọ agbọn hia ne okaro kevbe khọe iyi okaro ọghe owa-aza-ọghe-igho otọ agbọn hia ne okaro. Iyi ne ogieva

(B) kevbe khọe iyi EIA II, iyi owa-aza-ọghe-igho otọ agbọn hia ne ogieha (C) kevbe khọe EIA III iyi.

Sokpan ọkpa ghi nọ, vbe odẹ alughan ne ọ rre iyi imiẹfan owa aza igho otọ agbọn hia vbe iyi ne ọ rrọ nẹ vbe ekpẹ ẹdogbo ra ikinkin ẹvbo, a gha ro ne a mu inwina NEWMAP sẹ te a khian kakabọ tua obọ ya lele ilele ne iran vin ye otọ. Katekate zevbe odẹ inwina te owa-aza-igho otọ agbọn hia khian gha r one ọ rẹẹn emwa kevbe otu nii gele mweẹ agiẹngiẹn ra emwa ni gele sẹ usẹ na ne ọ miẹ ehe na rẹẹn deghẹ odẹ vbe ilele na khọe ilele O.P 4.12 igiemwi inwina ne a tiẹre Projects Description.

ỌMAA NE Ọ BUU IVBIẸBO DEE

- Inwina ne a gha viọ ne emwa
- Alaghodaro vbe ẹmwẹ igho kevbe a ya igho ru hia
- Inwina aguakpa vbe edọmwadẹ ikẹnkẹn hia
- ẹmwẹ elẹyolẹrro kevbe ẹmwẹ ẹki ne a do ke arriọba ọkpa gha rrie arriọba ọvbehe ghi vbe maa sẹẹ ayọ
- a ghi vbe suẹn vbe ọghe ẹgiẹgiẹ edọmwadẹ emwi ne a ru khiẹn kevbe emwa ughughan ne ọ kaan ugbo ne a gbe
- odẹ hia ne a ya nyaa agbọn ghi vbe doo maa sẹẹ ayọ
- igue nibun ghi vbe doo rhaan aro
- okhọnẹn ne ọ rre ẹmwe otọ kevbe igbinna ni rre ogha ẹvbo ghi vbe siyo
- aguakpa ghi vbe doo gha rrọọ vbe ẹmwẹ ẹki ne a do vbe a gha bọlọ emwi na hia nẹ
- inwina ne emwa gha nwina ghi vbe doo kpọ kua.

ẸBE NE Ọ VBEE LELE EMWAMWA NA KHIAN

A gha doo la obọ ọvbehe nwanọ ọnrẹn ye otọ emwi ne NEWMAP ghi si ye ivbiẹvbo egbe, a ghi vbe doo miẹ wẹrẹ emwi nibun ne a mugbọọ gha vbee rhie ọmaa ye ẹvbo vbe ne a na vbe doo miẹ wẹrẹ emwi dan nibun vbee lele ẹre khian. A na ghi viọ ehia kugbe, a gha ru emwi ne a wene a ru vbe ekpa NEWMAP, emwi dan nibun ghara rre ọre ne ọ vbee ye vbe inwina ọghe EA category "A" ne ọ keere ne a rẹẹn vbe ne ọ gha rhia ẹdogbo hẹ.

A vbe ka ya unu kaan emwi dan hia ni lele eprogiẹti na hia nẹ. A gha vbee vinnọ ena hia ya ototọ emwi dan ni kuan ẹdogbo kevbe ni kuan ivbiẹvbo.

EMWI DAN NI KE OBỌ ẸDOGBO DE (ADVERSE ENVIRONMENTAL IMPACT

- emwi ne a ya khian hia ghi doo buun sẹẹ ayọ
- ẹhoho dan kevbe orogho ghi gbaa ehe hia
- emwi ọwiẹyi ne a ru ke vbene a gha vbee ya vi ọre kua hẹ
- ẹwia ni rre ẹhoho
- vbe ne a gha loo ẹfe otọ hẹ
- oguo otọ hia
- ẹmwẹ emianmwẹ ne ọ kaan ehe ne a na nwina kevbe emianmwẹ ne ọ gbaa ore hia
- ẹfe oha ne ọ wii agbọn, katekate avbe aranmwẹ ne ẹ i kpọ a i ghi miẹ
- orogho ne ọ lẹẹ okpokpo lẹẹ ogbigbi.

EBE NE Ọ KAAN IVBIẹVBO

- ẹvbo ghi doo vọn sẹẹ ayọ
- emwi arre ni wii
- otọ ivbiẹvbo ne a waa mu vbe inwina gha suẹn nẹ
- otọ ne a miẹ ivbiẹvbo re ghi doo sin e emwa gha na vbe gha gualọ ihe ọvbehe ne iran gha ya nyi. Levabsevba, emwi ne a run e a gha ya nyaa agbọn hia ghi vbe doo wii ivbiẹvbo
- emwa ni bun hia i ghi gu uro kevbe wẹrẹ e i ghi re ehe hia ọre emwamwa na la
- unyimwẹ usankanmwẹ kevbe emwa ni mu otọ ya ido ghi doo kpọ kua.

ODẸ HIA NE A GHA LA NE ẸBE NA HIA SIYO

Odẹ ne a gha la na keghi kaan emwi hia ne a gha run e a miẹ wẹrẹ aruọma ne ọ rre inwina na ọre a gha miẹ vbe ne a gha na we ne ẹbe nirrọ siyo ọre a we ne a loo vbe NEWMAP.
Odẹ aruọma ne a zẹ ọre iro vbe ebe inyẹ na keghi re ilele hia ni kaan inwina ni rre obọ hia. Vbe a ghi ta aro odẹ aruọma ne a gha lele ne ọ de ye uviẹn, ilele ne a khian ya unu kaan na keghi vbe re ne a roo vbe orhiọn ẹsese:

- afiwerriẹ ne ọ gha rre emwamwa ne a ru ye otọ
- osẹrae
- odogaa
- afian ru
- aguarre
- a ya emwamwa ọkpa roo ihe ọvbehe
- a ghi haa osa ye emwi
- emwi ghi maa sẹẹ vbe ne ọ kaa ye
- aguakpa ne ọ rre emwi
- a ghi miẹ wẹrẹ ughughan rre emwi

A vbe rẹẹn sẹ rriọ wẹrẹ vbe ne a gha ya loo edọmwadẹ odẹ aruọma na vbee rre obọ ọghe vbe ne edọmwadẹ inwina ni rre obọ ye hẹ, ẹdogbo ne inwina na ye kevbe ilele ẹvbo ne inwina ye. Levbasevba, eso vbe uwu odẹ aruọma nag ha vbee ghaan gbe ra vbe wẹrẹ a i vbe sẹtin loo aro odẹ na sẹ ufomwẹ rhumwuda emwi eso. Vbe a ghaa loo edọmwadẹ odẹ aruọma na, emwi ne ọ keere nọ na a mu ukpa ghee inwina ne ọ rre obọ vbe odẹ ne a khian sunu yin a:

- inwina ne a ya mu so na, odẹ ne ọ gbare nọ ra?
- olọghọ i ke olọghọ vbe rre inwina na ra?
- ako ne a mu inwina na gbọọ yi maa ra?
- de aro uhi ra ilele ne ọ kaan ọnrẹn?
- vbe a khian ya gha gbaro ghe ẹre hẹ?
- inu igho ọ gha gbe (ne a ya ru osugie emwi kevbe igho ne a loo vbobọvbobọ)?
- Vbe a gha ya miẹ hẹ wẹrẹ a loo igho na vbe ne ọ keere ne a loo ẹre?

OMUSO ỌGHE ESMF

Ebe ọghe "ESMF" na keghi mwẹ emwi eso ne ọ viọ ye uwe evbe ne a khian ya dọlọ ru ẹmwẹ ẹdogbo ẹvbo rẹ ighẹ ene "ESMF" vbe uwe enene "NEWMAP" kevbe avbe ivbiẹ inwina ni rre uwe ẹre. Ọna gha ya dekan edọmwadẹ evbaru ọkade ọkade ni rre ekpa ẹre, zẹvbe ni ya kan evbe ne a khian ya gha mwẹ ilele ọghe adọlọ run a vbe ne a gha na miẹ wẹrẹ a ma ba aro ọghe "ESMF" ku.

EMWAMWA ỌGHE AGBARO KE OTỌ GHE INWINA KEVBE EHE NE INWINA KHIAN SẸ

A gha gbe aro ke otọ ghe avbe otọ ne a khian na nwina hia ne a rẹn emwi ne inwina na gha sẹtin si vbe ẹdogbo kevbe emwa ni rre ẹvbo vbe ne a ke miẹ ighe ene "PMU" rrie obọ yi. Ọmwa inwina ne a wa ẹre inwina nag ha sẹtin gbe aro ke otọ ghe ena. A gha vbe kakabọ gbe aro ke otọ ghe ene inwina ne a ya rẹn:

- Ehe ne ọ kere ne inwina ke suẹn kevbe ehe ne ọ khian sẹ
- Avbe ilele ẹwere ne a lele vbe idogbo ẹvbo ne otu aza igho ne a tiẹre " World Bank" yi,
- Avbe osi oze ọghe ẹdogbo ẹvbo nig ha sẹtin la ẹre rre, kevbe
- Avbe osi ọghe orre kevbe enikẹre

Vbe arrieba, a gha gbe aro ke otọ ghe edọmwadẹ inwina ne a ya rẹn avbe ikankangban ne emwamwa na dekan kevbe evbe ne ọ yak an edọmwadẹ ọghẹ rẹ. Ebe ne a khian gbẹn ladian vbe ekpa emwi ne a miẹ vbe a ghẹ gbe aro ke otọ ghe emwi ne inwina n gha sẹtin do si vbe idogbo ẹvbo kevbe egbe emwa ni rre ẹvbo, ọre a khian rrie gie otu aza ebe ọghe otọ ẹvbo hia ne a tiẹre "World Bank" ne iran dọlọ vbe rrie obọ yi vbe a gha ghi mwamwa emwamwa inwina fo nẹ kevbe vbe a gha ghi ru inwina ọghe arughe nẹ vbe ekpa ẹdogbo ẹvbo, zẹ vbe ne ọ dekan ilele ni rre otọ

Enaigirria vbe ekpa ẹdogbo ẹvbo (ne a tiẹre "decree 86 ọghe ukpo 1992). Zẹ vbe ne ọ dekan emwi ne a miẹ vbe a gbe aro ke otọ dọlọ ghẹ ẹmwẹ inwina na kevbe ehe ne ene inwina khian na suẹn ya sẹ ehe ne ọ khian sẹ a gha viọ ebe ọghe emwamwa inwina ne a khian lo kevbe ebe ne "ESIA" kevbe "ESMP" gbẹn giẹ otu aza igho ọghe otọ agbọn hia ne a tiẹre "World Bank", ne dọlọ ghe kevbe ne iran mu obọ yi, a ke miẹ wẹrẹ a ya ẹre wewe vbe otọ Enaigirria kevbe ehe ne "World Bank' na mu emwi wewe.

EMWAMWA ỌGHE A GBE ARO GHE ẸDOGBO KEVBE EMWA NI RRE ẸVBO

A gha ho ne enene inwina ni rrre uwe ẹre gha mwẹ "ESMP" kpataki zẹ vbe ne ilele ọghe "ESIA" khare, ne a miẹ wẹrẹ a mu aho ọghe ilele ẹvbo ni dekan ekpa isimwi egbe, ẹwerẹ, ẹdogbo ẹvbo kevbe edọmwadẹ otu inwina kevbe egbe emwi vberriọ ya so. Emwi kpataki ọre "ESMP" khin vbe uwe "NEWMAP", katekate, vbe ne ọ dekan emwamwa ne a ya gbe aro ghe ẹdogbo ẹvbo kevbe emwa ni rre ẹvbo, ne a miẹ wẹrẹ ẹmwẹ ẹdogbo ẹvbo kevbe isimwiegbe emwa ni rre ẹvbo ma de ne ọ rria vbe inwina na kevbe edọmwadẹ ivbiẹ inwina ni rre uwe ẹre. zẹvberriọ, enene "ESMP" kakabọ mu aro da ilele, emwa inwina ni rrre ekpa a gbe aro ghe ẹvbo, a ma emwa inwina, a gu emwa ẹvbo zẹ kevbe inwina agbe aro ke otọ ghe emwi ne a ru.

A gha lo emwamwa ọghe a gbe aro ghe ẹmwẹ ẹdogbo kevbe emwa ẹvbo vbe edọmwadẹ ivbiẹ inwina na vbe asefẹn eva. Vbe asefẹn ne a re na ta emwi na a khian run e ọ rrọ, edọmwadẹ otọ ẹvbo ni rrie obọ ye inwina na gha zẹ vbe aro ọghe iran gbẹnẹ evbe ne iran

khian ru ẹmwẹ emwi ni dekan ẹdogbo ẹvbo kevbe emwa ẹvbo hẹ vbe ẹghẹ ke ẹghẹ. Enene emwamwa gha vbe kha evbe ne a khian ya ru edọmwadẹ ivbiẹ inwina hẹ ne a ya miẹ wẹrẹ ẹdogbo ẹvbo ma khian ene ọ rria, kevbe we ne emwa ẹvbo vbe kue yọ. evbe ne a khian ya ru ẹre hẹ na, kevbe emwamwa ne a horo ne a khian ya ru ẹmwẹ ẹvbo, kevbe ẹmwẹ emwa ne a viọ hin otọ iran rre gha rrie ehe ọvbehe vbe ne iran ma na te ho, kevbe ẹmwẹ ne ọ dekan iyi (ọghe emwa nẹ ghi mwẹ owa, otọ, evbe iran la miẹ wẹrẹ inwina "NEWMAP" suẹnrẹn) ghara rre usun ne a khian kakabọ mu arro da. A gha vbe gualọ ESMP vbe a gha sẹ asefẹn ne a khian na suẹn gha nwina na vbe edọmwadẹ ivbiẹ inwina ni rre uwe ẹre.

IRUẸMWI NE A YA GU INWINA

Vbe ne a gha na miẹ wẹrẹ a mu aho ọghe ESMF so, a gha ho ne a zẹgiẹ suẹn gha ma emwa inwina ne a miẹ wẹrẹ emwa ni khẹke ya guẹ inwina a gbe aro ghe ẹdogbo ẹvbo kevbe emwa ẹvbo ẹsẹse vbe edọmwadẹ abọ arriọba (vbe arriọba otọ Enaigirria, arriọba edọmwadẹ otọ ẹvbo kevbe ya sẹ abọ arriọba iko ẹvbo) kevbe avbe emwa ni mu inwina ve hia. Zẹvberriọ, a gha ghẹ iruẹmwi ne a ya gu inwina na sẹ iruẹmwi kẹkan. Ne a ya ma emwa emwi ne iran gha sẹtin ru nọ, kevbe ne a ya ma emwa evbe ne iran gha ya rẹn emwi rẹ, ne iran ya sẹtin gualọ emwi ne iran gualọ kevbe iruẹmwi ne iran gha ya kakabọ guẹ inwina rẹ. Ọ gha vbe ya dekan atọnmu ọghe otu inwina, kevbe ne a ya yẹ emwamwa ọghe agbe aro ghe ẹmwẹ ẹvbo ya khian ene ọ gbare, emwamwa ilele vbe uwe otu inwina kevbe evbe ne otu inwina ọkpa yak an otu inwina ọvbehe hia kevbe abọ emwa ni nya isi inwina (ne arriọba nyarẹn, ne emwa kẹkan nyarẹn kevbe ne emwa ẹvbo koko nya).

Zẹvbe nẹ emwi ne a horo kevbe ne a mwẹ vbe ekpa emwamwa ọghe a ghe aro ghe ẹmwẹ ẹdogbo kevbe emwa ẹvbo ye hẹ vbe uwe "ESMF", a gha ho ne a ru iruẹmwi ọghe inwina ne a ya gu inwina na zẹ edọmwadẹ abọ na:

- ọghe ne a khian ya gbe aro ke otọ ghe emwi hia ne inwina nag ha sẹtin si vbe ẹdogbo ẹvbo ne a tiẹre "Environmental Impact Assessment (EIA)" - Ẹkie a gbe aro ke otọ ghe inwina, ẹkie a kha evbe ne inwina khian sẹ rẹ, enana ọghe edọmwadẹ emwi ne ọ gha sẹtin si vbe ẹvbo, emwamwa ne a khian ya miẹ wẹrẹ obalọ ne ọ si ma ghi kan gbe, ne a khian ya rrie aro lele ẹre kevbe ne a khian ya gbe aro ke otọ ya ghẹ ebe ne EIA gbẹn.
- ọghe a gbe aro ke otọ ru ẹmwẹ ẹdogbo ẹvbo ne a tiẹre "Environmental Due Diligence – Edọmwadẹ ọna ne a miẹ, a rrie aro lele inwina ne a ya rẹn emwi hia ne a gha ru vbe uhi ne a rẹn evbe nẹ inwina na sẹ kevbe ne a dọlọ ghee be ne ọ gbẹn rre
- Vbene a ya gbe aro ghẹ inwina na: ne a rẹn aro emwi kpataki ne M&E ye vbe inwina ya sẹ ufomwẹ, avbe ilele ọghe M&E vbe utọmwẹ ọghe inwina na.

IGHO NA HOO YE OTỌ VBE EKPAE INWINA ESMF

A hoo igho ye otọ ne ọ re ẹbo erẹnrẹn vbe arriaisẹn ọgban (8, 030, 000 US dollar) nay a ru inwina ESMF vbe gha mwẹ vbe ekhọe avbe emwi ne ọ lele inwina na. Emwamwa ne a khian ya we aro igho ne a hoo rre emwa. Igho ne a hoo keghi rẹ ena hia:

- Inwina ẹghẹ hia ọghe abọ PMU (E&S)
- Iruẹmwi ne a ya guẹ inwina se ne PMU kevbe avbe emwa ọvbehe nọkaẹn
- A vbe rrie emwa niguẹ inwina ọghe ikinkin ẹvbo vbe ẹdogbo na ye
- Enana ra Iyemwiẹro ọghe ẹdogbo kevbe emwa ni rre ẹvbo

- Iruẹmwi ọghe usẹmwẹ inwina vbe ekpa ẹdogbo vbe emwa ni rre ẹvbo ne PMU ọghe ne edọmwadẹ otọ ẹvbo Enaigirria kevbe otọ Enaigirria mugbọ
- Inwina ọghe gbe aro kẹ otọ ghẹ emwi ọghe PMU

IGHO HIA NE A MWAMWA NE A KHIAN LO RU INWINA ESMF

Olaba uviẹn	**Inwina ESMF**	**Igho ne ọ gbe (vbe idọla) $**
Okaro	Iruẹmwi ọghe inwina	A rriaisẹn iyeha vbe ekigbesiyeha
Ogieva	ESIA/ESMP (kevbe avbe ebe imiẹfan na ru)	ẹbo ihinrọn vbe arriaisẹn vbe arriaisẹn iyeha
Ogieha	Igbaroghe	Arr iaisẹn uri vbe iyeha
	EHIA	**ẹbo erẹnrẹn vbe arriaisẹn ọgban**

EZANZAN ỌGHE ASẸ NEWMAP

Vbe ihe eso, ọmwa ne ọ khian mọmọ emwị (otọ ra igho) ọ khian ru emwamwa ọghe imiẹfan ra ẹwerẹ kevbe emwamwa ọghe ehe ne ọ khian lo vbe ekpa inwina na, nene inwina ESMF kevbe RPF gha bu odẹ nẹ emwamwa ọghe usẹmwẹ ezanzan ẹdogbo kevbe emwa vbe ẹvbo (ESIAs)/emwamwa adọlọ ọghe ẹdogbo kevbe emwa vbe ẹvbo (ESMPs), ne a ya viọ emwa ya dia ehe ọvbehe (RAPs) kevbe/ra avbe emwamwa imiẹfan ọvbehe ne a mwamwa ne NEWMAP, eso vbọ ne aza igho otọ agbọn gha loo igho yi.

IZEDU ỌGHE EVBO KPATAKI VBE IKINKIN INWINA NA

Na ya miẹ wẹ ẹdogbo kevbe ẹvbo ne ọ rre ehe ne inwina sẹ, gha ya rẹn ekpa inwina na, vbe kevbe avbe emwi ne ọ lelẹ, a gha gbẹn enana kpẹnrẹn ọghe ebe na vbe ẹvbo eha kpataki ne a zẹ vbe ẹdogbo ne inwina na kaẹn (Igbo, Ẹdo kevbe Efik).

EVẸ

Emwamwa ọghe inwina na ESMF keghi re emwi ne PMU vbe abọ arriọba otọ Enaigirria, avbe arriọba ẹdogbo otọ Enaigirria kevbe CBOs/NGOs vbe out eso vbe ikinkin ẹvbo rri obọ yi. A gha wẹ aro ESMF (vbe ebe ẹre) ma ẹvbo na ghẹre vbe guan yan ẹnrẹn vbe dọmwadẹ ehe vbene: abọ arriọba vbe ẹdogbo ẹvbo ne ọ rre ekpa ikinkin ẹvbo (Federal and State Ministries of Environment) kevbe ehe ne igho otọ agbọn mugbọ. A gha mwamwa dọmwadẹ EIAs/EMPs ne dọmwadẹ abọ-inwina rhumwuda ima odẹ vbe ilele nọ rre ESMF na kevbe wẹ a gha vbe wẹ iran aro vberriọ

TRANSLATION IN EFIK

Nda-usuñ Ukama Nkan-ñkuk ye Edu-uwem ke Obio (ESMF)

Utom Ukama Ediwure Iso□ñ ye Ediwure Mben Inyañ ke Nigeria (NEWMAP)

<u>Ibio-ibio Iko□</u>

Idak iso□ñ□

Akamba afaniko□ñ kiet emi idut Nigeria enyenede edi iso□ñ ndiwure – oro edi iso□ñ ndiwure enyo□ñ enyo□ñ mme ndiwure nsiak ñkpri afañ – emi ekeme ndito obot mme ubo□k utom mme owo. Ediwure iso□ñ emi esim ñkpo□ nte 6000km² ke udomo, ke otu emi, 3400km² eneñede o□dio□k. Ediwure iso□ñ afina uwem ediwak owo eti eti onyuñ abiat mme akpan ufo□k ye mme ñkpo□ efen emi edude ke obio ndinwam ñko□ri nnyuñ nnam unana amana o□suho□de. Iso□ñ ndiwure mforo ukpe ada afaniko□ñ edi ke n□kan-ñkuk onyuñ abiat ñkpo□ emi ekemede ndibe do□la milio□n ikie ke isua (akpan-akpan ke usuk-usuk usiak-utin Nigeria). Iso□ñ ndiwure iyakke ñko□ri okuk oduk nte ekpedide onyuñ edi ñkpo□ nnyan-ubo□k o□no□ uduak akwa ukara Nigeria ke abaña "Ekikere 202020". Ñduño□de emi enamde ndo□-ndo□ emi owut ete ke afaniko□ñ emi okpon akan se mme ñkpri obio, mme ñkpri ukara obio, mme sted ye idem akwa ukara Nigeria ekemede ndinam ntre ndiyom unwam nto mme ikpo□ ñka obio emi enwamde ke uforo. Ke ntak oro, akwa ukara idut Nigeria ke oyom unwam oto Ufo□k Utom Ukama Okuk Ekondo (World Bank) ke ndinwana ekoñ ye akani afaniko□ñ emi akade iso ndidio□k ñkan se ekedide akpan-akpan mme mben inyañ ke usuk-usuk Nigeria emi ema ekewure idio□k-idio□k. Ekere ndida ñkpo nte isua itiaita nnam uduak emi. Uduak emi ekere "Utom Abañade Ndidio□ñ Nnyuñ mbio□ño□ Ediwure iso□ñ ye Ediwure Mben Inyañ (NEWMAP)". NEWMAP odomo ndidio□ñ mme mbiara iso□ñ ndibio□ño□ iso□ñ ndiso□p nwure nnyuñ nsi□n ubio□ño□ mbak ofum ye edim ediwuri iso□ñ ke mme itie esiso□pde nditibe. NEWMAP ebiere ndinam utom emi akpan-akpan ke sted itiaba, emi edide □ Abia, Anambra, Cross River, Ebonyi, Edo, Enugu ye Imo.

Ebahade Utom emi esin ke ikpehe inañ□

- *Ndibiat okuk ke ndibio□ño□ ediwure iso□ñ ye ndikama mben inyañ;*
- *Ndikpep ñkpo□ nnyuñ nno□ ịfio□k mbaña ediwure iso□ñ ye ukama mben inyañ;*
- *Mme ukpuho□de edude ke eyo, nte ekemede ndinam enye o□fo□n ye mme owo ye nte ekemede ndibio□ño□ mme idio□k ñkpo□ ekemede nditiene enye; ye*
- *Nte ekamade utom.*

Mme akpan ñkpo□ edinamde ke akpa ikpehe edi□

- *Mme ñkpri-ñkpri utom nte ndibo□p ye ndidio□ñ mme o□to□ emi edio□ño□de nte itie emi iso□ñ esiso□pde owure mme mmo□ñ esiso□pde ndito□ mmen. Mme ñkpri utom emi eyenyene ụfo□n eno□ ñkan-ñkuk ye ebuana mme owo kiet ye eken, emi anade enam asaña okoduk ye mme uduak ñko□ri idahaemi emi ediso□ño□de ida. Ndutim ukama ñkan-ñkuk ye ebuana mme owo kiet ye eken oyom ndiwut anwa-anwa*

usuñ otukde uduak ndimen ekikere abañade ñkan-ñkuk ye ebuana mme owo kiet ye eken ñkobok ye utom abañade ukama ediwure iso□ñ ye ediwure mben inyañ ke Nigeria.

- *Saña-Saña ñwed o□no□ mme uduak ndineñede ñkpo□ mbon edieke uno□mo□ emi abiatde ufo□k-iduñ mme owo mme otukde itie idibi-udia mmo□.*

Mme Ntak, Unio□ñ ye Ubom Utom ESMF

Ke ini enamde ndutim utom, owo ineñekede i□dio□ño□ kpukpuru ñkpo□ ibaña mme itie emi edikade ikanam mme utom emi. Ke ntak oro, ana eneñede ndutim abañade ukama ñkan-ñkuk ye ebuana mme owo kiet ye eken ebon ke nde ke nde ndiwut mme mbet ye mme usuñ edisañade ndikut nte ke utom emi NEWMAP anamde asaña ekekem ye mbet EIA odude ke Nigeria ye eke Ufo□k Utom Ukama Okuk Ererimbot. Mbak ekeme ndinam uduak ESMF, ubom utom emi otuk mme ñkpri-ñkpri utom nte ewetde ke idak emi□

Utom 1 – Ediduño□de Ñkan-ñkuk ye Ndidomo Unio□ñ ye Ubom Esie
Utom 2 – Edinam Mbet Ñkan-Ñkuk ye Nda-usuñ Ikpehe Utom
Utom 3 – Ufo□n Ekerede Ete Utom Emi Eyenyene O□no□ Ñkan-Ñkuk ye Ebuana mme Owo Kiet ye Eken.
Utom 4 – Ndinam Ufo□n Utom Enyenede O□no□ Ñkan-ñkuk Anwaña
Utom 5 – Ndutim Ndikut Nte Utom Emi Ifinake mme Owo mme Ñkan-ñkuk
Utom 6 – Nditim utom Mbon ke Ikpehe ke Ikpehe
Utom 7 – Mme Ñkpo□ enyenede Ndikpep mme Anam-Utom
Utom 8 – Ndinyene Nneme Ye Mme Owo ke Obio Mbaña Utom Emi

Mbet ye Nda-usuñ Ikpehe Utom

Ediwak nda-usuñ emi edade enam utom NEWMAP ke Nigeria edu. Ndusuk edi eke idut nnyin, edi mmo□ eken ebaña utom ñkan-ñkuk ke ofuri ererimbot. Ke Nigeria, Ufo□k Utom Esede Ñkpo□ Abaña Ñkan-ñkuk (FMEnv) enyene odudu ndinam mme utom emi enyenede ufo□n o□no□ ñkan-ñkuk. Eno□ ufo□k utom emi odudu ndikpeme ñkan-ñkuk, ndinyuñ ñkut nte ke etim ekama mme eno□ obot emi edude mbak enwam ke nkaiso ye ñko□ri Nigeria.

Kiet ke otu mbet emi eneñerede enyene ufo□n o□no□ utom NEWMAP edi mbet udomo ufo□n Ñkan-ñkuk (EIA) o□yo□ho□ 86 eke isua 1992. Ke ntak mbet emi, kpukpru utom ñko□ri enyene ndida udomo EIA nno□ item nnyuñ mmen ikpehe edidade inam utom ye nte ediwetde ibo□ro□ nduño□de ye ukpep-ñkpo□ EIA. Ñko, ana eduño□de kpukpru utom ñko□ri ese ufo□n emi mmo□ edinyenede. Ke ema enam ñduño□de emi ema, eyekeme ndidio□ño□ mme eyefiak ese ebaña ufo□n utom emi edinyenede ke ñkan-ñkuk ofuri-ofuri, ubak ubak, mme nditetre ndifiak nse. Emi asaña ekekem ye se Ufo□k Utom Ukama Okuk Ofuri Ekondo (ekotde World Bank) oyomde ndida nnam utom ñko□ri ke ñkan-ñkuk nnyin (EA) ye nte enye abaharede mme unana ñkan-ñkuk (EA) esin ke ikpehe ke ikpehe (A, B ye C). Ñko, enyene mme ediwak mbet emi ebo□pde ñkan-ñkuk idut nnyin ye eke mme idut efen ye mme ido ye mbet ebo□pde ebuana mme owo ke obio emi etukde uduak NEWMAP ye mme ñkpri-ñkpri utom esie. Mme Ufo□k Utom Ukara efen, mme ñko□k mmo□ ye mme ufo□k utom eno□de mmo□ unwam (ekotde mme MDA) enyene mbet emi enwamde mmo□ ndinam uduak ESMF. Ndusuk mbet emi eyom usuñ ndinime mme ndisuho□de mfina otode ubo□k utom mmo□ osim ñkan-ñkuk ye mme owo ke obio.

Ediwak mme Sted emi enamde utom emi enyene mme mbet abañade ñkan-ñkuk emi esañade ekekem ye mme mbet Sted oro. Nigeria edi kiet ke otu mme obio emi esinde ubo□k ke ñwed ke abaña mme mbet ye mme edu-unam-ñkpo□ emi abañade ñkan-ñkuk ke mme nsio nsio idut ke ererimbot. Ndusuk edinyime emi otuk eyo, ndek, aran, idio□k ofum otode mme usiak-ifia, utom ye mmo□ efen.

Ke oro ebede, Ufo□k Utom Ukama Okuk Ofuri Ekondo (World Bank) o□no□ mme mbet unam utom ye mkpeme-idem, emi enwanade ndikpan mme ndisuho□de idio□k-ñkpo□ osimde mme owo ye ñkan-ñkuk mmo□ oto ke utom ñko□ri emi enye anamde. Mbet Udomo Ufo□n Ñkan-ñkuk (EIA) eke Nigeria ye Mbet Mkpeme-idem ye eke Unam-utom World Bank enyene mbiet. OP. 4.01 ye Mbet Udomo Ufo□n Ñkan-ñkuk (EIA) eke Nigeria, eka ndibiet ñko. Edu ñduño□de ñkan-ñkuk (EA) eke Ufo□k Utom Ukama Okuk Ofuri Ekondo (World Bank) ikpehe A (category A) ebiet eke Nigeria, Akpa ikpehe (category I). Ñduñode Ñkan-Ñkuk eke itie Ukama Okuk Ofuri Ekondo, Ikpehe B, edi ukem-ukem ye Mbet Udomo Ñkan-ñkuk eke Nigeria o□yo□ho□ Ikpehe 2 (category II). Eke Ufo□k Utom Ukama Okuk Ofuri Ekondo, Ikpehe (category C) edi ukem ye Mbet Udomo Ñkan-ñkuk eke Nigeria O□yo□ho□ Ikpehe 3 (category III). Edi, edieke ukpuho□de odude ke otukde mbet ukpeme Ñkan-ñkuk eke Ufo□k Ukama Okuk Ofuri Ekondo ye mbet ñkan-ñkuk ke Nigeria ke ini eyomde ndinam uduak NEWMAP, mbet enye emi o□s□o□ñde odudu akan ke edida. Oro edi, ke ini enamde utom, Ufo□k Utom Ukama Okuk Ofuri Ekondo ekeme ndinyene nneme ye mme mmo□ emi ñkp□o□ oro otukde mbak edi□o□ño□ mme usuñ unam utom oro ye se idiwo□r□o□de isu esaña ye nte O.P 4.12 oyomde utom esie etie.
Utom Abañade Ndidio□ñ Nnyuñ Mbioño Ediwure Isoñ ye Ediwure Mben Inyañ ke Nigeria edi ñkpo□ Ufo□k Utom Ukama Okuk Ofuri Ekondo (ekotde World Bank) ediande ubo□k ye Akwa Ukara Nigeria enwana ndise nte edikemede nditre mfina uwure iso□ñ ye uwure mben inyañ ke mme itie enyenede mfina emi.
Utom emi aduak ndida isua itiaita (8) ye unwam okuk otode PPPI nsin ñko□ri ke mme idaha utom ke nsio-nsio itie utom. Utom emi eyenyuñ anwam ke ndiso□ño□ ndutim ukara enamde ebaña unyam-urua, ye ndisuho□de mme ñkpo□ ekpedade ntak-urua edi mme ekpemenerede ekom-urua.
Okuk emi odude ndida nnam utom emi edi do□la milio□n 500 emi otode Ñka Uforo Ekondo (emi edio□ño□de nte IDA) ye mme O□bu□□o□t Okuk ke Abaña Mbubehe Ñkan-ñkuk Ekondo (emi ekotde Global Environment Facility – GEF ye Forest Carbon Partnership Facility – FCPF). Akwa Ukara Nigeria ye eke mme Sted enyime ndino□ okuk ye ñkpo□ utom eken mbak oto do ekeme ndinam utom emi o□wo□ro□ usuñ.

Mme Ñkpo□ Emi Ekemede Ndito Utom Emi Nsim Ñkan-ñkuk ye Uwem mme Owo ke Obio

Mme nti ñkpo□ emi ekemede ndito utom emi nwo□ro□ nda, ndusuk edi ufo□n emi esimde ñkan-ñkuk, ye mme owo ye mme usuñ unwana idem emi ewakde ekan mme uno□mo□ emi ekemede ndito utom emi.

Ufo□n Otode Utom Emi Esim Ñkan-ñkuk Nnyin:

- *Iso□ñ idiso□pke ndiwure aba ke mme itie oro*
- *Mmoñ idiso□pke aba ito□ imen mme ebiet ke ñkan-ñkuk oro*
- *Ndidio□ñ mme iso□ñ oro ekewurede ye ndinam mmo□ efo□n ekem nte edade enam ñkpo□*
- *Anam ukpa iso□ñ emi edide iko□t amana okpon*
- *Ndinam mme ukpuho□de ke eyo okufina mme owo ye ñkan-ñkuk.*

- *Ndinam nnyun nno□ ukpeme mbak mme akai iko□t ye mme unam edude ke esit ekaiso edu.*
- *Ndinam usuñ nduño□de ESIA o□so□p onyuñ otim o□fo□n*
- *Ndikpan mme ñkpo□ emi ekemede ndida uno□mo□ ndi ke itie enamde utom*
- *Ndisin ñko□ri ke mme ñkpo□ enamde ebaña ñkan-ñkuk ye nte ekamade nkan-ñkuk.*

Ufo□n Otode Utom Emi Esim Mme Owo ke Nkan-ñkuk□

- *Ndisiak mme nsio-nsio itie utom*
- *Ndisin ñko□ri ke mme usuñ unwana*
- *Mme edinam emi esinde ñko□ri ke obio*
- *Ndisioño mme usuñ emi obio kiet ye eken ekemede ndinyene ebuana ye ñko□ri ke mme mbubehe mmo□*
- *Ndito□ño□ mme usuñ emi ediso□pde isin nsehe ke mme mbubehe ye ke uto□-inwañ*
- *Ndinam mme usuñ emi mme owo enyenede ebuana ye kiet eken emana ewak*
- *Ndinam mme ñkpo□ emi ekemede ndinam usuñ unwana mme owo amana o□fo□n*
- *Ndinam mme obio etara*
- *Ndinam unyaña iso□ñ ye mme uwem afai ke ufo□t mme obio amana osuho□de*
- *Ndinam mme mbubehe unwana ye unyam-urua ke ini enamde utom emi ye ke ini ekurede emana eto□t*
- *Mme usuñ mme owo ekemede ndida nnyene ubo□k utom emana ewak*

Mme Ndio□i Ñkpo□ Ekemede Ndito Utom Emi Ñwo□ro□

Ñduño□de emi enamde ebaña utom NEWMAP owut ete enye enyene ufo□n ke ñkan-ñkuk eti eti. Ediwak mbubehe emi mmo□ esinde ubo□k eyenyene ufo□n eno□ ñkan-ñkuk ye mme owo edi mme ndio□i ñkpo□ ifañ ekeme ndito do nwo□ro□ ñko. Ke nditañ mmo□ ndian kiet, ndisin NEWMAP ke edinam ekeme ndinyene akpan mfina, emi otukde mme owo. Mme uto mfina emi ebiet mfina emi ewo□ro□de ke akpa ikpehe mme utom EA (category A project) emi eyomde enam o□yo□ho□ nduño□de ebaña.

Eduño□de edio□ño□ mme mfina emi ekemede ndito utom emi ye mme ñko□k esie nwo□ro□. Ebahade mme mfina emi ebañade mme utom emi ye mme uto□ mfina efen ekemede ndiwo□ro□ nto mmo esin ke ikpehe iba. Mme ikpehe emi ebaña mme mfina emi etukde ñkan-ñkuk ye mme mfina ebañade ebuana mme owo kiet ye eken ke obio.

Mme Ndio□i Ñkpo□ Emi Efinade Ñkan-ñkuk□

- *Mme owo ye mme ñkpo□ isañ ewak ekaha ke usuñ*
- *Mme idio□k ofum ye o□kpo□so□ñ uyom*
- *Mme nso□so□ñ ndek etode mme usiak-ifia ye nte eduo□ño□de mmo□*
- *Mme mmo□ñ mmo□ñ ndek*
- *Nte edade mme ñkpo□ etode ñkan-ñkuk enam ñkpo□*
- *Unyek iso□ñ emi ekemede ndinam iso□ñ ye mbat ebuño□*
- *Mfina otukde ubo□k utom ye ñso□ñ idem mme owo*
- *Uwot akai emi anamde ndusuk eto ye unam ke ikot eto□ño□ ndinana*
- *Mmo□ñ ukwo ndito□ mmen obio*

Mme Ndio□i Ñkpo□ Emi Efinade Mme Owo ke Obio:

- *Mme owo ndiwak ke obio ñkan nte ekesidide*
- *Ndinam mme edu-uwem ekpuho□de*
- *Ndiduk ke mme iso□ñ owo ke ini utom akade iso*
- *Ndibo□ iso□ñ, oto do mbio obio enana ebiet iduñ, ubo□k utom, ye mme usuñ/ñkpo□ unwana idem*
- *Ndinim mbio obio nsan nsan ntre ndinam mmo□ edio□ño□ se ikade iso*
- *Ndinam etime etime ido eto□t ke obio ye ndiyom ndido□ñ urua ke ufo□k/iso□ñ*

Mme Usuñ Ndinam Mfina Emana Esuho□de

Mme ñkpo□ edu emi ekemede ndinam mbak eno□ NEWMAP item ebaña mme ñkpo□ ekemede ndinam mbak oto do mme ufo□n etode utom mmo□ ewak ekan mme ndio□i.

Ke ibo□ro□ ñduño□de abañade mme ñkpo□ ndinam mfina emana esuho□de, eno□ mme nda-usuñ ebaña mme ñkpo□ emi ekemede ndinam mbak esuho□de mfina emi okpotode edinam utom emi ye mme ñko□k esie. Eno□ nda-usuñ nte odotde ye nte ekemede ndida nnam utom. Mme nda-usuñ emi nte ekerede ebaña edi□

- *Ndikpuho□de uduot*
- *Ndifara idem*
- *Nditim ñkama*
- *Ndinam amana ekpri*
- *Ndino□ obufa itie*
- *Ndidio□ñ*
- *Ndino□ obufa ñkpo□*
- *Ndino□ utip nte odotde ye se edade eto ñkan-ñkuk*
- *Ndinam amana o□fo□n*
- *Ndisin ñko□ri*
- *Ndinam asiaha nsio-nsio ñko□k*

Enam efio□k ete mme ukpuho□de emi ke mme nsio nsio utom ñkan-ñkuk ye mme edu-uwem mbio obio eyetuk mme ñkpo□ edinamde ke abaña mme usuñ kiet kiet ndinam mfina emana esuho□de. Ñko, mme ubak edinam emi ekeme ndiso□ñ urua ñkaha. Onyuñ ekeme ndidi owo idikemeke ndinam mmo□ etiene nte ñkpo□ etiede. Ke ndida mme usuñ ukpan mfina emi nsin ke edinam, akpan ñkpo□ enyenede ndinam edi nduño□de abañade mme ñko□k utom emi kiet kiet□

- *Mme eyedi se ekemede ndinam*
- *Mme eyemem ndinam*
- *Mme eyenyene ufo□n o□no□ ñkan-ñkuk odo*
- *Se ukara ediyomde*
- *Se edidade ikpep ñkpo□*
- *Ukpeme utom*
- *Nte edikamade okuk inam utom*

Nwed ESMF emi o□do□ño□ ediwak ñkpo□ emi etañde ebok kiet ke abaña nte ekamade ñkan-ñkuk ye mme edu-uwem mme owo eke NEWMAP ye mme ñko□k utom esie. Edu

edinam ñkpo□ odo enyene mme akpan usuñ ye mme usuñ unam ñkpo□ efen emi etañde edian mbak ekeme ndinyene ata eti nda-usuñ emi edisañade ekekem ye se ESMF oyomde.

Ndiduñode Utom, Ubom Esie ye Ndibahade Nsin ke Mme Nsio Nsio Ikpehe.

Mbemiso PMU o□no□ uyo ndinyime utom akaiso, eyenam nduño□de ebaña mme ufo□n emi utom emi edinyenede ino□ ñkan-ñkuk ye mme owo. Akwa owo kiet emi PMU eno□de edinam mme nduño□de emi. Nduño□de emi ñko eyebaña editim ndisari nnyuñ ndio□ño□ se utom oyomde mbak ekeme ndidio□ño□ nte edinamde ñkpo□:

- *Ndibahade utom EA nsin ke mme nnen-nnen ikpehe*
- *Mme edu ukpeme ñkan-ñkuk ye mme owo emi World Bank okutde ete o□fo□n*
- *Mme mfina emi ekemede ndisim ñkan-ñkuk ye mme owo*
- *Mme edu-uwem ye mme edu unam ñkpo□*

Ke ndidian do, eyeduño□de mme utom emi kiet kiet ese mbak ekeme ndidio□ño□ mme mmo□ oro enyenede ubo□k ke esit ye mme uto□ ikpehe mmo□. Eyeno□ ibo□ro□ nduño□de emi eso□k World Bank mbak enye ekeme ndinam nduño□de esie onyuñ enyime ke ema ekekure nditim ediwet edinam emi ye akpa nduño□de enamde ebaña ñkan-ñkuk (IEE/ema enanam akpa nduño□de asañade ke ewuho□ EIA eke obio Nigeria; decree 86 eke 1992). Ke ema eketim ese mme nduño□de ye mme (edinam) ñkpo□ ebañade utom emi, eyeno□ mme item nda-usuñ emi edio□ño□de nte (TOR) ye mme ñwed ibo□ro□ eke ESIA/ESMP emi editode ke edinam emi eso□k World Bank mbak mmo□ ñko ekeme ndiduño□de nse nnyuñ nnyime mbemiso eyarade mme utom emi ke obio Nigeria ye ke ufo□k-utom uno□ mbuk eke World Bank.

Ndutim Abañade Nte Ekamade Ñkan-ñkuk ye Ebuana Owo Kiet ye Eken Edio□ño□de Nte ESMP

Eyeyom utom emi ye mme ñko□k esie esaña ke mbet ye item ndutim ebañade ukama ñkan-ñkuk ye ebuana mme owo. Ndutim emi eyenwam mme owo ndidu ke nso□ñ-idem, ndikpan uno□mo□, onyuñ asaña ekekem ye se eyomde ke uto□ ñkan-ñkuk oro ye se enyenede ndinam ye mme ñkpo□ efen emi enyenede ufo□n. Edinam emi ñko eyenyuñ anam edio□ño□ ebaña mme ibio□ñ utom emi ukara enyenede ke abaña ndutim emi ye kpukpru mme ñkpo□ efen anade ukara enam.

Ndutim oro edio□ño□de nte ESMP edi ata akpan ñkpo□ kiet ke mme usuñ emi NEWMAP edade ekama utom edise ñkpo□ mbaña ñkan-ñkuk ye mme mbon obio ye nso□ñ-idem mmo□. Ana ekut ete ke enam kpukpru utom ye mme ñko□k utom esie o□fo□n. Ke ntem, ESMP emi etim ekpeme mme ewuho□, ndino□ mme owo eka ukpep, asuan etop utom onyuñ ekpeme nte utom asañade. Ediyom nte ekamade ñkan-ñkuk ye mme ebuana mme owo eke ñko□k utom ke ikpehe iba. Akpa ikpehe abaña ndisin ke ñwed kpukpru se ekerede ndinam abañade utom oro. Ndien ke ikpehe emi, PMU ke mme nsio-nsio Sted emi eduakde ndibuana ke utom emi ana, ke akpa nto□ño□, eno□ ekikere ke abaña nte utom edikade iso. Mme ndutim emi eyetiñ ebaña nte edikamade ñko□k utom emi ke nnen-nnen usuñ mbak oto do ñkan-ñkuk enyene nso□ño□nda, mme owo enyuñ ekop inemesit ebaña utom enamde. Udomo ye ndutim emi edida inam ñkpo□ ibaña mme owo ke obio, ndusuk edide ndino□ obufa ebiet-iduñ ye mme ñkpo□ efen (odo edi mmo□ emi edinanade ufo□k- iduñ, iso□ñ, ubo□k-utom ye mme inyene efen oto ke ntak iso□ñ ndiwure mbemiso NEWMAP eto□ño□

utom). Ifio□k ESMP eyenyuñ anwam ndida mbo□p nnyuñ nnam mme ñko□k utom emi ke idaha ke idaha.

Ndiyene Mme Anam-Utom ye Ndino□ Mmo□ Ukpep

Mbak ekpekeme ndinam utom ESMP o□fo□n, Akwa ukara ye mme ukara Sted ke Nigeria ye mme ñkpri ñko□k ukara (ekotde local government), ye ukara ñkpri obio eyeno□ mme owo eka ukpep mbak ekeme ndinyene mme owo enyenede ifio□k ebaña utom emi. Mmo□ emi enyenede ifio□k utom eyemana edio□ño□ ekan ke ema eno□ mmo□ ukpep. Ndinyene mbio enyenede ifio□k ebaña utom idighe ke ndino□ mmo□ eka ukpep□ñkpo□ ikpoñ. Ana mmo□ eko□ri ke ifio□k, ekpebe eto mmo□ efen mbak enyene ifio□k ye mbufio□k kabaña utom, enam mmo□ ekop mme mbuk ebañade utom emi mbak mmo□ ñko ekpekeme ndinam o□fo□n. Ke ndidian do, itie utom emi ana o□ko□ri, mme adaha ena enyene isuñ-utom mmo□ kiet kiet ye mme usuñ unam ñkpo□ ke mme itie oro. Mmo□ ñko ana enyene usuñ ye edu emi mmo□ edade ebuana ke otu mmo□ ye mme mmo□ efen ke mme nsio-nsio ikpehe utom efen ke obio, nte eke ukara, mme eke obio, ye eke mmo□ emi enamde mbubehe idem mmo□.

Mme ñkpo□ emi anade enam ke nditiene uduot ñkan-ñkuk ye edu-uwem mme owo nte ESMF emi oyomde, ana ekut ete ke enyene mmo□ emi enyenede ifio□k ye mbufio□k ke abaña utom ke mme nsio-nsio ikpehe nte ewetde ebaña ke ñwed emi□

- *Mme usuñ emi edade eduñode mme ufo□n emi osimde ñkan-ñkuk ndinam nduño□de ndidio□ño□ ubom utom, ndidio□ño□ uto□ ufo□n emi editode ke esit, mme usuñ ndisuho□re mme mfina emi ekpetode do ewo□ro□, ndikpeme nte utom akade iso ye ndinyuñ mfiak nse mme ñwed ibo□ro□ utom eke EIA.*
- *Nditiñ-enyin nnam utom ebañade ñkan-ñkuk – mme uto□ ntiñ-enyin edude, ediduño□de mme utom mbak edio□ño□ ntak-urua, nditiñ-enyin nduño□de ubom utom ye ndifiak nse mme ibo□ro□ otode mme nduño□de emi.*
- *Ndikpeme nte utom akade iso nnyuñ nnam nduño□de mbaña (emi edio□ñode nte M & E) – Ndidio□ño□ ufo□n M & E eyomde ke ntak mme utom ebañade ñkan-ñkuk ye ebuana mme owo.*

Okuk Ebierede Eda Enam ESMF

Enim do□la mi□li□o□n 8,030,000 ndida nnam ESMF, ke ema ekesin ke ekikere kpukpru mme ñkpo□ ebañade utom emi. Enam kpukpru ñkpo□ ndikut nte ke usuñ ubiat okuk emi abaña□

- *Mme utom E & S eke PMU emi enamde kpukpru ini*
- *Ndinyene mme anam-utom eke PMU ye mme mmo□ efen ebuanade ke esit*
- *Ndida mme nta-ifio□k edio□ño□de ebaña ñkan-ñkuk ye uwem mme owo.*
- *Mme ukpep-ñkpo□ ebañade ufo□n otode ñkan-ñkuk ye ebuana mme owo (emi edio□ño□de nte ESIA) emi PMU mme Sted ebuanade ye PMU ke ñko□k Akwa ukara eno□de uyo enam.*
- *Ndikpeme nte utom akade iso nnyuñ nnam nduño□de mbaña mme edinam eke PMU.*

Ibat okuk emi ekerede ndibiat ke edinam ESMF edi emi□

S/N	Mme Edinam ESMF	Ibat okukke do□la (USD)
1	Mme ukpep-ñkpo□	650,000
2	ESI A/ESMP (esinede nte ewetde ñwed abañade mkpeme-idem)	7,120,000
3	Ndikpeme nte utom akade iso	260,000
	Ibat kpukpru	8,030,000

Ndineñede Adaña NEWMAP

Ndusuk ini, andibuo□t okuk ekeme ndinam ndutim mbaña nduño□de ufo□n ñkan-ñkuk ye mme uduak enyenede eno□ mme nsio-nsio itie uno□mo. Utom ESMF ye eke RPF eyeno□ nda-usuñ ke ndiduño□de ñkan-ñkuk ye nte utom oro editiede ye mme owo ke obio. Eyenyuñ enam ndutim abañade nte ekamade ñkan-ñkuk (ESIA) ye mme owo ke obio (ESMPs), ye mme ñkpo□ ukpeme efen emi edide Ufo□k Utom Ukama Okuk Ofuri Ekondo (World Bank) emi edino□ okuk eda enam.

Ndikabade Mme Uduak Emi Nsin ke Mme Ikpo□ Usem Edude ke Mme Itie Emi Eyomde Ndinam Utom

Mbak ekut ete mme obio ke mme itie emi eyomde ndinam utom, akpan-akpan mmo□ emi utom edino□de ufo□n (PAPs) edio□ño□ se idude ke idak□iso□ñ, enyene ndikabade ibio-ibio iko□ ebañade se eyomde ndinam nsin ke mme ikpo□ usem emi edude ke mme itie eyomde ndinam utom emi (oro edi□ usem Unehe, usem Edo ye iko□ Efik).

Edinam Anwaña

Ekenam ESMF ke ema ekenyene nneme ye PMU Akwa ukara, mme uduak mme Sted (MDAs, CBOs/NGOs) ye mme ñka ke obio. Enyene ndinam mme owo edio□ño□ ebaña uduak ESMF anwa-anwa ke ndiwet saña-saña ñwed mbaña uduak esie nno□ ufo□k-utom esede ñkpo□ abaña ñkan-ñkuk eke Akwa ukara ye eke Sted, ekot enyuñ eno□ ifio□k mmo□ ebaña ke mme itie emi emekde ke Akwa ukara ye ke mme Sted oro enyenede ebuana ke esit, ye ke ufo□k-utom uno□ mbuk Itie Ukama Okuk Ofuri Ekondo. Eyewet mbet udomo ufo□n otukde owo kiet kiet (EIA) ye EMPs eno□ mme ñkpri ikpehe utom, etiene item ye ndausuñ ewetde ke ESMF enyuñ enam ekot mbak eno□ ekikere mmo□ ebaña se ewetde oro.

CHAPTER ONE

INTRODUCTION AND BACKGROUND TO NEWMAP

1.0 Background to the NEWMAP

The Federal Government of Nigeria has initiated the preparation of the Nigeria Erosion and Watershed Management Project (NEWMAP). The project is supported with financing from the World Bank to the tune of $500 million. At the Federal level, the lead agency is the Department of Erosion Control, Flood and Coastal Zone Management of the Federal Ministry of Environment.

The project is expected to be focused and implemented in seven states, namely: Anambra, Abia, Cross River, Edo, Enugu, Ebonyi and Imo States. Each State is expected to establish respective project teams, which will be involved in project preparation and implementation phases of the project at state level. The project is viewed to exhibit multi-sector operation as the institutional arrangements need to pragmatically involve other Federal and state ministries, and MDAs concerned with water resources and soil degradation such as the Federal Ministry of Agriculture, Federal Ministry of Water Resources (FMWR), River Basin Development Authorities (RBDAs), Integrated Water Resources Management Commission (IWRMC), and the National Hydrological Services Agency (NHSA) to mention a few. The local governments and local communities will2517831682517811202517821442517852162517841 92 also, form a strong forum of stakeholders to be considered as the project commences and continues.

1.1 Purpose of the ESMF

The Environmental and Social Management Framework (ESMF) is used in the case of operations with multiple sub-projects where the entire range of environmental and social safeguard issues involved are not fully known; It involves the use of safeguards plans. The ESMF serves as a statement of the policy, principles, institutional arrangements and procedures that the project management will follow in each sub-project in addressing environmental and social issues.

This ESMF identifies environmental and social safeguard policy frameworks, institutional arrangements and capacity available to identify and mitigate potential environmental and social safeguards issues and impacts of each subproject. It does not attempt to deal with site-specific impacts.

The Bank will disclose the ESMF document publicly, in Nigeria and at the World Bank Info-shop before project appraisal.

1.2 Objectives of the Environmental and Social Management Framework

The major developmental objective of the ESMF is to enable support for effective decision making in order to ensure that implementation processes during the execution of sub-project activities such as; construction, civil and rehabilitation works are environmentally sound, encourage community consultation and participation, enhance social wellbeing and are sustainable. Specifically, **t**his Environmental and Social Management Framework seeks to provide a clear process including action plans to integrate environmental and social considerations into the NEWMAP.

The specific objectives of the ESMF are to:

- Ensure the program is carried out in accordance with today's sustainable development tenets;
- Provide a structure/strategy for the integration of social and environmental consideration at all stages of the program planning, design, execution and operation of various sub-projects;
- Ensure overall positive social and environmental impacts of sub-projects and avoid/minimize, and manage any potential adverse impacts;
- Establish clear procedures and methodologies for incorporating environmental management requirements including stake holder engagement in the implementation of the project and all sub projects;
- Provide guidelines to appropriate roles and responsibilities, and outline the necessary reporting procedures, for managing and monitoring environmental and social concerns of the program and sub-projects;
- Determine the training, capacity building and technical assistance needed to successfully implement the provisions of the ESMF;
- Comply with regulatory and policy requirements (local and international) that are applicable to the program and sub projects;
- To assess the potential environmental and social impacts of the sub-projects (rehabilitation, extensions of or new constructions in gully erosion sites, livelihood adaption, etc), whether positive or negative, and propose measures and plans to reduce or mitigate adverse environmental impacts and enhance the positive impacts of the project.
- To identify potential environmental policies, legal and institutional framework pertaining to the project.
- To establish clear directives and methodologies for the Environmental and Social Impact Assessment (ESIAs) as might be needed for specific sub-projects.
- Identify modalities for estimating and budgeting the costs for the implementation of the environmental Management Plan for the projects.
- To ascertain the agencies responsible for the implementation of the projects Environmental Management Plans and the projects' Monitoring & Evaluation (M&E).

This ESMF will be used by the NEWMAP together with a separate report providing a Resettlement Framework (RF) for the project. The RFF provides a structure to address possible involuntary physical and economic displacement of the program's sub-project. With regard to the ESMF, in seeking to implement the NEWMAP project, the government of Nigeria intends to take into cognisance relevant state-owned laws, where the project will be executed and as well comply with all national and international environmental requirements in order to meet legal obligations and to ensure a sustainable project.

This requires meeting the following objectives:

- EIA to meet Nigeria EIA laws
- ESIA to meet World Bank EA guidelines and relevant Bank Safeguard policies and procedures including but not limited to:

- OP/BP 4.01 (Environmental Assessment)
- OP/BP 4.04 (Natural Habitats)
- OP 4.09 (Pest Management)
- OP/BP 4.12 (Involuntary Resettlement)
- OP 4.36 (Forests)
- OP 4.37 (Dam Safety) and
- OP/BP 7.50 (Projects on International Waterways).

NEWMAP PMU will disclose the ESMF as required by the Nigeria EIA public notice and review procedures as well as the World Bank Disclosure Policy.

1.3 Rational for the Environmental and Social Management Framework

The Environment and Social Management Framework (ESMF) has been developed in order to address the environmental and social issues that may arise as a result of the infrastructure development and execution of other civil work activities in the 7 participating States; Abia, Anambra, Cross Rivers, Ebonyi, Edo, Enugu, and Imo States.
The rationale for preparing this ESMF is as follows:

- The detailed operational activities/civil works of the NEWMAP project are yet to be carried out.
- The bulk detailed project activities to be financed under the NEWMAP are yet to be identified.
- The specific sites for each sub-project activities pertaining to NEWMAP are not known.

This document did not attempt to address impacts related to individual sites in all the 7 Study areas. However, issues on ways of integrating and management of social and environmental aspects of the sub-project components at all stages of the project planning, design, execution and operation of the entire NEWMAP project were established.

This document will be shared with the various relevant stakeholders in the Sectors of sub-project and it should form the principles and procedures that will govern the mitigation of adverse environmental and social impacts that would be apparent by the proposed NEWMAP project activities

1.4 Application of the ESMF

Application of ESMF to the sub-projects enables preparation of a standardized environmental and social assessment documents for appraisal and implementation. For subprojects that will trigger significant environmental / social impacts it will be necessary to undertake the necessary environmental and social assessments, as mandated by the Environmental laws of Nigerian Governments (national and state) and conforming to the safeguard policies of the World Bank. The process for conformance to these procedures is defined in this framework. The criteria established shall enable the identification of such projects.

1.5. Technical Approach and Methodology

This ESMF has been prepared in accordance with standard procedures for environmental assessment including the applicable World Bank safeguard policies and Nigerian environmental assessment guidelines.

1.6 Project Strategy

The preparation of the ESMF was for a period of 16 weeks - within which the consultant accomplished all the tasks as stated in the Terms of Reference (TOR). The indicative work plan, desktop study, scoping activities to understand the projects field of

influence, onsite visit to the seven (7) states, mapping, review of the existing laws and polices currently in place at each level of government as well as relevant World Bank policies and processes constituted activities for successful project output.

A step-wise process of ground investigations and community involvement mechanisms was utilized. The technical approach was targeted towards obtaining visual information as well as information based on oral interviews and focused group discussions (FGDs). Below is a brief description of activities performed in the implementation process of the methodology.

1.6.1 Literature Review

The methodology adopted for the ESMF studies involved an intensive application of desk reviews & collection of all relevant information in order to achieve successful outputs. Information was garnered from the Federal Ministry of Environment, Federal Ministry of Water Resources, Geological Surveys, River Basin Development Authorities (RBDAs) and National Water Resources Institute (NWRI), Department of Erosion, Flood and Coastal Zone Management World Bank, International documents for similar executed projects, etc).

1.6.2 Field Visits

This activity involved:

- Visits to all the States and Priority Erosion Sites Assessments.
- Impacts Identification and Assessments
- Potential Impacts Assessment and Definitions
- Oral interviews, use of questionnaires and focused group discussions.

(The consultant obtained addresses of representatives for State Ministries of Environment (or implementing agencies) and other stakeholders at the respective states).

1.6.3 Interactive Discussions

1.6.3.1 Community Consultations

This step involved intensive community involvement and participation. The sampling of community opinions and comments formed the basis for information gathered under this activity.

The main issues discussed with focus groups included:

- Land degradation & soil erosion
- Water pollution
- Afforestation and Deforestation
- Over-exploitation of wetlands
- Anthropogenic activities
- Labour issues and Socio-economics
- Public Health (Especially HIV/AIDs; Water-borne diseases & Choleras; STIs; Malaria; etc)

Field/On-site Focused Group Methodologies used

a) Independent investigation
    - Principal data source (Federal and state ministries, and MDAs concerned with water resources such as the Federal Ministry of Water Resources (FMW R), River Basin Development Authorities (RBDAs), Integrated

Water Resources Management Commission (IWRMC), and the National Hydrological Services Agency (NHSA).

b) Multi-method study or program
   - Qualitative & quantitative methods
   - Triangulation
     i. Investigator triangulation: This involved the use of multiple researchers in an investigation.
     ii. Methodological triangulation: This involved using more than one method to gather data, such as interviews, observations, questionnaires, and documents.
     iii.

c) Supplement
   - Interpretation of quantitative data

d) Questionnaire Alternatives
   - In-person, directive, structured (Used at the- National, State and Community Leadership level)
   - non-directive, unstructured (To be used at the- Community household level)

e) Identification of potential impacts and Mitigation Measures

Although specific sub-projects to be implemented under the NEWMAP programme are not known at this stage, potential impacts were identified through initial generic screening of the anticipated sub-projects in the light of the socio-environmental conditions; field visits and consultations with focused groups.

To ensure all sub-projects are appropriately screened for environmental and social issues at their conception stage, a checklist tool [See Annex 003] has been developed to screen each project in terms of:

(i) Appropriate EIA category;
(ii) Applicable local and international regulations and standards (e.g., labour, pollution, occupational health and other standards);
(iii) Appropriate World Bank safeguards;
(iv) Level of stakeholder engagement (both sectoral and project level);
(v) Existing environmental and other (e.g., pension or compensation) liabilities; and
(vi) Location sensitivities (e.g., sensitive environments and culture)

The screening tools provide necessary information to appropriately scope ESIA studies. These will include:, environmental, social and other due diligence investigations.

Mitigation measures are often proffered to either eliminate or minimize adverse environmental and social impacts of specific actions, projects or programs, with a purpose to also enhance positive effects. The approach to mitigation has been primarily preventive principles of anticipated impacts based on well-known negative outcomes of project-environment interactions.

CHAPTER TWO

POLICY, LEGAL AND REGULATORY FRAMEWORK

2.0 Introduction

A number of national and international environmental guidelines are applicable to the operation of the NEWMAP. In Nigeria, the power to enforce all activities that might impact the environment is vested in the Federal Ministry of Environment (FMEnv). Internationally, agencies such as the World Bank, IFC and other financial organizations usually set environmental criteria for projects, which must be met by project proponents before the agencies invest in them.

2.1 Relevant Regulatory Policies of Nigeria

Federal Policy/Legislation
The Federal Ministry of Environment
The act establishing the Ministry places on it the responsibility of ensuring that all development and industry activity, operations and emissions are within the limits prescribed in the National Guidelines and Standards, and comply with relevant regulations for environmental pollution management in Nigeria as may be released by the Ministry. To fulfil this mandate a number of regulations/instruments are available (See section on National Legal Instruments on Environment), however the main instruments in ensuring that environmental and social issues are mainstreamed into development projects is the Environmental Impact Assessment (EIA) Act No. 86 of 1992 See Annex 1. With this Act, the FMENV prohibits public and private sectors from embarking on major prospects or activities without due consideration, at early stages, of environmental and social impacts. The act makes an EIA mandatory for any development project, and prescribes the procedures for conducting and reporting EIA studies.

As part of the effective utilization of the EIA tool, the Ministry has produced Sectoral guidelines detailing the necessary requirements of the EIA process from each Sector. One of these Sectoral Guidelines that apply to the proposed project is the 'Sectoral Guidelines on Infrastructure Development.'

Procedurally, in Nigeria, it is worthy to note that before commencement of an EIA, the FMENV issues a letter of intent on notification by the proponent, approve the terms of reference, ensure public participation, review and mediate.

The possible technical activities expected for a proposed project include screening, full or partial EIA Study, Review, Decision-making, Monitoring Auditing and Decommissioning/Remediation post-closure.

National Legal Instruments on Environment

2.1.1 The National Policy on the Environment (NPE) of 1989

The National Policy on Environment, 1989 (revised 1999), provides for "a viable national mechanism for cooperation, coordination and regular consultation, as well as harmonious management of the policy formulation and implementation process which requires the establishment of effective institutions and linkages within and among the various tiers of government – federal, state and local government".

The objective of the policy is to achieve sustainable development in Nigeria and in particular to:

- Secure a quality environment adequate for good health and well being
- Conserve the environment and natural resources for the benefit of present and future generations.
- Raise public awareness and promote understanding of the essential linkages between the environment resources and development and encourages individual and community participation in environmental improvement efforts
- Maintain and enhance the ecosystems and ecological processes essential for the functioning of the biosphere to preserve biological diversity;
- Co-operate with other countries, international organizations and agencies to achieve optimal use and effective prevention or abatement of trans-boundary environmental degradation.

2.1.2 Environmental Impact Assessment Act No. 86, 1992 (FMEnv)

This Act provides guidelines for activities of development 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.

2.1.3 The National Guidelines and Standards For Environmental Pollution Control In Nigeria

This was launched on March 12th 1991 and represents the basic instrument for monitoring and controlling industrial and urban pollution.

2.1.4 The National Effluents Limitations Regulation

This instrument makes it mandatory that industrial facilities install anti-pollution equipment, make provision for further effluent treatment, prescribe maximum limit of effluent parameters allowed for discharge, and spell out penalties for contravention. It also provides that all industries in Nigeria should be operated on the basis of Best Available Technology (BAT);

2.1.5 The NEP (Pollution Abatement In Industries And Facilities Generating Waste) Regulations

Restrictions are imposed hereunder on the release of toxic substances and requirement of Stipulated Monitoring of pollution to ensure permissible limits are not exceeded; Unusual and accidental discharges; Contingency plans; Generator's liabilities; Strategies of waste reduction and safety for workers.

2.1.6 The Management of Solid and Hazardous Wastes Regulations

These regulate the collection, treatment and disposal of solid and hazardous waste for municipal and industrial sources and give the comprehensive list of chemicals and chemical waste by toxicity categories.

2.1.7 National Guidelines on Environmental Management Systems (1999)

The guidelines establish the requirement for an Environmental Management System (EMS) in 'all organisations /facilities in Nigeria'. They also state that this EMS should be audited annually or as deemed necessary.

2.1.8 National Guidelines for Environmental Audit

These are designed to serve as a reference for compliance with the Environmental Audit requirements of the FMEnv. It states that it is mandatory for a company to carry out an audit every 3 years or at the discretion of the Hon. Minister of the FMEnv.

2.1.9 National Policy on Flood and Erosion Control 2006 (FMEnv)

This policy addresses the need to combat erosion in the country utilizing the procedures outlined in the National Action Plan for Flood and Erosion Control and Technical Guidelines, developed by the WIC Environmental Committee which was set up to plan an operational platform for these issues.

2.1.10 National Air Quality Standard Decree No. 59 of 1991

The FMEH is the regulatory agency charged with enforcing ambient air quality standards in Nigeria. The World Health Organization (WHO) air quality standards were adopted in 1991 as the national standards by the FMEH. These standards define the levels of air pollutants that should not be exceeded in order to protect public health.

2.1.11 The National Environmental Standards and Regulations Enforcement Agency Act 2007 (NESREA Act)

After the repealing of the Federal Environmental Protection Act of 1988, the NESREA Act, 2007 became the major statutory regulation or instrument guiding environmental matters in Nigeria. It specially makes provision for solid waste management and its administration and prescribes sanction for offences or acts, which run contrary to proper and adequate waste disposal procedures and practices.

2.1.12 The National Oil Spill Detection and Response Agency Act 2005 (NOSDRA ACT)

This statutory regulation makes adequate regulations on waste emanating from oil production and exploration and its potential consequences to the environment.

Other Acts and Legislations

2.1.13 Land Use Act of 1978

The land-use Act of 1978 states that "…It is also in the public interest that the rights of all Nigerians to use and enjoy land in Nigeria and the Natural fruits thereof in sufficient quality to enable them to provide for the sustenance of themselves and their families should be assured, protected and preserved'. This implies that acts that could result in the pollution of the land, air, and waters of Nigeria negates this decree, and is therefore unacceptable.
Furthermore, the Land Use Act of 1978 (modified in 1990) remains the primary legal means to acquire land in the country. The Act vests all land comprised in the territory of each state in the Federation in 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 this Act.
According to the Act, administration of land area is divided into urban land which will be directly under the control and management of the Governor of each State; and non-urban land, which will be under the control and management of the Local Government. State Governors are given the right to grant statutory rights of occupancy to any person or any purpose; and the Local Government will have the right to grant customary rights of occupancy to any person or organization for agricultural, residential and other purposes.

2.1.14 Forestry Act

This Act of 1958 provides for the preservation of forests and the setting up of forest reserves. It is an offence, punishable with up to 6 months imprisonment, to cut down trees over 2ft in girth or to set fire to the forest except under special circumstances.
Nigeria is at present a wood deficit nation. In order to ameliorate the situation, the policy on forest resources management and sustainable use is aimed at achieving self-sufficiency in all aspects of forest production through the use of sound forest management techniques as well as the mobilization of human and material resources. The overall objectives of forest policy are to prevent further deforestation and to recreate forest cover, either for productive or for protective purposes, on already deforested fragile land.
Specifically, the National Agricultural Policy of 1988 in which the Forestry Policy is subsumed, provides for:

- Consolidation and expansion of the forest estate in Nigeria and its management for sustained yield.
- Regeneration of the forests at rates higher than exploitation.
- Conservation and protection of the environment viz: forest, soil, water, flora, fauna and the protection of the forest resources from fires, cattle grazers and illegal encroachment.
- Development of Forestry industry through the harvesting and utilisation of timber, its derivatives and the reduction of wastes.
- Wildlife conservation, management and development through the creation and effective management of national parks, game reserves, tourist and recreational facilities, etc.

2.1.15 Criminal Code

The Nigerian Criminal Code makes it an offence punishable with up to 6 month imprisonment for any person who:

- Violates the atmosphere in any place so as to make it noxious to the health of persons in general dwelling or carry on business in the neighbourhood, or passing along a public way: or

- Does any act which is, and which he knows or has reason to believe to be likely to spread the infection of any disease dangerous to life, whether human or animal?

2.1.16 Inland Waterways Authority (NIWA)

Nigeria Inland Water Authority (NIWA) Act 13 of 997 established NIWA whose functions are among others are to:

- Provide regulations for inland navigation;
- Ensure the development of infrastructural facilities for a national inland waterways network connecting the creeks and the rivers with the economic centres using the river-ports as nodal points for inter model exchange;
- Ensure the development of indigenous technical and managerial skill to meet the challenges of modern inland waterways transportation; and
- Carry out environmental impact assessment of navigation and other dredging activities within the inland water and its right-of-ways.

2.2 State Legislations

Some of the functions of the State Ministries of Environment include:

- Liaising with the Federal Ministry of Environment, FMENV to achieve a healthy or better management of the environment via development of National Policy on Environment
- Co-operating with FMENV and other National Directorates/Agencies in the performance of environmental functions including environmental education/awareness to the citizenry
- Responsibility for monitoring waste management standards,
- Responsibility for general environmental matters in the State, and
- Monitoring the implementation of ESIA studies and other environmental studies for all development projects in the State.

Some laws in the state include:

2.2.1 Anambra State Policy on Environment (2010)

This policy emphasizes state government efforts to sustainable management of the Anambra environment with regards to Erosion control. The state government commits to:

- Seek the intervention of the Federal Government of Nigeria and relevant partner agencies in the control of Erosion, to compliment the effort of the state.
- Sensitize communities on erosion control efforts.
- Procure necessary refuse disposal equipment like trucks, pay loaders, giant bins e.t.c
- Involve households, communities, local governments and states in the joint clearance of drainages.
- Sensitization of households on waste disposal practices and management.
- Sponsor relevant environmental bills to the state assembly for enactment.
- Involve LGAs, communities, and civil society organizations (CSOs) in the enforcement of environmental laws.

- Embark on aggressive afforestation programmes involving LGAs, communities and civil society organizations (CSOs) in the state.

2.2.2 Anambra State Flood and Erosion Control and Soil Conservation (2010)

This policy is to promote sustainable land use management by minimizing soil erosion and flooding hazards; achieving this through reducing soil exposure to rainstorms; reduction of surface run-offs and paved surfaces and restoration of degraded land mass.

2.2.3 Anambra State Flood Control and Water Conservation (2010)

This policy is to forecast, prevent, monitor and manage flooding.Optimal utilization of floodwater for agricultural and other purposes as well as management of floodplains.

2.2.4 Anambra Riverine Area Management Policy (2010)

This policy is to minimize riverine erosion and other forms of riverine degradation such as riverbank failures, landslides and alluvional deposits.

2.2.5 Anambra State Watershed Management Policy (2010)

This policy enables the commencement of co-ordinated/holistic/integrated management of natural resources: Land, water, vegetation, etc. on a watershed basis to ensure resource conservation through the minimization of land and soil degradation and maintenance of water quality and yield for environmental sustainability.

2.2.6 Anambra State Flood and Erosion Control Management Support System (2010)

This policy aims at supporting a reliable up-to-date database and integrated management system as tools to support all erosion and control programs.

2.2.7 Anambra State Environmental Protection Agency Law

2.2.8 Enugu State Environmental Protection Agency Law

2.2.9 Imo State Environmental Protection Agency Law

2.2.10 Abia State Environmental Protection Law

The four above stated laws focus on the protection of the rural and urban environment in the states. They were made to support the observation of a sanitation day being the last Saturday of the month.

2.2.11 Edo State Environmental & Waste Management Law

2.2.12 Enugu State Waste Management Authority Law

2.2.13 Imo State Bureau For Sanitation & Transport Law

2.2.14 Imo State Environmental Protection Agency Amendment Law

2.3 International Laws and Regulations

Among these are:

The World Bank safeguard policies are designed to help ensure that projects proposed for Bank financing are environmentally and socially sustainable, and thus improve decision-making. The Bank has ten safeguards policies and these are:

- OP 4.00 Use of Country Systems
- OP 4.01 Environmental Assessment;
- OP 4.04 Natural Habitats;
- OP 4.09 Pest Management;
- OP 4.11 Physical Cultural Heritage;
- OP 4.12 Involuntary Resettlement;
- OP 4.10 Indigenous People;
- OP 4.36 Forests;
- OP 4.37 Safety of Dams;
- OP 7.50 Projects on International Waterways;
- OP 7.60 Projects in Disputed Areas

2.3.1 Summary of some relevant World Bank Environmental and Social Safeguard Policies

This section focuses on the World Bank Environmental and Social Safeguard Policies as applicable for to the NEWMAP. These policies provide guidelines for the identification, preparation, and implementation of programs and projects. The following policies will be triggered and are relevant for consideration for the NEWPMAP:

1. Environmental Assessment (EA) (OP/BP 4.01)

Environmental Assessment is used in the World Bank to identify, avoid, and mitigate the potential negative environmental and social impacts associated with Bank's lending operations early- on in the project cycle. In World Bank operations, the purpose of Environmental Assessment is to improve decision making, to ensure that project options under consideration are sound and sustainable, and that potentially affected people have been properly consulted and their concerns addressed. This policy is triggered if a project is likely to have potential adverse environmental and social risks and impacts in its area of influence. The EA has various tools that can be used, including amongst others Environmental and Social Impact Assessment (ESIA) or Environmental and Social Management Plan (ESMP). The selection of EA instruments to be used for a particular project is made through the Environmental and Social Screening process; all projects proposed for World Bank financing are to be screened, and are categorized according to their potential environmental and social impacts as preliminarily assessed during the screening process. Efforts have been made to identify some potential adverse environmental and social impacts of the NEWMAP.

2. Natural Habitats (OP/BP 4.04)

There is need to ensure that the natural habitat is preserved and protected in order to foster sustainability in our environment. The Bank ensures that sponsored projects give proper consideration to the conservation of natural habitats, in order to safeguard their unique biodiversity and ensure the sustainability of the environmental services and products which natural habitats provide to human society.

This policy is applicable when a project (including any subproject under a sector investment or financial intermediary loan) with the potential to cause significant conversion (loss) or degradation of natural habitats, whether directly (through construction) or indirectly (through human activities induced by the project).

For projects with potential adverse impacts in the natural habitat, the Bank takes into account the borrower's ability to implement the appropriate conservation and mitigation measures. If there are potential institutional capacity problems, the project includes components that develop the capacity of national and local institutions for effective environmental planning and management. If the environmental assessment indicates that the project and sub-project would significantly convert or degrade natural habitats, the proposed project will not be eligible for financing.

3. Pest Management (OP 4.09)

In assisting borrowers to manage pests that affect either agriculture or public health, the Bank supports a strategy that promotes the use of biological or environmental control methods and reduces reliance on synthetic chemical pesticides -- in other words, integrated pest management. The Bank may finance procurement of pesticides for agriculture when they are used as part of an integrated approach, or for public health when environmental control measures alone are not effective. However, the Bank does not finance procurement of any pesticides in WHO classes IA or IB, and it does not finance procurement of pesticides in class II unless the country has adequate controls on their distribution, storage, handling and application. Pest control product screening is required in projects that finance such products. When a project involves procurement of pesticides or may result in increased pesticide use even when not procured under the project, pest management issues must be addressed as part of the environmental assessment process. Depending on the issues, the environmental management plan may need to include a pest management plan, as described in Annex C to BP 4.01.

4. Forests (OP 4.36)

This operational policy aims to reduce deforestation, enhance the environmental contribution of forested areas, promote afforestation, reduce poverty, and encourage economic development. The policy recognizes the role forests play in poverty alleviation, economic development, and for providing local as well as global environmental services. Success in establishing sustainable forest conservation and management practices depends not only on changing the behavior of all critical stakeholders, but also on a wide range of partnerships to accomplish what no country, government agency, donor, or interest group can do alone.

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;
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. If a project involves the significant conversion or degradation of natural forests or related natural habitats that the

Bank determines are not critical, and the Bank determines that there are no feasible alternatives to the project and its sitting, and comprehensive analysis demonstrates that overall benefits from the project substantially outweigh the environmental costs, the Bank may finance the project provided that it incorporates appropriate mitigation measures.

5. *Involuntary Resettlement (OP/BP 4.12)*This policy can be triggered if the project will involve involuntary taking of land and involuntary restrictions of access to legally designated parks and protected areas. The policy aims to avoid involuntary resettlement to the extent feasible, or to minimize and mitigate its adverse social and economic impacts.It promotes participation of displaced people in resettlement planning and implementation. The main objective of this policy is to assist displaced persons in their efforts to improve or at least restore their incomes and standards of living after displacement.The policy prescribes compensation and other resettlement measures to achieve its objectives and requires that borrowers prepare adequate resettlement planning instruments prior to Bank appraisal of proposed projects.

For this policy to be achieved properly, the proponent needs to prepare a resettlement plan or a resettlement policy framework that should cover measures to ensure that the displaced persons are informed about their options and rights pertaining to resettlement. The displaced persons are consulted on, offered choices among, and provided with technically and economically feasible resettlement alternatives and provided prompt and effective compensation at full replacement cost for losses of assets attributable directly to the project. Attention needs to be accredited to vulnerable group such as women, children, and indigenous and displaced individuals.

6. Projects on International Waterways (OP/BP 7.50)

The Niger River is a major river in West Africa, and the river runs in a crescent through Mali, Niger, on the border with Benin and through Nigeria, discharging through the Niger Delta into the Gulf of Guinea in the Atlantic Ocean. This policy will apply for the NEWMAP due to the premise that the Niger River is shared amongst the other countries other than Nigeria.
This policy relates to the relations between the riparian states. Therefore, the Bank attaches great importance to the riparian making appropriate agreements or arrangements for the entire waterway, or parts thereof, and stands ready to assist in this regard. This project is being undertaken in international waters thus the policy is triggered. The Niger River is an important water body that is used The Niger River is a source of food, water and drainage for five nations of West Africa.

7. Physical Cultural Heritage OP 4.11
This policy addresses physical cultural resources, which are defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. The project in itself will not be implemented in any culturally sensitive site. Sites of cultural significance will be avoided. In the case of a chance find, cultural artifacts will be collected and secured. Physical cultural resources are important as sources of valuable scientific and historical information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices.

8. Safety of Dams OP 4.37

The safe operation of dams has significant social, economic, and environmental relevance. In Nigeria, some major dams such as the Shiroro and Jebba dams receive their waters from the river Niger which also is the major river giving out tributaries to the rivers in the project states. Civil engineering and bio-engineering works to manage the watershed will need to take into cognizance upstream and downstream movement of water at check dams, and especially the probable occurrence of siltation downstream. Also NEWMAP activities will need to employ dam expertise especially if watershed management activities may lead to foreseeable gradual overflow of dam reservoirs over the project time frame.

2.4 Nigeria EIA Guidelines and World Bank EA Guidelines

The Environmental Impact Assessment Act No. 86 of 1992 requires that development projects be screened for their potential impact. Based on the screening, a full, partial, or no Environmental impact assessment may be required. Guidelines issued in 1995 direct the screening process.

According to these guidelines the Nigeria EIA Categories include:

- Category I projects will require a full Environmental Impact Assessment (EIA) for projects under this category EIA is mandatory according to Decree No. 86. Projects includes large-scale activities such as agriculture (500 hectares or more), airport (2500m or longer airstrip), land reclamation (50 hectares or more), fisheries (land based aquaculture of 50 hectares or more), forestry (50 hectares or more conversion, etc.

- Category II projects may require only a partial EIA, which will focus on mitigation and Environmental planning measures, unless the project is located near an environmentally sensitive area--in which case a full EIA is required.
- Category III projects are considered to have "essentially beneficial impacts" on the environment, for which the Federal Ministry of the Environment will prepare an Environmental Impact Statement.

With regard to environmental assessment, the Bank has also categorized projects based on the type of EA required, namely:

- **Category A** - projects are those whose impacts are sensitive, diverse, unprecedented, felt beyond the immediate project environment and are potentially irreversible over the long term. Such projects require full EA.
- **Category B -** projects involve site specific and immediate project environment interactions, do not significantly affect human populations, do not significantly alter natural systems and resources, do not consume much natural resources (e.g., ground water) and have adverse impacts that are not sensitive, diverse, unprecedented and are mostly reversible. Category B projects will require partial EA, and environmental and social action plans.
- **Category C** - Projects are mostly benign and are likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project, although some may require environmental and social action plans.
- **Category FI** - A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts.

This World Bank categorization (A, B, & C) corresponds in principle with the Nigeria EIA requirements of Category I, II and III, which in actual practice is done with regard to the level of impacts associated with a given project. However, in the event of divergence

between the two, the World Bank safeguard policy shall take precedence over Nigeria EA laws, guidelines and or standards.
Thus for this ESMF, the Nigeria's *EIA* requirements and World Bank operational procedures were harmonised as far as possible, hence it is made responsive to the objectives of good practice. It is especially made responsive with regard to the followings:

- Early consideration of environmental and social issues (starting at the screening stage);
- Identification and early consultation with stakeholders;
- Prevention of adverse impacts through the consideration of feasible alternatives; and
- Incorporation of mitigation measures into planning and (engineering) design.

2.4.1 NEWMAP - Adequacy of Legal Instruments for Environmental & Social Issues

Generally with regard to environmental and social management issues, legislation is in a continuing process of development in Nigeria. Amongst the existing pieces of legislations highlighted above, there are a number of local, national and international environmental guidelines applicable to the sub-projects under the proposed NEWMAP project.
In other words, the States have a good governance framework and laws to back up and manage the environmental and social safeguard issues that shall be triggered.
The Ministries' officials are conversant with the Environmental Assessment (EA) legislation, procedures and framework applicable based on the Federal EIA Act 86 of 1992.
In addition, although there are no State laws, the Land Use Act guides the processes of land acquisition and compensation in the various States, which include: -

- Identification of Lands or Sites for various developments
- The Publication/Service of Acquisition Notices
- Enumeration/Inspections, assessment of compensation and the payment of it.
- Documentation of Acquisitions and Gazetting

Thus for the NEWMAP sub-projects, there are guidelines to ensure that the project succeed socio-environmentally, speaking.
The main challenge would be enforcement of these legislation/guidelines, since most State Government-owned projects, for instance, rarely or are not accustomed to using EA tool for state-owned project.
In addition there are problems of inadequate funding, low human capacity, computerization of system/information, etc.
Thus as part of this ESMF, in order to support the due diligence process, to avoid causing harm or exacerbating social tensions, and to ensure consistent treatment of social and environmental issues across the sub-project intervention areas, institutional capacity strengthening and funding have been recommended.

2.5 Other International Laws and Regulations

- International Union for Conservation of Nature and Natural Resources (IUCN) Guidelines
- Convention of Biological Diversity
- Convention Concerning the Protection of the World Cultural and National Heritage Sites (World Heritage Convention)
- United Nations Framework Convention on Climate Change (1992)

2.5.1 Convention on Biological Diversity

The objectives of the Convention include the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising out of the utilization of genetic resources.

2.5.2 Convention Concerning the Protection of the World Cultural and Natural Heritage Sites (or World Heritage Convention)

The convention sets aside areas of cultural and natural heritage for protection. The latter is defined as areas with outstanding universal value from the aesthetic, scientific and conservation points of view.

2.5.3 United Nations Framework Convention on Climate Change (1992)

In order to achieve sustainable social and economic development, energy consumption for developing countries needs to grow taking into account the possibilities for achieving greater energy efficiency and for controlling greenhouse gas emissions in general. This also includes the application of new technologies on terms, which make such an application economically and socially beneficial, determined to protect the climate system for present and future generations.

2.5.4 International Environmental Agreements

International protocols signed by Nigeria, that are relevant to the project include:

2.5.5 Basel Convention on the control of hazardous wastes and their disposal

This agreement aims to address the problems and challenges posed by hazardous waste. The key objectives of the Basel Convention are:

- To minimize the generation of hazardous wastes in terms of quantity and hazardousness; and
- To reduce the movement of hazardous wastes by disposing off as close as possible to the source.

The convention aims to protect human health and the environment by minimizing hazardous waste production whenever possible through “environmentally sound management” (ESM). ESM address the issue through an “integrated life-cycle approach”, which involves strong controls from the generation of a hazardous waste to its storage, transport, treatment, reuse, recycling, recovery and final disposal.

Finally, the World Bank provides a number of operational and safeguard policies, which aim to prevent and mitigate undue harm to people and their environment in any development initiative involving the Bank. The Nigerian EIA Act and the World Bank safeguard policies are similar. OP.4.01 and Nigerian EIA Act are also similar. World Bank EA Screening Category A is similar to Nigerian EIA Act category I, World Bank EA Category B is equivalent to Nigeria EIA Act Category II, World Bank EA Category C is equivalent Nigeria EIA Act Category III. However in the event of divergence between World Bank safeguard policies and the Existing Environmental laws in Nigeria the more stringent requirement will take precedence.

CHAPTER THREE

PROJECT DESCRIPTION

3.1 Introduction

During project initiation and planning, the need to obtain specific information on number of sub-projects, site locations, local communities, geo-physical land features, vegetation, wild life and the intensity of the social and environmental impacts and their effective mitigation measures resulted in the necessity to develop an Environmental and Social Management Framework (ESMF) in order to establish the mechanism for determining and assessing the future potential adverse environmental and social impacts of the sub-projects that are to be identified during project implementation and the establish mechanism for positive impacts enhancement, and negative impacts minimisation and mitigation.

The project is designed around three (3) main components- Investments in targeted areas, Institutional development and information systems for erosion and watershed planning and Project management: under which selected activities will be implemented to produce outputs that will contribute towards the achievement of the project. The components of the NEWMAP are highlighted below.

3.2 Components of the NEWMAP

The project is divided into three components:

Component 1: Erosion and Watershed Management Investments

This component would aim to support on the-ground interventions to address, prevent and reverse land degradation. The primary focus would be on addressing severe gully erosion in southeastern Nigeria, focusing on but not limited to the Anambra-Imo and Cross River Basins. A strategic combination of engineering, biological, and community-centered low-tech measures would be deployed to (i) stabilize severe erosion sites, (ii) prevent emerging erosion problems early on when intervention costs are low and (iii) provide the basis for longer term sustainable livelihoods practices. Accordingly, interventions will include structural, vegetative, and adaptive natural resource based livelihood measures, coupled with micro-catchment planning where necessary; examples include:

- Structural land management measures and civil works such as cross-drainages check dams, gabions, terracing and other slope stabilization works, river groynes, geotextiles, etc.
- Vegetative land management measures such as afforestation, agroforestry, grassing, bunds, live check dams, no tillage, buffer strips etc.
- Adaptive livelihood measures important for mobilization local stakeholders to carry out, maintain and monitor erosion management practices, and to reduce pressure on land.
- Strengthening of communities and local authorities to carry out participatory micro-catchment planning in targeted investment areas, establish community resource management areas, and participate in investment implementation and monitoring.

This component will be implemented with appropriate planning, preparation, stakeholder involvement, and monitoring.

A Gully Rapid Action for Slope Stabilization (GRASS) Facility is proposed to address the many emergency situations in existing gully propagation that pose immediate threats to lives, livelihoods and critical infrastructure. Investment priorities for GRASS facility will be informed by a rigorous typology of erosion problems. In addition, the component would support communities and local agencies to stem rills and incipient gullies in their early stages of formation, and address constraints to collective action.

Component 2: Erosion and Watershed Management Institutions and Information Services

This component will address longer-term sustainability by strengthening the enabling environment to address erosion and watershed degradation problems in a comprehensive manner across sectors and states. The component will support modernization and coordination of the many institutions involved in planning, management, assessment, enforcement, and monitoring of watershed and erosion related activities from sub-watershed to basin scales. Again, communities will play a central role in developing sustainable planning and management practices. To reinforce good design and prioritization of investment, the component would also support improvements in the policy environment, data modernization, development and application of analytical and monitoring tools, and diagnoses of watershed problems. The component would tentatively finance:

- Development of watershed actions plans and monitoring arrangements based on analytical and stakeholder input including land use/land cover mapping and community based research on adaptive and sustainable land use planning and management.

- Development of coordination mechanisms for multi-sector and multi-scale planning, joint approaches; enabling policies, regulations, and by-laws; and harmonized guidelines for improved land and water management across actors at Federal and State levels; facilitation of local and community level plans;

- Strengthening of regulatory compliance, environmental assessments, and contract management related to erosion management at Federal and State levels; and establishment of a comprehensive Dynamic Information System as well as other analytical, data, ICT, and monitoring tools that would support planning, prioritization, outreach, and management of investment activities. These could include real time land/water data networks; such systems would also include community mobilization around monitoring and enforcement.

- Training to modernize federal and state institutions, coupled with outreach activities to help address land-degrading practices at all levels of implementation.

- Establishment of an innovation facility to pilot possible payments for environmental services, investment competitions, innovation fairs, natural resource based industries and other events.

Component 3: Climate Change Agenda Support
The climate change component will support activities to both reduce climate vulnerability; and to promote low carbon development Activities to be supported by the project under this component include: (i) Background studies for the development of the climate change strategy; (ii) Mapping of renewable energy potentials of Nigeria; (iii) Preparation atlas to devise a set of measures to support climate smart agriculture in the (v) Equipment to conduct site-specific tests/ measurements to assess the viability of renewable implementation of the Agricultural transformation agenda; (iii) Pilot projects in selected states to demonstrate the potential of climate-smart agriculture technologies, and (iv) Consultation/ outreach activities and so on.

Component 4: Project Management
This component would aim to support the government at Federal and State levels to implement this project. This will include support for project management, including fiduciary aspects (procurement, financial management, environmental and social safeguards), project M&E, strategic communications, and documentation, and community liaison/affairs. In particular, a strong monitoring and learning framework will be set up to learn from past and ongoing interventions for adaptive management all through the process of the project planning, implementation, and evaluation. The activities of components (1) will involve civil works that is construction and /or rehabilitation of gullies; thus triggering the Environmental Assessment policy (OP 4.01).
This document is therefore a Draft Report for the **Environmental and Social Management Framework (ESMF)** for the **Nigeria Erosion and Watershed Management Project (NEWMAP), which**, provides a detailed description of the project states and their prioritized erosion sites. This report also provides information on the stakeholder/community consultation processes and documented responses, identification of potential and adverse environmental and social impacts, ESIA implementation, generic Environmental and Social Management Plan and annexure.

3.3 Project Scope of Works
The ESMF shall clarify environmental and social mitigation principles, organizational arrangements and design criteria to be applied to sub-projects, which are to be prepared during project implementation. Sub-project Environmental and Social Impact Assessments (ESIAs) consistent with the policy framework will be subsequently submitted to the Bank. The expected output is a report that provides basic information about the scope of adverse environmental and social impacts to be induced by project planning, operation, & management; mitigation and monitoring actions to be taken and cost implications.

It is expected that the ESMF will cover the following:

1. Environmental and social scope analysis
2. Environmental and Social Screening
3. Baseline Data
4. Policy and Regulatory Framework
5. Institutional Needs and Capacity
6. Analysis of Alternatives
7. Development of Management Plans to Mitigate Negative Impacts.
8. Public Consultation

9. Budgeting & Costs Planning for ESMPs
10. Monitoring and Evaluation (M&E) methodologies for ESMPs implementations.

3.4 ESMF Implementation Arrangement

World Bank (WB)

The World Bank will function in the capacity of ***''Project Donor***". The Bank will lay the benchmarks for all environmental and social safeguard issues concerned with the development and implementation of NEWMAP activities. It will provide overall supervision, facilitation and co-ordination of the NEWMAP. It will also monitor funds and funds allocations; and project performance indicators.

Federal Ministry of Environment (FME)

The ministry will function in the capacity of the Federal Republic of Nigeria ***(The Borrower).*** It will be the responsible institution for implementing the NEWMAP in Nigeria. The ministry will also facilitate liaisons with all MDAs that are to be involved in the NEWMAP and ensure that every effort is made to enhance the positive impacts of the project and reduce/mitigate negative project impacts. The Environmental Assessment Department of the Federal Ministry of Environment will ensure that all project/sub-project ESIAs meet international "best practices" and the NESREA will regulate and enforce the implementation of all EMPs developed for the NEWMAP.

Department of Flood Control and Coastal Zone Management

This is the designated department of the FME to handle all, issues pertaining to erosion and coastal zone management. It will be the FMEs primary representative in the execution of the NEWMAP.

NEWMAP-PMU (Federal)

The federal NEWMAP-PMU will co-ordinate all NEWMAP administrative and technical activities at the national level. It will be responsible for organizing and implementing capacity building programs, procurement of commodities, consultants and project management. The federal NEWMAP-PMU will establish a communication system between the state NEWMAP-PMUs and responsible for project success on behalf of the FME.

NEWMAP-PMU (State)

The states NEWMAP-PMU will co-ordinate implementation of NEWMAP activities at the state level. It will be responsible for all administrative, technical implementation and project management activities in the state. It will also facilitate liaise with MDAs, CBOs, NGOs and project affected communities.

Relevant Institutions

These are ministries, departments, agencies, civil societies etc that are directly or indirectly involved with the implementation of the NEWMAP. Implementation of the NEWMAP will involve multi-sectoral participation. These institutions will aid in broader activities under the project.

3.5 ESMF Implementation Budget

The total estimated budget for implementing the ESMF is given below.

Table 3.0: Total estimated budget for implementing the ESMF

S/N	ESMF activity	Cost $ (USD)
1.	Trainings	650,000
2.	ESIA/EMP(including production of Safeguards manual)	7,120,000
3.	Monitoring	260,000
	Total	8,030,000

CHAPTER FOUR

DESCRIPTION OF THE PROJECT STATES

4.0 Introduction

The study areas for the NEWMAP project consist of Abia, Anambra, Cross Rivers, Ebonyi, Edo, Enugu and Imo States. The Federal Republic of Nigeria classes Abia, Anambra, Ebonyi, Enugu and Imo under the southeast geopolitical zone whereas Cross Rivers State and Edo State are classed under the South-South geopolitical zone. There is the potential for NEWMAP to be scaled up to other states in the future, in which case this ESMF will be updated as necessary.

The major states that are of concern for the implementation of the NEWMAP are described below.

4.1 Baseline Data for each state

4.1.1 Abia State:

Located in southeast Nigeria with Umuahia as her capital town, this area constitutes one of the nine (9) states in the Niger Delta region of Nigeria. The area occupies about 5,834 km^2 with a population of 2,833,999 (2006) and is bounded on the north and Northeast by Anambra, Enugu and Ebonyi States. The state is bounded to the west by Imo State and to her east and southeast by Cross River State and Akwa Ibom State respectively.

Local Government: Abia State has 17 local government areas (LGAs). They are: Aba North, Aba South, Arochukwu, Bende, Ikwuano, Isiala Ngwa North, Isiala Ngwa South, Isuikwuato, Obi Ngwa, Ohafia, Osisioma Ngwa, Ugwunagbo, Ukwa East, Ukwa West, Umuahia North, Umuahia South, Umu Nneochi

Socio--Economics: Agriculture is the major occupation with crops such as cashew, Palm oil, cocoa, rubber, coconut etc. food crops like cassava, yam, rice, maize and plantain. Trading is another major occupation. A small percentage of the people are public servants.
Education: Higher institutions such as: University of Agriculture, Umudike; Conventional University at Uturu; Polytechnic at Aba; College of Education (Technical) at Arochukwu etc.
Biological Environment: The rainy season begins in March and ends in October with a break in August. The dry season which lasts for four months begins in November. Heavy thunderstorms are characteristic of the onset of the rainy season. The total rainfall decreases from 2200mm in the south to 1900mm in the north. The relative humidity is usually high throughout the year, reaching a maximum during the rainy season when values above ninety per cent are recorded.

Physical Environment: Abia State has a variety of landforms, despite the fact that it is dominated by flat and low-lying land, generally less than 120m above sea level. The low-lying plain is the inland extension of the coastal plain from the Bight of Benin. The central part of the state is characterized by undulating land with many hills. The highland areas are part of the Enugu - Nsukka - Okigwe cuesta. This area has an average height of between 120m and 180m above sea level. From Okigwe (Imo State), this escarpment extends in a west-east direction and, on getting to Afikpo (Ebonyi State), veers southeastwards to Arochukwu where it terminates. The soils of Abia State fall within the broad group of ferrallitic soils of the coastal plain sand and escarpment.
Erosion and Watershed Issues: The state is badly hit by the menace called erosion. It is the biggest ecological problem of the state. It makes other degradation like flooding; poor sanitation and pollution look like child's play. It is most prominent in the Northern and central parts of the state – Umunneochi, Isuikwuato Bende, Arochukwu, Ohafia, Umuahia North & South and Ikwuano. Solution to it is capital intensive and this is why the state is finding it almost impossible to handle the menace.

4.1.2 Anambra state

Anambra State is located within the southeastern zone of Nigeria. Onitsha & Nnewi, which are listed amongst the biggest commercial cities in Africa, are in Anambra State. The state has a land mass of over 4120 sq. km.
This state is the worst hit by erosion as numerous farmlands, residential homes, and economic crops have been destroyed and displaced. Currently it is the eighth (8th) most populated state in Nigeria (2006 Census). Investigations carried out by our preliminary site visits described the primary causes of erosion especially the gully type as attributable to the hydro-geological and geotechnical properties of the complex aquifer system underlying the affected erosion sites in the state. The high hydrostatic pressures in the aquifers produce a reduction in the effective strength of the unconsolidated coarse sands in the walls of the gullies leading to intense erosion. The erosion is followed by mass movements and sediment removal by flood flows. This is most pronounced during the rainy season. The estimated Population of the state is 4,000,000 (four) million people.

Local Government Areas - The twenty-one (21) Local Government Areas in Anambra State are: Aguata, Anambra East, Anambra West, Aniocha, Awka North, Awka South, Ayamelum, Dunukofia, Ekwusigo, Idemili North, Idemili South, Ihiala, Njikoka, Nnewi North, Nnewi South, Ogbaru, Onitsha North, Onitsha South, Orumba North, Orumba South, Oyi.

Socio-Economics- Major economics activities include agriculture, manufacturing and commerce. Agriculture dominates the rural economy. Agricultural activities include farming, livestock & forestry. The state has relatively high concentration of trade/commercial

activities artisans and small manufacturing. The state's economic potential lies in its industrial layouts in Onitsha and Nnewi.

Education- There are the Nnamdi Azikiwe University (UNIZIK), Awka a federal university with College of Medicine situated at Nnewi. The UNIZIK Nnewi runs a modern Teaching Hospital with facilities also at Umunya and Ukpo. The Anambra State University, formerly known as Anambra State University of Science and Technology (ASUTECH), with two campuses, one in Uli, and another at Igbariam; the Federal Polytechnic, Oko; Nwafor Orizu University of Education (formerly known as the Nwafor Orizu College of Education), Nsugbe. Private Universities include The Tansian University, Oba and Umunya, and Madonna University, Okija.

Biological Environment – Although annual rainfall is high in Anambra State, ranging from 1,400mm in the north to 2,500mm in the south, it is concentrated in one season, with about four months of dry ness, November to February. Consequently, the natural vegetation in the greater part of Anambra State is tropical dry or deciduous forest, which, in its original form, comprised tall trees with thick under growth and numerous climbers.

Physical Environment - Anambra State lies in the Anambra Basin, the first region where intensive oil exploration was carried out in Nigeria. The Anambra basin has about 6,000 m of sedimentary rocks. The sedimentary rocks comprise ancient Cretaceous deltas, somewhat similar to the Niger Delta, with the Nkporo Shale, the Mamu Formation, the Ajali sandstone and the Nsukka Formation as the main deposits. On the surface the dominant sedimentary rocks are the Imo Shale a sequence of grey shales, occasional clay ironstones and Sandstone beds.

Erosion and Watershed Issues: The main ecological hazards in the state are accelerated gully erosion and flooding. Extensive forest clearing, often by bush burning, and continuous cropping with little or no replenishment of soil nutrients, resulted in the disruption of the ecological equilibrium of the natural forest ecosystem. Such a situation in a region of loosely consolidated friable soils is prone to erosion, giving rise to extensive gully formation.

It is reported that each of the 21 L.G.A. in the state has at least 48 gully erosion sites. 177 communities have at least 6 gully erosion sites each. The rate of growth of gully erosion is progressive in general and exponential in particular cases. Gully erosion problems have extremely impacted the socio-economic wellbeing of the state negatively. In the Agulu-Nanka and Oko areas, which are underlain by the Nanka Sands, the gullies have attained spectacular and alarming proportions, turning the area into real "bad lands." Many of the gullies are at the head streams of the rivers that flow down the cuestas. The head streams carve their valleys deep into the deeply weathered red earth; developing dendritic patterns of gullies. Such gullies are also found in Nnobi, Alor and Ideani, along the course of the Idemili River. Besides, the greater part of the state is prone to severe sheet erosion. In the low plains of the Niger and Mamu Rivers, heavy rains often result in excessive flooding, such that the undulations occupied by settlements are marooned for some months. The people resort to the use of canoes for movement and transportation. Oba Ofemili and Ugbenu on the plains of the Mamu River are sometimes, in the rainy season, cut off from others as their roads remain flooded knee-deep for many weeks. The floods also cause serious damage to crops.

- All Watersheds in Anambra State are massively devastated due to weakness in implementing the existing regulations.
- Flood and erosion control policy and its technical guidelines.
- Summits

- Capacity-building workshops and formation of erosion watchdogs in communities.

4.1.3 Cross River state

Cross River State is in the south-south geopolitical zone, and within the tropical rainforest belt of Nigeria. It lies between latitude 4° 28'and 6° 55' North of the Equator and longitude 7° 50' and 9° 28' East of the Greenwich meridian. It shares common boundaries with the Republic of Cameroun in the East, Benue State in the North, Ebonyi and Abia States in the West, Akwa Ibom State in the South West and the Atlantic Ocean in the South. It has a land area of 20,156 km^2, and it is a coastal region covered with bodies of water from the tributaries of Cross River and the Atlantic Ocean. Consultations with the state government and non-governmental organizations domiciled in the state provided written and graphical evidence that in the past and recent, erosion has destroyed farmlands and land sites allocated for development projects especially those related to agriculture, wildlife conservation and horticulture/forestry in the state. The estimated population of the state is 3,000,000 million people.

Local Government Areas: There are 18 LGA's- Abi, Akampu, Akpabuyo, Bakassi, Bekwara, Biase, Boki, Calabar-Municipal, Calabar South, Etung, Ikom, Obanliku, Obubra, Obudu, Odukpani, Ogoja, Yakurr and Yala

Socio-Economics- Tourism and Agriculture are the two major economic thrust of the State. Agriculture employs about 80 percent of the State's labour force and contributes about 40 percent to the Gross State Products (GSP). The Tourism infrastructure is well developed to international standard, like the Obudu Ranch Resort, Tinapa Business Resort, etc. which currently attracts several tourists to the State. Though the state's rich forest ecosystem is acknowledged as one of the 25-biodiversity 'hotspots' in the world, it is severely threatened by unsustainable agricultural practices and illegal logging.

Education: Institutions such as the University of Calabar and the Calabar Polytechnic are among some of the most popular educational facilities in the state.

Biological Environment: The "Gulf of Guinea" forests, which start east of Cross River, are a global biodiversity hotspot. Contain 22 primate species including endemics like Cross River Gorilla, Drill and Preuss Guenon monkey. Butterfly, plant, reptile and amphibian studies all indicate similar high levels of richness. More than 70% of all of Nigeria's endangered tree species are only found in Cross River State.

Physical Environment: high mountains generally surround the state. Ambient temperature ranges from 28 ºC- 37 °C. It rests in a coastal region covered with bodies of water from the tributaries of Cross River and the Atlantic Ocean. Similar stratigraphic sequences of thick cohesion-less sand strata overlain by a red clayey sand stratum and surface earth of sandy loam or silty loam, are predominant in the area.

Erosion and Watershed issues: The main causes of erosion in the state include:

1. Rainfall regime in the state records double maxima and exhibits high erosivity impact.
2. The soils are mostly susceptible to heavy rains and have slopes, which have high erodibility index.
3. Rainfall varies from 1800mm to 4500mm annually
4. Inadequate drainage structures

5. Poor agricultural practices
6. Lack of land use planning and sustainable land management practices.

Impacts of erosion in the state

- Over 48% of the State vegetation and land is degraded.
- 2.5% of the state is devastated by erosion gullies.
- Over 45.5% of the land in the state is ravaged by sheet erosion threatening food security.
- Estimate of the land degradation cost on the state is put at over 500billion naira

In Cross River state, numerous erosion sites have also been identified (Cross River State Basin Authority- CRSBA). Some of the affected areas are: Adiabo Okurikang, Odukpani Local Government; Nigerian Television Authority / Ikot Effanga gullies in Calabar; Itigidi, Abi Local Government Area; Bendie in Obaniku Local Government Area; Ikot Akpaso / Ikot Nkim. Its Erosion project Akwa Ikot Effanga / Urua Nyom Ebe Akpabuyo; Edim Otop Stream road gully erosion Calabar; Eso Street Gully Erosion and Flood/ off Atimbo Calabar; Effiong Asi Gully erosion and flood; Bendi Technical College Obaniku; Federal Government Girls College, Calabar; Marina Beach, Calabar; Ogoja Ukpagada, Cross River State Road, Ogoja; Ikot Eneobong / Basin Town, Calabar Municipality.

4.1.4 Ebonyi State

The state covers an area of 5,530 km^2 and a population of about 4,339,136 (2006). Ebonyi state is primarily an agricultural and quarrying production state with also presence of mineral deposits such as coal and limestone. Mining has long been in existence; some of the mining pits have been abandoned and over the years have developed into gully sites. The active major gully sites are spatially distributed in the state. Erosion is a major problem in Ebonyi State. The failure and/or absence of managerial and technical expertise in the area of disaster management and emergency planning are a major disadvantage facing the state in its duties to curb the adverse negative effects of erosion. These poor management practices have led to flooding of erosion sites with the resultant flooding of nearby habitats causing the destruction of homes, buildings and extensive inter-local government roadwork destruction. Ebonyi state consists of the following local government areas: Abakaliki, Afikpo North, Afikpo South, Ezza North, Ezza South, Ikwo, Ishielu, Ivo, Izzi, Ohaozara, Ohaukwu, Onicha.

4.1.5 Edo State

Edo State is an inland state in central southern Nigeria. Its capital is Benin City. It is bounded in the north and east by Kogi State in the south by Delta State and in the west by Ondo state. Edo state covers an area of 19,635 (Sq Km). The estimated population is about 3.23 million people (2006 Census).

Local Government Areas -. The major Local Government Areas are; Akoko Edo, Egor, Esan North-East, Esan Central, Esan South-East, Esan West, Etsako Central, Etsako East, Etsako West, Igueben, Ikpoba Okha, Oredo, Orhionmwon, Ovia North-East, Ovia South-West, Owan East, Owan West, Uhunmwonde

Socio-Economics- Agriculture is the predominant occupation of people in this State. The major cash crops produced are rubber, cocoa and palm produce. In addition, the State produces such crops as yams, cassava; rice, plantains, guinea-corn, and assorted types of fruits and vegetables. Other economic activities include fishing, Woodwork, Arts, Craft, Oil exploration.

Education- The University of Benin, Benin City, the Ambrose Alli University, Ekpoma, the Igbinedion University, Okada, and the Benson Idahosa University, Benin City, are among the institutions of higher learning located in Edo State.

Biological Environment – The state is mainly in the tropical rain forest region of Nigeria but Northern portions are located in the derived savannah zone of the country and some communities in the south fall within the mangrove swamp vegetation. The state undergoes two seasons: rainy season starting from April to October and dry season from November to March with a cold harmattan spell between December and January. In the state is the Benin lowlands originally a stretch of tropical forest but the increasing interest in the economic value of rubber plantations has reduced the forest population. The state also has the Okomu Wildlife Sanctuary long managed by the Nigerian Conservation Foundation. The Okomu river crosses the old Okomu Forest reserve from the Northeast to the Southwest and it is from the river that the forest reserve derives its name. The Okomu sanctuary is located within the state borders and has various species of butterflies and birds. However, through the years, the forest reserves surrounding the sanctuary have been threatened by economic activities by various stakeholders including a 1992 concession granted to Michelin to erect a rubber estate close to the forest reserves. Other striking features are the Afenmai Hills, Orle Valley Basin, Esan Plateau and the Benin Lowlands. The Ikpoba River rises from the Esan Plateau where many Ishan communities live.

Physical Environment - Edo State is endowed with abundant natural resources. The principal mineral resources include crude oil, natural gas, clay chalk, marbles and limestone. The distinct relief regions in the state include: the swamps/creeks, the Esan plateau, Orle valley and the dissected uplands of Akoko-Edo Local Government Area. There are six types of physical features which con stitute the landscape of Edo State. In the Benin lowlands is found a sandy coastal plain and alluvium clay with some hills in the east. Slopes are tilled in the southwest direction. Rivers Osse, Orihionmwon and lkpoba drain the area. With the exception of River Osse that has a wide flood plain, the other rivers are characterised by steeply incised valleys in their upper courses; they become broad as they enter River Ethiope in Delta State. The Esan Plateau ranges from 213 to 305m. It is characterised by sandstone hills, numerous dry valleys, and steep slopes in the northern and southern portions but gentle slopes in the west. The Orle valley is developed on sandstone and runs in an east west direction with Rivers Owan and Orle as the main drainage outlets westwards and eastwards, respectively. The dissected uplands of AkokoEdo on the other hand, range from 183m to 305m. Outstanding features of the uplands include granite peaks, which rise above 610m and sandstone in the south. In addition, erosional and stable land surfaces are predominant.

Erosion and Watershed Issues

- The major problem of the State has been Erosion and Watershed degradation as a result of
- Development without adequate planning or provision of services,
- Heavy tropical rainfall ~ 2000mm per year,
- Natural drainage routes obstructed with no space for green belts or ponding areas,
- Deep soils prone to severe erosion and blocked road drainages

4.1.6 Enugu State

Enugu State is one of the states in the South East geopolitical zone of Nigeria, which is located between latitude 04 30’N and 07 30’N and longitude 06 45’E and 08 45’E. The state derived its name from the capital city Enugu (top of the hill), which is regarded as the oldest urban area in the South East geopolitical zone. The state occupies a land area of about 7,738

sq km. Estimated population - 3,257,298 (2006 census). It has a population density that is two and a half times the national average.

Local Government Areas - The 17 Local Government Areas in Enugu State are: Aninri, Awgu, Enugu East, Enugu North, Enugu South, Ezeagu, Igbo Etiti, Igbo Eze North, Igbo Eze South, Isi Uzo, Nkanu East, Nkanu West, Nsukka, Oji River, Udenu, Udi, Uzo Uwani

Socio-economics

Economically, the state is predominantly rural and agrarian, with a substantial proportion of its working population engaged in farming. Trading (18%) and services (12.9%) respectively, are also important. Trading is the dominant occupation in the urban areas, followed by services, mostly public service. However, the private sector encouraged by the present state government investment friendly disposition is gaining increasing impetus.

Education - Every community in Enugu State has at least one Primary/Elementary school and one Secondary school, funded and run by State Government. There are also large numbers of private nursery, primary and secondary schools in Enugu State. Nigeria's First Indigenous University, University of Nigeria, Nsukka (UNN), is located in Enugu State. The state also hosts the Enugu State University of Science & Technology (ESUT), Institute of Management and Technology (IMT), Enugu State College of Education Technical, Enugu, Caritas University, Amorji-Nike, Renaissance University, Ugbawka; Federal Government College Enugu, Federal School of Dental Technology & Therapy College of Immaculate Conception, Enugu

Biological Environment - It is characteristically green and is complemented in the Nsukka area by typical grassy vegetation. Fresh water swamp forests occur in the Niger Anambra Basin. The climate is comparatively congenial, and particularly equable in the hilly and ecologically transitional region of Nsukka. The mean monthly temperature in the hottest period of February to April is about 33°C and the annual rain fall ranges between 152 to 203cm. The rain is almost entirely seasonal, most of it falling between May and October.

Physical Environment- Enugu State occupies much of the highlands of Awgu, Udi and Nsukka. The hills are flanked by the rolling lowlands of Oji River, Adada and Anambra Basins to the west, and the Ebonyi (Aboine) River Basin to the east.

Erosion and Watershed

1. The area is well drained. The notable rivers and streams that are found in this state include; Nyaba river, Oji-River, Adada river, Ekulu river, Iyioku river, Ivo river and Idodo River.
2. The state lies within two River Basins viz; Anambra-Imo River Basin (North West) and Cross-River Basin (south Eastern part).
3. The State experiences incidences of erosion menace due to its sedimentary terrain that encourages water percolation.

The main causes of erosion in Enugu state include the hills and valleys that permit speedy flow of water thereby encouraging erosion menace.

- More so the increased industrial activities and fast growing nature of the urban and the rural areas also enhance erosion.
- Majorly the areas degraded were found at the residential areas, roads, forests and farm lands, etc. They are found in almost all the LGAs of the state.

In Enugu State the gullies are concentrated in the areas underlain by the loose Ajali and Nsukka geological formations, such as the scarp slopes of Udi Escarpment. There is strong

relationship between the gully formation and expansion and the geomorphology as well as underlying rock types of the areas

1. In Enugu State, 6252.08 km^2 or 80.8 % of the territory are mildly gullied, 1481.41 km^2 or 19.2 % of the territory suffer moderate gully impacts.
2. The land degradation cost on the state has been estimated to cost over N8.8bn to mitigate the menace.

4.1.7 Imo State

Location

Imo State derives its name from Imo River, which takes its course from the Okigwe/Awka upland. It lies within Latitudes 4^0 45^IN and 7^0 15^IN, and Longitude 6^0 50^IE and 7^0 25^IE. It occupies the area between the lower River Niger and upper and middle Imo River. The state is bounded on the East by Abia State, on the west by the River Niger and Delta State; and on the north by Anambra State while River State lies in the south. Imo state covers an area of about 5,100sq km.

The state is rich in natural resource and farming is a common practice. A combination of heavy human population, anthropogenic causes and heavy rainfall has contributed to degradation of the soil leading to massive erosion and flooding in major areas within the state. Estimated population of Imo state has is about 4,485,499 persons. The population density varies from 350 persons per sq. km. in Oguta/Egbema area, to about 1,500 persons per sq.km. in Mbaise, Orlu, Mbano and Mbaitoli areas. Low crop yield and loss of land to erosion have combine to induce people to migrate in search of jobs and even farmland in other parts of the country.

Local Government Areas- The 27 LGA's in Imo state are; Aboh Mbaise, Ahiazu Mbaise, Ezinihitte Mbaise, Ihitte Uboma, Ehime Mbano, Ideato North, Ideato South, Ikeduru, Isiala Mbano, Isu, Mbaitoli, Njaba, NgorOkpala, Nkwerre, Nwangele, Obowo, Oguta, Ohaji/Egbema, Okigwe, Onuimo, Oru East, Oru West, Orlu, Orsu, Owerri Municipal

Socio- economics

Agricultural Activities: Planting and Growing cocoa, Oil palm, rubber, cashew, citrus fruits, cassava, maize, plantain/banana, Palm tree, pineapple etc.

Mineral Deposits: Raw materials include metallic & non-metallic mineral and agro-based resources. e.g. Limestone, Kaolin, Clay, Black Marbel, Gypsum, Glass Sand, Lignite, etc.

Education- Imo state has institutions such as the Federal University of Technology, Owerri and the Imo State University.

Biological Environment- Imo State has an average annual relative humidity of 75 percent, which is highest during the rainy season, when it rises to about 90 per cent. The high temperature and humidity experienced in the state favour luxuriant plant growth, which ideally should produce the climax vegetation of the tropical rain forest. Economic trees like the iroko, mahogany, obeche, gmelina, bamboo, rubber and oil palm pre dominate. But due to high population density, most of the state has been so farmed and degraded that the original vegetation has disappeared. Thus farm ers are forced into marginal lands, a situation aggravated by the rising demand for fuelwood. Deforestation has triggered off acute soil erosion especially in the Okigwe Orlu axis.

Physical Environment- Imo State is underlain by the Benin Formation of coastal plain sands. This formation, which is of late Tertiary age, is rather deep, porous, infertile and highly leached. In some areas like Okigwe, impermeable layers of clay occur near the

surface, while in other areas, the soil consists of lateritic material under a superficial layer of fine-grained sand. Rivers are few with vast interfluves that are characterised by dry valleys that carry surface drainage in periods of high rainfall.

The phenomenal monotony of the terrain may be accounted for by the absence of any tectonic disturbances and by the homogeneity of the rock structure. The main streams draining the state are Imo, Otamiri, Njaba and Ulasi rivers, all of which have very few tributaries. With the exception of Imo River, which runs through the area underlain by the Imo Shales, other rivers rise within the coastal plain sands.

Generally, river valleys constitute the major physical features, which are often marshy. The undulating nature of the interfluves gives rise to numerous depressions especially in the northeast Rainfall distribution is bimodal, with peaks in July and September and a two week break in August. The rainy season begins in March and lasts till October or early November. From March to May, there are violent storms, which destroy crops and houses. Rainfall is often at its maximum at night and during the early morning hours.

Erosion and Watershed Issues

Erosion in Imo State is creating gullies that are killing people, destroying properties, destroying ancestral lands and living space, and destroying fertility of agricultural soils.

Factors That Influence Soil Erosion in Imo State

1) Soil properties (erodibility); Size of soil particles & Organic matter content
2) Ground slope (topography); Slope length & steepness
3) Vegetation (ground cover), Deforestation, over-grazing, and indiscriminate bush burning make soils vulnerable to erosion
4) Rainfall characteristics; Frequency, intensity & Duration
5) Changes in land use (anthropogeny); Laterite Excavation is a booming business etc.

CHAPTER FIVE

PROJECT COORDINATION AND IMPLEMENTATION ARRANGEMENTS

5.0 Introduction

It is necessary to highlight and define the roles, responsibilities and institutional arrangements for the implementation of the NEWMAP, as they are fundamental to the effective implementation of the environmental safeguard measures outlined in this ESMF. Accordingly, details of institution arrangements and the roles and responsibilities of the various institutions in the implementation of the ESMF are highlighted below.

5.1 NEWMAP Institutional Arrangement

Generally, the NEWMAP project is expected to run at two levels, namely the Federal and State. At the Federal level, the Federal Project Support Unit (FPSU) supervised by the Federal Ministry of Finance will manage the Coordination and Program Support. The FPSU will establish coordination and support relationship with the State counterpart Agencies. Thus at the State level, the governments of the 7 States are expected to set up by State Law, agencies that would work in collaboration with the FPSU, though operating independently. Albeit, the Ministry of Finance, Budget and /Economic Planning, as the case may be in the various State is at present taking the lead in the coordination of the NEWMAP preparatory programmes.

The law or legal agreement used in establishing the agencies will insulate the agencies and specifically the management unit from undue political or administrative interference. In addition, to implement the NEWMAP program according to the agreed terms and conditions, a formal agreement is needed between the State Governments, the Implementing Agencies (PMU) and other MDAs outlining the tasks, responsibilities, schedules, procedures, deliverables etc., required for preparation and implementation of the approved sub-projects.

Furthermore, the State Agency/Project Management Unit (PMU) will have an advisory board or a technical steering committee and a management unit. The board will include representatives from civil society and the government.

The Project Management Unit (PMU) shall be headed by a General Manager who will supervise activities of staff within three (3) major departments of the Agency, namely: Operations, Finance and Administration, and Monitoring a& Evaluation (all three departments will cater for the environmental and social components/issues as concerns the NEWMAP).
To capture the inflow and use of credit proceeds in a transparent manner through the Office of the Accountant General [Project Financial Management Unit (PFMU) set up for financial management of donor assisted projects at the state level], the PMU shall establish a relationship with PFMU.
This relationship would entail:

- A copy of the annual budget and work plan will be made available to the PFMU by the PMU;
- PFMU internal auditors will be responsible for regular internal audit in the PMU and submit quarterly reports to the government (copied to IDA).
- A copy of monthly progress reports, quarterly reviews and interim Financial Reports (IFRs) shall be sent regularly to the PFMU;

- The PFMU internal auditors shall participate in quarterly monitoring visits to communities as organized by the PMU.

5.2 Roles and Responsibilities

The successful implementation of the ESMF depends on the commitment of the sector and related institutions, and the capacity within the institutions to apply or use the ESMF effectively, and the appropriate and functional institutional arrangements, among others. Thus details of institutional arrangements, the roles and responsibilities of the institutions that would be involved in the implementation of the ESMF are highlighted below. For the purpose of this ESMF, the institutions identified include;

- Federal Level Institutions: Federal Ministry of Environment and other relevant Ministries, Departments and Agencies (MDAs).
- State Level Institutions: PMUs and other relevant Ministries, Departments and Agencies (MDAs).
- Local Government Level Institutions: Local Government Review Committee (LGRC); Local Government Desk Office (LGDO)
- Community Level and other Institutions
- Direct and Other Stakeholder/Groups: Community Project Management Committee (CPMC); CDA; CBO/NGOs
- Consultants, Contractors and Site Engineers
- World Bank and Other Development Partners

Their roles and responsibilities are highlighted below

5.2.1 Federal Level Institutions

The institutions at the federal level are responsible for the establishment of national policy goals and objectives and the appropriate provision of technical and financial assistance to State and local governments.

For this ESMF specifically, the Federal Ministry of Environment and her relevant agencies like Department of Erosion, Flood and Costal Management shall play the role of lead environmental regulator, overseeing compliance requirements, granting consent and also monitoring or providing supervisory oversight for the NEWMAP projects. It also shall receive comments from stakeholders, public hearing of project proposals, and convening technical decision-making panel as well as provide approval and needed clearance for EA/EMP or other environmental clearance.

Federal Ministry of Environment (FME)

Federal Ministry of Environment (FME) is mandated by the Federal Republic of Nigeria to ensure environmental protection and natural resources conservation for a sustainable development in the country. They promote cooperation in environmental science and conservation technology with similar bodies in other countries and with international bodies connected with the protection of the environment and the conservation of natural resources. The Ministry also cooperates with Federal and State Ministries, Local Government, statutory bodies and research agencies on matters and facilities relating to the protection of the environment and the conservation of natural resources.

Department of Erosion, Flood and Costal Management

The Department is the lead agency at the federal level for this project. The department is ultimately responsible for monitoring, assessing, mapping, inventory and generation of baseline environment data for the prevention, mitigation and control of hydro- meteorological related disasters in Nigeria. Other responsibilities include:

- Monitoring the impact of global change and associated impacts on flood, inland and coastal Erosion

- Land reclamation
- Development of Soil Conservation policy and master plan towards efficient land use practices in Nigeria
- Processing and management of satellite data for management of hydro-metrological related disasters in Nigeria-flood, erosion, water harvest & Coastal Erosion
- Inter-basin water transfer from regions of surpluses to region of deficits for water harvesting for flesh flood prevention
- Formulation of resettlement strategies, emergency preparedness plans, and sociological aspects of coping with flood in affected areas in the country in cooperation with other related agencies.
- Development and operation of flood, early warning systems.
- Studies and designs for control of Soil Erosion, Flood Coastal Zones Management water harvesting and management.
- Public enlightenment on prevention, mitigation and control of Flood Erosion and Coastal Zone Degradation.
- Operation and Maintenance of installed physical structures for control of flood and erosion, to ensure optimum efficiency and achievement of designed life spans of such structures.
- Protection and management of coastal shoreline against coastal erosion and coastal degradation.
- Establishing linkages with agencies with similar mandates.

Federal Ministry of Water Resources (FMWR)

The Federal Ministry of Water Resources is the umbrella government organ under which all water resources activities at the Federal levels, including hydrological activities, operate. The Nigerian Hydrological Services Agency and Integrated Water Resources Commission and River Basin Development Authorities are under the Ministry.

Nigerian Hydrological Services Agency (NIHSA)

The Nigeria Hydrological Services Agency (NIHSA) operates and maintains hydrological stations nation-wide for gauging of surface water points. The agency also undertakes groundwater exploration and monitoring. The data collected is stored in robust database system, analyzed and processed for the purpose of mapping all the nation's water deposits and also to provide the vital hydrological and hydrogeological data required for sustainable water resources budgeting for various purposes such as domestic, irrigation/agricultural development (for food security and poverty alleviation), hydroelectricity generation, industrialization, tourism and recreation among others.

Integrated Water Resources Commission

The commission ensures the effective monitoring and evaluating of water sector program, and also receives and investigates complaints from consumers and other persons in the water resources sector.

Federal Ministry of Works (FMW)

The Federal Ministry of Works is engaged to ensure modern and reliable national road transport network in the country. They are also charged with Federal Highways and Bridges (Planning & Design, Construction & Rehabilitation, Monitoring and Maintenance of Federal Roads nationwide, Provision of Highway Engineering Infrastructure, Surveying and mapping the nation’s internal and international boundaries. Under the ministry they have several departments and agencies.

Federal Ministry of Agriculture and Rural Development (FMARD)

The Federal Ministry of Agriculture and Rural Development ensures that the citizenry are provided with credible and timely information on government activities, programs and

initiatives; while creating an enabling technological environment for socio-economic development of the nation.

National Environmental Standards and Regulatory Enforcement Agency (NESREA)

The agency is chiefly responsible for the protection and development of the environmental, biodiversity conservation and sustainable development of Nigeria's natural resources in general and environmental technology including liaison with relevant stakeholders within and outside Nigeria on matter of enforcement of environmental standards, regulations, rules, laws, policies and guidelines.

The safeguard responsibilities for the NEWMAP are highlighted in the table 5.0 below

Table 5.0: Safeguard Responsibilities for NEWMAP

S/No	Category	Roles
I	Federal Government MDAs (Federal Ministry of Environment and her agencies (Such as NESREA)	Lead role -provision of advice on screening, scoping, review of draft RAP/EA report (in liaison with State Ministry of Environment), receiving comments from stakeholders, public hearing of the project proposals, and convening a technical decision-making panel, Project categorization for EA, Applicable standards, Environmental and social liability investigations, Monitoring and evaluation process and criteria
II	State Government MDAs (Ministry of Lands, Survey and Urban Development, Ministry of Environment, etc.	Compliance overseer at State Level, on matters of Land Acquisition and compensation and other resettlement issues, Lead role -provision of advice on screening, scoping, review of draft RAP/EA report (in liaison with Federal Ministry of Environment), receiving comments from stakeholders, public hearing of the project proposals, and convening a technical decision-making panel, Monitoring and evaluation process and criteria.
	Other MDAs	The MDAs applies when relevant areas or resources under their jurisdiction are likely to be affected by or implicated sub-projects. They participate in the EA processes and in project decision-making that helps prevent or minimize impacts and to mitigate them. These institutions may also be required, issue a consent or approval for an aspect of a project; allow an area to be included in a project; or allow impact to a certain extent or impose restrictions or conditions, monitoring responsibility or supervisory oversight.
III	World Bank	Assess implementation Recommend additional measures for strengthening the management framework and implementation performance.
IV	NEWMAP PMU Safeguards Unit	Liaise closely with Ministry of Environment in preparing a coordinated response on the environmental and social aspects of project development.
V	Local government	Liaising with the PMU to verify adequacy of resettlement location and provide approval for such sites, Providing additional resettlement area if the designated locations are not adequate, Provide necessary infrastructures in relocated areas, engage and

		encourage carrying out comprehensive and practical awareness campaign for the proposed sub-projects, amongst the various relevant grass roots interest groups.
VI	CDA (Community Development Organisations)	Ensure Community participation by mobilizing, sensitizing community members;
	Consultants, Contractors, and Site Engineers	Will work with the PMUs at Federal and State levels, and other stakeholders. They are to ensure effective project delivery in a timely, safe and environmentally sound manner.
VII	NGOs/CSOs	Assisting in their respective ways to ensure effective response actions, Conducting scientific researches alongside government groups to evolve and devise sustainable environmental strategies and rehabilitation techniques, Organizing, coordinating and ensuring safe use of volunteers in a response action, and actually identifying where these volunteers can best render services effectively & Providing wide support assistance helpful in management planning, institutional/governance issues and other livelihood related matter, Project impacts and mitigation measure, Awareness campaigns
VIII	The General Public	Same as above

The other institutions, on the other hand, come in as and when relevant areas or resources under their jurisdiction or management are likely to be affected by or implicated in the execution of the project. These institutions are grouped broadly into two – resource based ones and the utility service providers. They all have a significant role and are consulted as appropriate. They participate in the EIA processes and in project decision-making that helps prevent or minimize impacts and to mitigate them. These institutions may also be required:

- To issue a consent or approval for an aspect of a sub- project;
- To allow impact to a certain extent or impose restrictions or conditions.

Furthermore, the institutions may have monitoring responsibility or supervisory oversight during in an area of concern or interest to them during implementation.

5.2.2 State Level Institutions

The State level institutions include the PMUs and other relevant Ministries, Departments and Agencies (MDAs). Some relevant agencies include:

State Environmental Protections Agencies/Authorities (SEPAs*)*

Most states have set up Environmental Protection agencies as the regulatory body to protect and manage the environmental issues in their domain. The functions of the SEPAs include:

- Enforcement of all environmental legislations in the states
- Minimization of impacts of physical development on the ecosystem
- Preservation, conservation and restoration to pre-impact status of all ecological process essential for the preservation of biological diversity.
- Protection of air, water, land, forest and wildlife within the state.
- Pollution control and environmental health in the state.

State Ministry of Agriculture & Rural Development (SMARD)

The state ministry promote accelerated agricultural development, increase production in all the sub sectors; and realization of the structural transformation in the socio-economic development of the rural areas.

State Ministry of Works (SMW)

The Ministry of Works at the State level ensures the construction and maintenance of rural and urban road networks. They are also responsible for the physical development of the States specifically the duties of Planning, Researching, Formulation, Implementation and evaluation and evaluation of policies on roads, electrical and Mechanical installations as well as the acquisition of earthmoving equipment and other machines needed in survey and Civil Engineering works.

State Ministry of Lands

The major function of the Ministry of Land is to ensure that there is optimal utilization of land resources in their states in order to achieve development. For the NEWMAP purpose, the State Ministry of land will provide proper guidelines in acquiring land from the members of the community for the purpose for the work.

State Ministry of Information and Communications

The State Ministry of Information and Communication will be responsible for dissemination of information that will enhance and facilitate project understanding and acceptance at the level of the state. It will have an idea on the language of the community members and the culture of its indigenous people. The ministry will utilize the use of radios, television media, public awareness campaigns and jingles; going into the communities and informing the people and other communication media to educate the community members on the importance of the NEWMAP in their community. This ministry will play a vital role in community involvement mechanism.

State Ministry of Human Capital Development

This ministry will work with the SNEWMAP to ensure that members of the local communities gain occupational benefits from sub-project implementation.

Ministry of Rural Development

The State Ministry of Rural Development is responsible for community-based matters such as community mobilization; self help projects, rural industrialization, neighborhood watch, training and workshop for community development associations, listing of community development associations in the State etc. It will assist in educating the community members on the importance of the NEWMAP. It will provide indigenous communities with assurance. For example: that the NEWMAP will not disrupt any farming practices but rather provide a better environment for production systems to thrive.

5.2.2.1 State Agencies/Project Management Unit (SA/PMU)

The SA/PMU, as the implementing authority, has the mandate to:

- Co-ordinate all policies, programmes and actions of all related agencies in the States

- Ensure the smooth and efficient implementation of the project's various technical programmes
- Cooperate through a Steering Committee that provides guidance to the technical aspects of all project activities;
- Maintain and manage all funds effectively and efficiently for the sub-projects
- Plan, coordinate, manage and develop NEWMAP projects to ensure success.
- Coordinate activities of the State Licensing Authority and all vehicle inspection units.
- Recommend on policy issues to the Governor including mechanisms for implementation.
- Prepare plans for the management and development of NEWMAP project.
- Facilitate the discussion between PAPs and communities regarding compensation for land acquired for the subprojects micro-projects;
- Monitor the project work to ensure that the activities are carried out in a satisfactory manner;
- Organize the necessary orientation and training for the departmental officials so that they can carry out consultations with communities, support communities in carrying out RAPs and implement the payment of compensation and other measures (relocation and rehabilitation entitlement) to PAPs in a timely manner;
- Ensure that progress reports are submitted to the World Bank regularly

5.2.2.2 PMU Safeguard Units

To ensure sustainability in all the NEWMAP projects, an Environmental/Social Safeguards Unit that reports directly to the General Manager shall exists. The paramount objective of the Environmental/Social Safeguards unit is to ensure the effective consideration and management of environmental/social concerns in all aspects of NEWMAP project, from the design, planning, implementation, monitoring and evaluation of initiatives in the various States. Thus a key function of the Unit is to engender a broad consensus, through participatory methods and extensive dialogue with affected and interested parties, on fair and adequate methods by which rights of way can be cleared of occupants as needed, taking account of international standards for involuntary displacement as incorporated into the World Bank's OP 4.12 on Involuntary Resettlement and environmental compliance with the EA.

With this, particular attention is directed at minimizing environmental/social risks associated with the development of sub-project initiatives, as well as the identification and maximization of social development opportunities arising from investments.

In the implementation of the NEWMAP, the Safeguard Unit will be expected to advise on the environmental and social costs/benefits of the different options and audit environmental and social safeguards compliance of sub-projects. The PMU Safeguards Unit will function as an independent unit. For all environmental and social issues, the Safeguard Unit shall work to closely with other relevant MDAs in preparing a coordinated response on the environmental and social aspects of the NEWMAP sub-projects. In order to achieve this made, the PMU would have in each State Steering Committee (Board) and a Project Implementation Unit (PIU) for coordinating the day to day activities with the relevant line departments..

Two members of the PMU will be designated as Environmental & Social Officers to oversee the implementation of Safeguard instrument for the ESMF and the RPF as well as any other environmental and social provisions as deemed fit for project implementation as per the regulations of the World Bank and Government of Nigeria and the respective State government. The roles and responsibilities of the Safeguard Specialists (Environmental and Social Officers to anchor environmental and social issues distinctively) are described below

Roles & Responsibilities of Safeguard Specialist

- Review all EA / SA Documents prepared by consultants and ensure adequacy under the World Bank Safeguard policies including the OP4.01.
- Ensure that the project design and specifications adequately reflect the recommendations of the EIA / ESIA
- Co-ordinate application, follow up processing and obtain requisite clearances required for the project, if required
- Prepare compliance reports with statutory requirements.
- Develop, organize and deliver training programme for the PIU staff, the contractors and others involved in the project implementation, in collaboration with the PMU
- Review and approve the Contractor's Implementation Plan for the environmental measures, as per the ESIA and any other supplementary environmental studies that may need to be carried out by the PIU
- Liaise with the Contractors and the PIU / State Implementing agency on implementation of the ESMP / RAP
- Liaise with various Central and State Government agencies on environmental, resettlement and other regulatory matters
- Continuously interact with the NGOs and Community groups that would be involved in the project
- Establish dialogue with the affected communities and ensure that the environmental concerns and suggestions are incorporated and implemented in the project
- Review the performance of the project through an assessment of the periodic environmental monitoring reports; provide a summary of the same to the Project Manager, and initiate necessary follow-up actions
- Provide support and assistance to the Government Agencies and the World Bank to supervise the implementation

***Note: Because of the sectoral nature of the NEWMAP and anticipated project types, and given the number of safeguard policies, a safeguards manual will be prepared by the proponent*.**

5.2.3 Local Government Level Institutions

The Local Government has become accepted as the government nearest to the people or the masses. For any meaningful development to take place, this level of government needs to be galvanized, to execute people oriented programs, which seek to lower poverty level as is designed in NEWMAP. The LG governs the affairs in the various communities. It is expected that it serve as an inter-phase between the community members and the SNEWMAP. The LG can assist in the implementation of the proper community mechanism. Members of the local government are mostly people from the community and can easily win the trust of the people. Their staff can work together with the other MDAs and CBOs.

The Local Government Council has to be fully briefed and enlightened in the process and steps to be taken in the ESMF/EA/ESMP and the overall project execution. The Council should in turn engage and should be encouraged to carry out a comprehensive and practical awareness campaign for the proposed project, amongst the various relevant grass roots interest groups.

5.2.4 Community Level and other Institutions

This includes direct and other concerned stakeholders/groups. This may have complaints/views that need to be resolved in the choosing and execution of the various sub-

projects. It is obvious that villages and youth leaders shall ensure that social values are not interfered with.

5.2.5 Community Based Organizations (CBO)

These are organization based in the communities. Organizations in the community can serve as an inter-phase and can speak for the people. They can communicate to the SNEWMAP, the intentions and needs of the people and vice versa.

5.2.6 World Bank

The World Bank will assess the implementation of the ESMF and recommend additional measures for strengthening the management framework and implementation performance, where need be. The reporting framework, screening procedures and preparation of management and mitigation plans shall be discussed and agreed by the Bank team and PMU during the early part of project implementation.

5.2.7 Consultants, Contractors and Site Engineers

The Consultant and Contractor will work with the PMUs and other stakeholders in prompt and effective projects delivery.

5.2.8 Safeguards Manual

A Safeguard manual will be prepared in order to enable the FNEMAP-PMU, SNEWMAP-PMU, Safeguards PMU and implementers of sub-projects, ensure that all sub-project activities comply with environmental and social safeguards requirements of the World Bank.

CHAPTER SIX

ENVIRONMENTAL & SOCIAL IMPACTS IDENTIFICATION

6.0 Introduction

This Section contains a summary of the impacts that are likely to result from the project as a result of the interaction between the project components and the environmental elements. The method of impact identified and evaluated is also given in this Section. It should be noted that impacts identified are preliminary in nature; potential for occurrence has to be ascertained during further stages of project design and implementation.

Any sub-project under the NEWMAP, whether it is simple and small, or large and complex has some level of impacts on the environment and socio-economics. The environmental and social impacts may be beneficial or adverse, but the main objective of impact identification especially with emphasis to the NEWMAP is to identify and prioritize areas that are likely to be affected by the implementation of sub-projects and proffer suitable mitigation measures. Environmental and social impacts, by definition, imply an alteration of environmental conditions or creation of new sets of adverse or beneficial environmental and social consequences caused by the action under consideration.

6.1 Screening Process

The objective of screening is to determine the appropriate level of environmental and social impact assessment and management for a proposed subproject.

Environmental and Social screening process distinguishes sub-projects and activities that will require thorough environmental review to prevent/mitigate negative environmental impacts or those which will provide opportunities to enhance positive impacts.

Thus one of the objectives of the screening process is to rapidly identify those subprojects, which have little or no environmental or social issues so that they can move to implementation in accordance with pre-approved standards or codes of practices for environmental and social management.

In other words, based on environmental screening, sub-projects with no noticeable impacts are cleared from an environmental perspective; subprojects with some impacts proceeds to another level of conducting an environmental assessment, which will be evaluated to clear the subproject.

6.1.1 Implementing the ESMF

This ESMF document incorporates a number of elements into an overall Environmental and Social Management process for the Nigeria Erosion and Watershed Project and its sub-

projects. The process involves distinct steps and associated activities that are linked to deliver a robust and veritable management framework in line with the stated objectives of the ESMF

6.1.2 Project Screening, Scoping and Categorization

All potential project intervention sites will be screened for Environmental and Social (E&S) impacts prior to approval by the PMU. A designated officer and or consultant of the PMUs can carry out the screening. The screening process will include robust assessment of the project to determine:

2 The appropriate project categorization EA;
3 Applicable World Bank environmental and social safe guards;
4 Potential for environmental and social liability; and
5 Cultural or other sensitivities

In addition, each project will be screened to identify relevant stakeholders and, the nature and extent of engagement for each stakeholder category. The report of the screening exercise (according to both Nigeria EIA decree and World Bank requirements) will be sent to the World Bank for review and approval. In addition, following the review of the screening and scoping, the terms of reference (TOR) and the reports of the ESIA/ESMP that would ensue will be sent to the World Bank for review and approval prior to disclosure in Nigeria and at World bank Info-Shop.

6.1.3 Environmental and Social Management Plan (ESMP)

The project and all sub-projects shall be required to maintain comprehensive ESMPs underpinned by Environmental and Social Impact Assessments (ESIAs) to achieve health, safety, and environmental regulatory compliance objectives, institutional requirements (e.g., Word Bank), and other related commitments. An ESMP is an important element of the NEWMAP's overall Environmental and Social Management strategy to ensure environmental, social, and health performance of the entire project and sub-projects. To this end, the ESMPs will focus on policy, management of personnel, competence building, communications with the public, and monitoring.

Environmental and Social Management Plans for each sub-project will be required at two stages. During the proposal stage, each intending State PMU will as part of its proposal, submit an overview of how environmental and social issues of the project will be addressed on a continuous basis. The plans will also specify standards proposed for the sub-project to ensure environmental sustainability and social acceptability. Standards and plans proposed to address social issues including involuntary resettlement and legacy issues.

Environmental assessment will determine the extent of impacts and how the impacts will be mitigated, or minimized by planning, approaching the activities in an environmentally sensitive manner and adopting specific mitigation measures.

The environmental and social screening conducted as part of the ESMF is intended to provide inputs into identification of potential impacts with the implementation of the NEWMAP project interventions. EIA/EA/ESIA is a process whose breadth, depth and type of analysis depend on the nature, scale, and the potential environmental impact of the proposed project. The EA evaluates a project's potential environmental risks and impacts in its area of influence; identifies ways of improving project planning, design and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts enhancing positive impacts, including throughout the project implementation. The World Bank favours preventative measures over mitigation or compensatory measures, whenever feasible.

Generally, the screening process for the execution of this ESMF involves an assessment of sub-project to determine:

- The appropriate project categorization for EA;
- Applicable World Bank environmental and social safe guards;
- Potential for environmental and social liability; cultural or other sensitivities

The categorisation for EA is done through the use of an Environmental Screening Checklist (SEE ANNEX 003 for checklist) of sub-projects to determine if they fall under any other EA Categories (A, B or C) and Nigeria EIA categories 1,2 and 3. . **Category A** projects are those whose impacts are sensitive, diverse, unprecedented, felt beyond the immediate project environment and are potentially irreversible over the long term. Such projects require full EA. Category B Projects will result in adverse environmental impacts on human populations or environmentally important areas--including wetlands, forests, grasslands, and other natural habitats-that are less adverse than those of Category A projects. In general, such impacts are localized; do not affect sensitive area/resources, and reversible, unlike Category A projects. All category B projects will also require EA/ESIA. However, the scope will be reduced.

Category C - Projects are generally benign and typically do not require EA. However, all such progress should be screened to determine if specific environmental management plans (e.g., waste management plan) are required.

Based on the scope of the projects, the number of states involved in this project, stakeholders the project is categorised a World Bank category A and Category 1 for Nigerian EIA category.
The ESMF however recognised that majority of the sites and mitigation measures will have inputs that will fall under category B or C and Nigeria EIA category 2 and therefore a checklist has been prepared for the screening of the sub-projects. The report from the screening and scoping exercise will be reviewed and forwarded to the World Bank for concurrence.

6.1.4 Sub-Project-Level Environmental and Social Reviews

The application of ESMF to the NEWMAP sub-projects enables preparation of a standardized environmental and social assessment documents for appraisal and implementation.
Annex 003 presents an Environmental & Social Screening checklist coherent with the Nigerian EIA Laws and World Bank safeguard requirements. Projects triggering significant environmental / social impacts, i.e. projects with potential to trigger impacts on environmental sensitive areas, or large scale resettlement activities are not envisaged under NEWMAP.
However, in the event of such projects, being critical, the projects shall be included after undertaking the necessary environmental and social assessments, as mandated by the Environmental laws of Nigerian Governments (national and state) and conforming to the safeguard policies of the World Bank. The process for conformance to these procedures is defined in this framework. The criteria established as per the Checklist of items shall enable the identification of such projects.
In other words, while most sub-project activities are expected to have generic environmental and social issues that are manageable through standards and codes of practice, there will be Project activities that carry a higher risk of environmental and social disruptions and/or impacts. These subprojects should be the subject of environment and/or social reviews as the key management tool for identifying opportunities for lower impact project opportunities (through an alternative analysis exercise whenever possible) and/or for the identification of

necessary mitigation measures in accordance with the prevailing legal framework and the Bank's safeguard policies.
At the stage of detailed project preparation, any significant environmental and social issues that may arise would be addressed and mitigated through an ESMP. The environmental management measures through the ESMP should be included as part of the specifications and codified in the bidding documents to ensure implementation.
All ESIAs/ESMPs will be sent to the World Bank for review and clearance to ensure compliance with OP4.01 and any other relevant policies, procedures and guidelines.

6.2 Potential Impacts Identification of the Proposed Project

For the identification of potential impacts of sub-projects with significant environmental and social issues, the most useful tool for identifying, assessing, and managing the impacts of the NEWMAP will be facilitated through undertaking an Environmental and Social Impact Assessment (ESIA) with rigorous scientific analysis and stakeholder engagement.
The ESIA process will help identify the critical social and environmental issues associated with the NEWMAP, and ensure that positive impacts are optimized and negative impacts are minimized or mitigated. The ESIA process will improve the understanding of the project by the local communities and this will increase trust between the PMU (Project Management Unit) and the local community. For completeness of the ESMF, a consultant will conduct an Environmental and Social Assessment to reflect potential impacts of proposed sub-projects under the NEWMAP; however it is imperative that a concise ESIA is conducted for each major development sub-project; the PMU will need to procure ESIA/ESMP consultants to conduct these studies before sub-projects are awarded.

6.3 Type of Impacts and their Consideration as Perceived Under the NEWMAP

For the purpose of this work, identified impacts that are likely to be associated with the NEWMAP projects have been classified to occur in three (3) phases for the lifespan of the works.
The phases include:

- Preconstruction phase
- Construction phase
- Operational and Maintenance phase

6.4 Potential Positive and Adverse Impacts of the Project

While most NEWMAP project activities are expected to have generic environmental and social issues that are manageable through standards and codes of practice, there could be sub-project activities that carry a higher risk of environmental and social disruptions and/or impacts. These sub-projects should be the subject of environmental and/or social reviews as the key management tool for identifying opportunities for lowering negative impacts of the project (through an alternative analysis exercise whenever possible) and/or for the identification of necessary mitigation measures in accordance with the prevailing legal framework and the Bank's safeguard policies.
Some of the potential positive and negative impacts are discussed below

6.4.1 The Potential Positive Impacts

The project is envisaged to have a range of positive environmental and social impacts. Some of these are a function of the objectives of the project, while others are a function of the way in which the project is designed to meet its objectives.
Some of the benefits impacts associated with the project include:

- Provision of employment.

- Reduction in hunger through the harnessing of previously degraded land for agricultural purposes
- Improved agricultural productivity.
- Community development programs.
- Reintegration of community and diversification of sources of livelihood.
- Improved health statistics.
- Promotion of afforestation programs (with all its benefits)
- Minimization of flooding and control of coastal overflow.
- Provision of proper and well designed road drainage systems
- Rehabilitation of affected lands, vegetation and forests.
- Reduced fear perception of loss of property, inhabitation and ancestral origins of the communities.
- Increased financial and technical collaboration between projects affected states and the NEWMAP-PMU.
- Control and Reduction of water body sedimentation rates due to erosion.
- Reduction in siltation of rivers due to improved land vegetation covers and decreases in slope.
- Reduction in mortality/morbidity from landslides.
- Creation of engineered travel routes and access roads.
- Increase in the life span of roads.
- Increased opportunities for easy inter-state movement and business development.
- Initiation/ kick-off of rapid production systems and agricultural practices.
- Increase in social interactions
- Improved livelihood enhancing activities
- Creation of land mass for new development projects (farms, fruits farms,, healthcare facilities, etc)
- Improvement in the eco-balance.
- Improvement on aquatic environment and fishing practices.
- Increase in urbanization
- Reduced level of land disputes and ethnic violence
- Increase in business/commerce during and after the construction works.
- Job creation opportunities.

The NEWMAP project will create jobs and provide skills that would meaningfully engage the youths within and outside the project study areas. The project will be a real boost to the economy of the communities by creating direct and indirect employments create new sources of income and enhance old sources. Thus improvements through NEWMAP will allow economies of scale and specialization, widen opportunities, expand trade, integrate markets, strengthen effective competition, enhance social interaction, and eventually increase real income and welfare of the society. These effects will, in general, provide real benefits to most, if not all, socioeconomic groups, including the poor.

6.4.2 The Potential Adverse Impacts

Implementation of NEWMAP could exert some negative impacts on the social and physical environment within the communities, in which they are implemented.

The identified impacts will trigger the following World Bank OP/BP: ***OP/BP 4.01 (Environmental Assessment); OP/BP 4.04 (Natural Habitats); OP 4.09 (Pest Management); OP/BP 4.12 (Involuntary Resettlement); OP 4.36 (Forests), and OP/BP 7.50 (Projects on International Waterways).***

Issues on Involuntary Resettlement are captured in the Resettlement Policy Framework (RPF), which is a standalone report.

Table 6.0: Some identified impacts and the sources of occurrence

Project Phase	Potential Impact source	Potential Impact
Pre-construction phase	Land acquisition from members of the communities in before the construction phase.	• Negative perception and discontent expressions by members of the community. • Decrease in accruable income. • Hostile and unfriendly community attitudes. • Unresolved issues with lands acquisition extending into the construction phase.
	Excavation, grading, compaction, filling and other civil works.	• Excavation and compaction activities through construction works will alter the soil properties including loss of valuable top soils,
	Channelization of flood waters	• Presence of undercutting in roads. • Increase flooding in other areas, which can lead to destruction of lands, crops and properties.
	Increased sedimentation and runoff during the construction activities such as grading, dredging and filling of the roads etc.	• Impairment in the health of local residents of the community especially cases of respiratory infection and respiratory disease symptoms. • Incidence of occular disease symptoms. • Presence of suspended particulates exceeding acceptable limits. • Complaints from members of the community.
	Noise and Vibration from construction activities	• Eutrophication in water bodies. • Presence of sediments can build up in stream channels and thus lower the water flow capacity.

6.4.2.1 Protected Areas, Natural Habitats and Forests

Natural habitats are land and water areas whose ecological functions have not been essentially modified by human activities. Subprojects like constructions, excavations are likely to lead to significant conversion or degradation of natural habitats.

.6.4.2.2 Biological and Physico-chemical Impacts.

Impacts of this sort relate to effects on biological resources such as vegetation, wildlife, crops, and aquatic life. Impacts affecting soil and landforms, or vulnerability to soil erosion, floods and sedimentation, would be considered as physical impacts. Chemical impacts relate to sub-project activities that will cause a chemical change in air/water/soil quality. Smoke emitted from tractors or bulldozers, for example, may change the amount of sulphur dioxide (SO2) content of ambient air, while untreated effluent discharged directly into water bodies may change the chemical characteristics of the water bodies.

The biological component covers all elements, including different forms of plant life, their functions and interaction with other components of the ecosystem. Another component of a biological system is the animal life, which ranges from microscopic protozoans to large animals occupying different niches.

In the planning process of the NEWMAP, the consideration of under-listed four major points should be made to avoid or minimize the adverse impacts on biophysical components;

- All activities, which may affect the biophysical component of the sub-project area(s), should be carefully analysed and measures to mitigate adverse negative impacts should be implemented.
- Flora and economic plants should be protected and conserved.
- Keystone animals constitute important players in food chain, and may be endangered, rare, threatened, and endemic species, and form an important component of biodiversity. They should not be affected by the project activities. Measures to protect such animals and their habitat from any adverse impacts should be included in the development activity package, and
- Any activities, which affect bio/geo-chemical cycle within the ecosystem should be carefully analysed and efforts should be made to minimise the impacts through the implementation of appropriate measures.

6.4.2.3 Social Impact

A study of socio-economic impacts would examine the sub-project activities that will alter the existing social and economic conditions of the communities within or around the project states. Socio-economic impacts may prove either adverse or beneficial. For example, the construction of new road networks designed to enhance the movement of goods and services would be beneficial; while the project might also result in water logging that could produce a salinity problem with adverse consequences.

Social impacts can be subdivided into the following:

- **Demographic impacts** - such as displacement and relocation effects; and changes in population characteristics,
- **Socio-economic impacts** - including income and income multiplier effects, employment rates and patterns, effects on prices of local goods and services, and taxation effects,

- **Cultural impacts** - traditional patterns of life and work, family structures and leadership, religious and tribal factors, archaeological features, social networks and community cohesion,
- **Institutional impacts** - including demands on the government and social service, NGOs housing, schools, criminal justice, health, welfare and recreation, and
- **Gender impacts** - the implications of the sub-projects on the roles of women in society, income-generating opportunities, access to resources, employment opportunities and equity.

For the NEWMAP, analysis must include the following socio-cultural parameters:

- Quality of life,
- Social organisation and structures,
- Cultural life, including language, rituals and general lifestyle. A cultural life makes a social group immediately recognisable as being distinct from other groups, and
- Dispute-resolution institutions and processes; relationships between generations and value systems.

The first step in the analysis of social impacts would be the identification of social communities such as: ethnic/tribal group, occupational groups, socio-economic status, and age and gender groups.

The distribution of production systems is also another important aspect to be analysed. Identification and analysis has to be made on:

- the existing local institutions and their systems of operation i.e. bio-physical resource utilization
- conflict resolutions,
- authority and leadership structures,
- Their capability of handling the issues.

Information on vital issues such as resource availability and utilization, impact of inadequate compensation are extremely useful for formulating environmental mitigation strategy in the process of ESIAs to be conducted under the NEWMAP sub-projects. Wider social groups can be broadly categorised into three resource user groups namely:

1. **Category 1**: those who are resident from generation to generation;
2. **Category 2:** new settlers, who have comparatively less knowledge of the resource base of the area for the sub-projects and of sustainable resource-use practices, and usually devastate the area through excessive use of biophysical resources, and
3. **Category 3:** Non-resident people, who often visit the area for exploitation of biophysical resources and are potentially more dangerous than either of the above types,

For the NEWMAP, it is important to analyse all three types of resource users. Involving the people in all levels of project implementation should enhance the Knowledge, Attitude and Practices (KAP) of category (1). Categories (2) and (3) of resource users have to be linked with local authority, leadership or any other kinds of regulating agencies in order to protect the biophysical resources.

Particular attention must be paid to the consideration of tribal, low- caste, ethnic and minority groups in implementation of sub-projects; these groups in the society, become most vulnerable to resettlement/dislocation and changes in socioeconomic status. Otherwise, this might, in turn, create more environmental problems, as they will be forced to adopt inappropriate production systems.

However, in some of the project states, native inhabitants are provided resource-use or land use rights through constitutions, policies/regulation and cultural inheritance; but in many cases, such rights are nullified due to socio-economic and political situations. In some cases, one tribal group dominates and others are ignored. In such circumstances, the primary concern of the ESIA consultant or procured contractor is not to encroach upon the lands and other properties of these vulnerable groups of people.

From findings on the participatory public consultation with the communities during visits to priority sites per state; it is recommended that two important aspects be considered in the identification of social impacts in ESIA:

1. it is always advisable to avoid involuntary resettlement, mostly in cases where vulnerable groups of people are involved, and
2. In cases, where projects require land acquisition from marginalized territories, the people affected should be compensated adequately so that their standard of living is improved or, at the least, is at the similar level.

6.4.2.4 Cultural Impacts

For the NEWMAP, it is important that the ESIA consultant(s) considers sub-project impacts on cultural heritage. Areas of study should include historic sites, religious shrines or areas, or traditional practices that may be affected. Cultural resources refer to archaeological, historical, religious, cultural and aesthetic values. Cultural resources are part of the resource base, it is therefore important that the development options, under consideration are screened for potential impacts on cultural properties. Additionally, establishments such as museums, universities, departments of archaeology, and other relevant agencies should be consulted. Any sub-project that involves a large-scale modification or disturbance of land and is located in an area where there are cultural resources will require an intensive survey by qualified archaeologists. On the basis of findings of intensive survey the decision-makers have to decide, whether or not the sub-project should go ahead or whether to adopt project alternatives or devise mitigation measures to be adopted, along with institutional training and monitoring requirements, etc. In all these processes, involvement of local communities is necessary. If in the project site, there are some buried materials of archaeological/ historical value, discovered within three meters under the earth's surface, they are called "Archaeological Chance Finds", and the sub-project construction contractor should comply with the following rules and Federal or State archaeological laws:

- notify relevant departments of such findings,
- request a site inspection,
- completely halt work until inspection results are received, and
- decide whether or not to proceed with further work.

In the event of relocating sacred religious shrines from the sub-project area, the first step is to determine whether the shrines are of national or local significance. This has to be confirmed by consulting a national heritage register. If it is a national treasure, then the concerned MDAs, NGOs and local people should agree on whether relocation is possible. However, such an intervention should be scientifically sound, locally acceptable and nationally agreeable. If the shrine to be relocated is only of local significance, the local people, community leaders, NGOs and others should reach a consensus and the local people should be involved in the process of relocation. Alternatively, if there is a series of shrines of archaeological and historical value, likely to be affected by development activities, then a strategy for restoration, conservation and management should be developed and implemented.

6.4.2.5 Health Impact

When social impacts are being investigated, the effects of a development project on individual mental and physiological well being (health status and trends) are often omitted or treated in an unsatisfactory manner. The World Health Organization (WHO) defines health as a state of social and individual well being and not just the absence of disease. If this view is accepted, then the links between health and social impacts are apparent. Often, not always, health impacts depend on environmental impacts, such change in habitat causing increased in vector or the likelihood of contact between the vectors and humans. The direct relationship between biophysical change and incidence of disease may be one of the important reasons. However, there are disease pathways, which occur solely, within a social context. A common example is an increased incidence of sexually transmitted disease resulting from the influx of a large construction labour force.

The following are reasons why the consideration of Health Impact Assessment (HIA), should be integrated into the ESIA process.

- Prevention is better than cure, as with other forms of assessment,
- It is specified in many forms of impact assessment legislation,
- Environmental degradation is linked with health impacts,
- Environmental, social and health outcomes can be improved,
- Systematic consideration of health issues improves the legitimacy of the decisions made and the process through they are taken, and
- Human health issues often prompt a public response and their involvement.

However, from past experience, the following are some difficulties in undertaking Health Impact Assessment:

1 Baseline data - Lack of such data on human health in local communities,
1 Time scale -
2 Synergistic effects - The interaction of different chemicals, etc. can make it difficult to isolate the effects or effects responsible for ill health, variety of human responses to exposures,
3 Lack of knowledge on dose-response relationship, and
4 Issues of confidentiality.

Some groups of individuals may be more exposed to harmful pollutants and their health status will decline. Also, some groups may suffer a decline in their standards of living and become poor. Such a change in socio-economic status can be accompanied by increased morbidity and mortality due to poor nutrition, unsanitary living conditions and reduced physical and financial access to healthcare facilities. Health impacts also can occur directly from development, particularly from hazardous installations, when an accident occurs, such as the release of a certain amount of a toxic gas or an explosion. Similarly, relocation of individuals and groups to new area can cause disaster development or increase in death and illness rates amongst those being relocated. The old and the young have been the most vulnerable to illness and death.

6.4.2.6 Economic Impact

The focus in economic impact assessment is the estimation of the change in economic variable caused by:

- Sub-project construction and operation
- workforce requirement and the income earned by workers,
- materials and other inputs for the project, and
- Capital investment.

It is essential to estimate the size of labour force, skilled manpower requirement and the duration of their involvement. Requirement of manpower will vary at different stages of the

sub-project implementation; for example, the need for labour peaks at the midpoint of construction and then declines gradually. An estimation of capital expenditure on local materials, and services is also required for economic evaluation.

A thorough analysis of the labour force and the local economy requires information on:

- the categories of labour available,
- the categories of labour that are highly demanded and employed, not employed and partly employed,
- estimation of unemployed labour; proportion of female looking for employment, and
- The number and type of employment likely to be generated by the sub-project implementation.

These data can be manipulated for analysing and predicting economic impacts. The money that comes into the area in the form of wages is the Initial Income Injection (III) into the local economy. Some part of such money will be spent on buying goods and services, helping to improve the economy of those who sell goods and services.

Social effects are the outcomes of environmental and economic impacts. In the NEWMAP, with sub-project activities going on, a large number of people are attracted in search of employment. Such massive aggregation of people can place significant additional strains on the local infrastructure, environment and local government resources.

When economic impacts are being investigated, the focus is always on the effects of the nature and behaviour of the local economy. Commonly, the economic consequences for local and other governmental organizations are omitted. These consequences are termed fiscal impacts because they are concerned with changes in the costs and revenues of these organizations. It is envisaged that the NEWMAP will cause a large increases in local population and, as a result, cause stress on local services (such as health provision), infrastructure (such as roads and sewerage), and local resources. Key factors determining fiscal impacts include:

- size of investment and labour force requirements,
- capacity of existing service delivery and infrastructure systems,
- local/regional tax or other revenue-raising processes, and
- Likely demographic changes arising from project requirements.

6.4.2.7 Pest Management

The agricultural subprojects are expected to have only minor use for nationally approved pesticides and there may not be significant issues of pest management and pesticide use to be addressed in the subprojects.

The World Bank Pest Management Policy (OP 4.09) could be triggered in a variety of subprojects such as:

New land-use development or changed cultivation practices in an area;

Expansion of agricultural activities into new areas;

It should be emphasized that *pests* are defined in the broad sense. In addition to agricultural insect pests and plant diseases, pests also include weeds, birds, rodents, and human or livestock disease vectors. Similarly, the FAO defines *pesticides* as any substance or mixture of substances:

- Intended for preventing, destroying or controlling any pest, including a) vectors of human and animal disease, b) unwanted species of plants or animals causing harm during, or otherwise interfering with, production, processing, storage, transport or marketing of food, agricultural commodities, wood and wood products or animal feedstuffs;

- that may be administered to animals for the control of insects, arachnids or other pests in or on their body;
- intended for use as a plant-growth regulator, defoliant, desiccant, or agent for thinning fruit or preventing the premature fall of fruit; and
- substances applied to crops either before or after harvest to protect the commodity from deterioration during storage and transport.
- the commodity from deterioration during storage and transport.

The use of pesticide for Pest Management could result to negative effects of pesticide misuse, which can result in the destruction of crop pollinators leading to the detriment of the environment and/or people's health.

The negative effects of pesticide misuse, can result in the

- destruction of crop pollinators leading to poor crop yields;
- elimination of the natural enemies of crop pests and consequent loss of natural pest control that keeps the populations of crop pests very low;
- development of pest resistance to pesticides, encouraging further increases in the use of chemical pesticides;
- contamination of the soil and water bodies;
- pesticide poisoning of farmers and deleterious effects on human health;
- Unacceptable levels of pesticide residues in harvested produce and in the food chain; and loss of biodiversity in the environment.

CHAPTER SEVEN

ASSESSMENT OF ALTERNATIVES

7.0 Introduction

Analysis of Alternatives is the analytical comparison of multiple alternatives to be completed before committing resources to one project. The practice of comparing multiple alternative solutions has long been a part of engineering practice. There is, however, a natural human tendency to propose a single alternative for funding or development and justify this option rather than compare multiple options with the goal of choosing the best one.

The purpose of the evaluation process in the analysis of alternatives is to determine which alternative meets the threshold criteria of overall protection of human health and the environment and attainment of Applicable or Relevant and Appropriate Requirements (ARAR)

The following alternative actions were considered for the study areas -

No-Action alternative or Civil works.

7.1 No Action Alternative

The "No Action" alternative assumes that there will be no alteration to the existing areas. This would imply that the erosion areas would be left in their present states with a real potential for worsening. Specifically, if the erosion sites are left unimproved, more houses and farmlands will suffer from the recurrent erosion situation, which occurs quite frequently in the study areas. Accident rates may increase as unimproved erosion sites will serve as unsuspecting death traps, as vehicle operating cost and travel time will also be affected. Negative environmental effects of this option will include reduction of road space, vegetation, fauna and land resource due to erosion of the roads and probably pollution of water bodies along the sections.

A no-action alternative is certainly not recommended.

7.2 Use of Civil Works

The rehabilitation of the erosion and watershed areas is needed to correct the geometric defects on soil structure, so as to improve soil standard, improve urban infrastructure, roads and human safety in all the study areas.

Such soil structure stabilization procedures will require the intervention of physical (civil) techniques and as well biological (vegetative) techniques. It is envisaged that a combination of both civil engineering and bio-engineering techniques will be most suitable to meet the expected rehabilitation goals for erosion sites to be addressed By the NEWMAP. Socially there will be destruction of economic activities. These impacts will be minor and of short duration and are manageable.

It is also anticipated that road improvement will reduce the frequency of accidents which are a frequent occurrence at erosion sites within the project states. It will also reduce the travel as compared with alternative derived routes. However, the rate of accidents may increase as drivers tend to speed on good quality road leading. Nevertheless with improved safety measures such as better sight distance and road markings, potential accidents could be reduced. Furthermore with the implementation of the road rehabilitation projects in a bid to improve erosion sites, safety for passengers, pedestrians, vehicles and cyclist in the towns and villages along the road would be enhanced. There will be easy movement of agricultural produce and passengers at a reduced cost. There will also be negative environmental and social impacts from the alternative. These include air, water and noise pollution, and destruction of vegetation while socially there will be disruption of economic activities. These impacts will be minor and of short duration and are manageable.

From the above, the advantages of the Civil works Alternative makes it a better option than the "No-Action" option.

The two actions will be assessed using the following criteria indicated in Table 7.0 below.

Table 7.0: Evaluation of the 'No Action' Alternative and Use of Civil Works

Criteria	No Action	Civil Work
Overall Protection of Human Health and the Environment	The field visits revealed some problems members of the various communities have experienced due to the erosion issues. Houses and farmlands have been displaced, most indigenous house owners have relocated to other places, sources of livelihood have been lost, and transportation cost has increased tremendously. Taking a "no action" alternative will not benefit members of the study areas or their environment.	Intervention with a fine mix of civil works and bioremediation would lead to the stabilization of the gullies, reduction in eroded soil and associated mass movement, reduction in the turbidity and silting of nearby rivers and restoration of livelihood
Compliance with ARARs	Does not require ARARs	The PMU will ensure that standards and permit requirement are meet.
Long-term Effectiveness and Permanence	No action alternative does not meet the long-term effectiveness and permanence criteria	Civil works will provide long-term effectiveness for the roads and watershed
Short-term Effectiveness	No action alternative will not add any input under this criteria	The civil work will be completed in a long-term period. However the benefits when completed out ways a no action alternative
Cost	0	$8,030,000

From the table above, it can be establish that even though the civil work is more extensive, it is a better approach to use for the erosion and watershed management areas in the 7 study

areas. The no action alternative will further lead to problems in the states, which will affect the livelihood, health and environment of the people.

CHAPTER EIGHT

8.0 Environmental and Social Mitigation Principles

The objective of the ESMF is to provide a framework for preventing and mitigating the negative impacts associated with the NEWMAP. The sub-projects may have different levels of environmental and social impacts.

The mitigation principles are considered broadly as they capture all levels of impacts that each sub-project could present in the communities. **These mitigation principles will also be useful and fundamental in the preparation of mitigation strategies which will be developed and implemented in the ESMPs prepared for sub-projects requiring ESIA**.

The Environmental Management Framework institutionalizes the measures through assigning implementation responsibilities and formulation of contract clauses for incorporation into contract documents.

The potential impacts of the projects and their mitigation measures are indicated in the Table 8.0 below.

Table 8.0 Identified Impacts and Mitigation Measures

Project Phase	Potential Impact source	Mitigation Measures	Roles and Responsibilities
Pre-construction phase	Land acquisition from members of the communities prior to the construction phase.	• Contact local stakeholders in time to address and identify issues on land acquisition during this phase. • Ensure that adequate public notices are provided of planned activities. • Resettlement Action Plan (RAP) activities should be included. • Development of project level grievance mechanisms to alleviate responses from affected communities. • Community involvement will be included through persuasion and provision of guidance if need be.	• SNEWMAP-PMU, MDAs(State Ministries of Information, Ministries of Human Capital Development, Ministries of Land, CBOs • RPF Consultant, MDAs, CBOs, SNEWMAP-PMU and FNEWMAP • • • Social Officer of the FNEWMAP-PMU and SNEWMAP-PMU, MDAs (Ministries of Land, Ministries of Rural Development) • • • • • • •
	Community Perception Community involvement is useful at this stage. The members of the Community may have negative perception about the project if not properly managed.	• Adequate and timely information will be provided to affected owners. • Creating proper complaints procedure. • Providing for compensation on damage to property outside the actual project corridor. In	• Social Officers of the FNEWMAP-PMU and SNEWMAP-PMU. CBOs FNEWMAP-PMU, SNEWMAP-PMU, MDAs(Ministry of lands, Ministry of Finance, Ministry of Urban and Rural Development) RPF Consultant

CHAPTER NINE

PUBLIC CONSULTATION AND STAKEHOLDER INVOLVEMENTS

9.0 Public Consultation

Public consultation for the NEWMAP entails the process of informing the communities on the need to carry out the Erosion and Watershed management sub-projects in (a) their environment, (2) the scope and the (3) need for the community to own and safeguard the project as beneficiaries and stakeholders.

Public consultation is very important because it will give the communities and the potentially Project Affected Person(s) the opportunity to contribute input and feedback information, aimed at strengthening the development project and avoiding negative impacts or mitigating them where they cannot be avoided. It also reduces the possibilities of conflicts between and among the APs and PMU. The rural communities will mostly be the beneficiaries of this project. Therefore, effective and close consultation with them is a pre-requisite for the successful running and execution of the NEWMAP. In recognition of this, efforts will be made to carry out the public consultation with potentially affected individuals/households when resettlement and compensation concerns are involved.

Public consultation should take place at the inception of the planning stages when the potential Erosion and watershed sites are being investigated.

Public consultation would be an on-going activity taking place throughout the entire project process. Public participation and consultation would take place through meetings, radio programs, requests for written proposals/comments, filling in of questionnaires, explanations of project to the locals, making public documents available at the federal, state and local levels. At the local level, suitable locations will include the Village squares, churches halls, residences of traditional or recognized leaders. These measures would take into account the low literacy levels prevalent in these rural communities by allowing enough time for responses and feedback. Notwithstanding, the best guarantors for public interest are the chiefs and other religious leaders who are responsible members of their local communities and can inadvertently be part of the potentially displaced (economically or physically) individuals/households either in part or in whole.

The Resettlement Consultant, the Social Officer of the PMU and nominated leaders from the community, will facilitate the monitoring of the public consultant process.

See Chapter 10 for a detailed description on the Public Consultation for the ESIA Process.

9.1 Stakeholder Focused Group Discussion and Interpretation

This section describes the findings and information analysis obtained during stakeholder consultation within the seven (7) project states of the NEWMAP. Stakeholders present in all interactions comprised of Commissioners, Permanent Secretaries, NEWMAP State Coordinators (where present), Directors, HODs of host state ministries of environment, other line ministries (MDAs), Community Based Organizations (CBOs), Non-Governmental Organizations (NGOs), Representatives/Leadership of at risk communities, and Heads of community households.

Consultations were implemented using the methodology described in Chapter 1 for Focus Group Discussions by the utilization of semi-structured questionnaires and field visitation to priority sites and at risk communities.

Information in this section is completely based on responses from (i) stakeholders, (ii) documented reports in state holdings and (iii) by physical site observations.

9.2 Consultations In The Study Areas

The stakeholder consultations process for the states visited can be found in Annex 008.

9.2.1 Situation Report- Enugu State

State NEWMAP-PMU Status-The ESMF and RPF consultants visited the state on the 25th of July, 2011. Informal interactive sessions with the State Commissioner of Environment and Solid Minerals and State Permanent Secretary for Environment and Solid Minerals revealed that actions are in progress towards instituting a competent state NEWMAP-PMU. The consultant team was briefed on the issue that the State Ministry of Environment (SME) had conducted interviews for a Coordinator of the State NEWMAP-PMU and is awaiting the outcome. On the 26th of July, 10.00am prompt, a formal interactive session was held in the office of the Commissioner. Focus Group Discussions (FGDs) were held at the State, MDA, CBO, NGO and Community Leadership levels. This session provided insight to the state legislations and laws on 'Land Use', indigenous or traditional methods of erosion and watershed management, state government methods for engaging local communities and achieving participation in implementation projects.

Other needs of importance for information gathering included;

a. Process for land acquisition within the state
b. List of priority erosion sites
c. List of major watershed/ water catchment areas in the states
d. Indigenous communities in proximity to erosion sites
e. Major language groups
f. Estimated at risk populations size
g. Major kinds of business in at risk communities
h. Peripheral vegetation description
i. Traditional and Political structure within at risk communities

Present at the interactive stakeholder consultation sessions were:

Host Ministry (Ministry of Environment and Solid Minerals)

1. Honourable Commissioner
2. Honourable Permanent Secretary
3. Director, Planning
4. Director, Pollution Control
5. Director, Finance and Administration
6. Director of Forestry
7. HOD, Environmental Conservation
8. HOD, Ecology and Mineral Resources
9. HOD, Environmental Health
10. PRO

Other Line Ministries

1. Ministry of Agriculture
2. Ministry of Works
3. Ministry of Information
4. Ministry of Lands
5. Ministry of Water Resources
6. Ministry of Human Capital Development (Honourable Commissioner Ministry of Human Capital Development

CBOs and NGOs

1. CIDJAC
2. Voice of Children
3. ASERNGO (Association of Enugu State Resident NGOs

Duties and functions of the Ministry of Environment and Solid Minerals Enugu State are enumerated in the ministry's regulations under section 5 sub-sections 2 of law No. 8, 2004.

9.2.2 Situation Report- Imo State

State NEWMAP-PMU Status-The ESMF and RPF consultants visited the state on the 27th of July 2011. A formal interactive session was held with the State Commissioner for Petroleum and Environment, and the State Permanent Secretary of the Ministry of Petroleum and Environment prior the consultation forum with expected stakeholders. A formal stakeholder consultation and interactive session was held in the conference room of the Ministry of Petroleum and Environment at 2.00pm prompt on the 27th of July 2011 and 10.00am prompt on the 28th of July 2011 during which Focus Group Discussions (FGDs) were held at the State, MDA, CBO, NGO and Community Leadership levels. This session laid the foundation for introductory information on the NEWMAP and further insight to the state issues and processes on 'Land Use', the current erosion and watershed management status in the state and state government methods for engaging local communities and achieving participation in implementation projects.

Other needs of importance for information gathering included;

a. Process for land acquisition within the state
b. List of priority erosion sites
c. List of major watershed/ water catchment areas in the states
d. Indigenous communities in proximity to erosion sites
e. Major language groups
f. Estimated at risk populations size
g. Major kinds of business in at risk communities
h. Peripheral vegetation description
i. Traditional and Political structure within at risk communities

Present at the interactive stakeholder consultation sessions were:

Host Ministry (Ministry of Petroleum and Environment)

1. Honourable Commissioner
2. Honourable Permanent Secretary
3. Director, Administration
4. Director, Finance
5. Ag Director, Petroleum
6. Ag Director of Forestry
7. Ag Director Environment and Ecology
8. Scientific Officer II

Other Line Ministries

1. Ministry of Agriculture
2. Ministry of Information
3. Ministry of Works
4. Ministry of Lands, Survey and Urban Planning
5. Ministry of Public Utilities and Rural Development
6. Ministry of Women Affairs
7. Ministry of Works, Housing and Transport
8. Ministry of Human Development
9. Local Government Service Commission

CBOs and NGOs

1. Ihioma Network
2. OBS
3. DDI (Diversity Disaster Initiative)

Private Sector

1. Oil Resources and Allied Investors Limited

9.2.3 Situation Report- Abia State

State NEWMAP-PMU Status-The state was visited on the 28th of July, 2011. A formal interactive session was held with the Permanent Secretary of the Ministry of Environment/Nature Resource, Abia State. A formal stakeholder consultation and interactive session was held in the office of the Permanent Secretary at 2.00pm prompt. Focus Group Discussions (FGDs) were held at the State, MDA, CBO, NGO and Community Leadership levels.

Other needs of importance for information gathering included;

a. Process for land acquisition within the state
b. List of priority erosion sites
c. List of major watershed/ water catchment areas in the states
d. Indigenous communities in proximity to erosion sites
e. Major language groups
f. Estimated at risk populations size
g. Major kinds of business in at risk communities
h. Peripheral vegetation description
i. Traditional and Political structure within at risk communities

Present at the interactive stakeholder consultation sessions were:

Host Ministry (Ministry of Environment/Nature Resource)

1. Honourable Permanent Secretary
2. Director, Environment
3. Director, Flood/Erosion Control
4. Director, Administration
5. Director, Finance
6. Health Director
7. Director, Forestry
8. Director, Solid Minerals
9. Ag Director, Conservations
10. Ag Director, Research and Planning

Other Line Ministries

1. Ministry of Agriculture
2. Ministry of Information
3. Ministry of Works
4. Ministry of Lands
5. Ministry of Public Utilities

Information in the table is based on frequency of responses by respondents to the parameters listed above. 3 parameters *where indicated under each column (high priority, moderate priority and low priority) to display cumulative concerns as perceived by respondents.*

CBOs and NGOs

1. SEMA (Safe Environment Movement for Abia)

Private Sector

1. Petroleum Services Limited

9.2.4 Situation Report- Cross River State

State NEWMAP-PMU Status-The state was visited on the 29th and 30th of July, 2011. A formal interactive session was held with the Commissioner for and Permanent Secretary of the Ministry of Environment, Cross River State. A formal stakeholder consultation and interactive session was held in the office of the Permanent Secretary at 12.00pm prompt. Focus Group Discussions (FGDs) were held at the State, MDA, CBO, NGO and Community Leadership levels.

Other needs of importance for information gathering included;

a. Process for land acquisition within the state
b. List of priority erosion sites
c. List of major watershed/ water catchment areas in the states
d. Indigenous communities in proximity to erosion sites
e. Major language groups
f. Estimated at risk populations size
g. Major kinds of business in at risk communities
h. Peripheral vegetation description
i. Traditional and Political structure within at risk communities

Present at the interactive stakeholder consultation sessions were:

Host Ministry (Ministry of Environment/Nature Resource)

1. Honourable Commissioner, Environment
2. State Co-ordinator NEWMAP
3. Director, Environment
4. Director, Flood/Erosion Control
5. Director, Environmental Health and Pollution Control
6. Director, Finance
7. Ag Director Coastal Zone Management
8. Ag Director, Urban Centre Development
9. Research and Planning Officers

Other Line Ministries

1. Ministry of Social Welfare and Community Development
2. Ministry of Agriculture
3. Ministry of Lands and Housing
4. Ministry of Works
5. Ministry of Local Government Affairs
6. Forestry Commission
7. Calabar Urban Development Authority (CUDA)

CBOs and NGOs

1. Achu Foundation
2. Concern Universal
3. Department of International Donor Support
4. Green Concern for Development (GREENCODE)
5. Rural Women and Youth Development Initiative (RWAYDI)

9.2.5 Situation Report- Anambra State

State NEWMAP-PMU Status-The state was visited on the 1st of August 2011. A formal interactive session was held with the Commissioner for Environment, Permanent Secretary of the Ministry of Environment, Anambra State. A formal stakeholder consultation and interactive session was held in the office of the Permanent Secretary at 10.00am prompt. Focus Group Discussions (FGDs) were held at the State, MDA, CBO, NGO and Community Leadership levels.

Other needs of importance for information gathering included;

j. Process for land acquisition within the state
k. List of priority erosion sites
l. List of major watershed/ water catchment areas in the states
m. Indigenous communities in proximity to erosion sites
n. Major language groups
o. Estimated at risk populations size
p. Major kinds of business in at risk communities
q. Peripheral vegetation description
r. Traditional and Political structure within at risk communities

Present at the interactive stakeholder consultation sessions were:

Host Ministry (Ministry of Environment)

1. Honourable Permanent Secretary
2. Rep. Honourable Permanent Secretary Youth and Sports
3. Director, Environment and Ecology
4. Director, Flood/Erosion Control
5. Director, Administration
6. Director, Finance
7. Director PRS
8. Director, Forestry
9. Director, Solid Minerals

Other Line Ministries

1. Ministry of Agriculture
2. Ministry of Information
3. Ministry of Works
4. Ministry of Lands
5. Ministry of Public Utilities
6. Ministry of Health

CBOs and NGOs

6. Thomas Aquinas Church
7. Anambra State Urban Development Board (ASUDEB)

Private Sector

1. Environmental and Human Resources Ltd
2. N.S.C Bullock

9.2.6 Situation Report- Edo State

State NEWMAP-PMU Status-The ESMF and RPF consultants visited the state on the 4th of August, 2011. Informal interactive sessions with the State Permanent Secretary for

Environment and Public Utilities further consultations were held at the State, MDA, CBO, NGO and Community Leadership levels.

Other needs of importance for information gathering included;

s. Process for land acquisition within the state
t. List of priority erosion sites
u. List of major watershed/ water catchment areas in the states
v. Indigenous communities in proximity to erosion sites
w. Major language groups
x. Estimated at risk populations size
y. Major kinds of business in at risk communities
z. Peripheral vegetation description
aa. Traditional and Political structure within at risk communities

Present at the interactive stakeholder consultation sessions were:

Host Ministry (Ministry of Environment and Public Utilities)

1. Permanent Secretary
2. Director, Environment
3. Director, Flood/Erosion Control
4. Director, Public Utilities
5. Director, Finance
6. Health Director
7. Director, Forestry
8. Director, Solid Minerals
9. Ag Director, Conservations
10. Ag Director, Research and Planning

Other Line Ministries

1. Ministry of Agriculture
2. Ministry of Information
3. Ministry of Works
4. Ministry of Lands
5. Ministry of Health

CBOs and NGOs

1. CPED (Centre for Population and Environment Development)
2. Land-lord Association (Benin City)

9.3 Responses to Concerns Raised

The general responses made by all stakeholders consulted were not directed towards negative perceptions but rather positive perception on the NEWMAP capacity to solve erosion in the project affected states. From the tables above, respondents provided information on their current knowledge of the erosion problems within their localities and showed good expectations that NEWMAP sub-projects will rather raise more positive impacts than negative impacts. A summary of major concerns raised is listed below.

- Land use management and land use – High priority concern
- Road drainage pattern – High priority concern
- Flood damages to homes, businesses and schools- High priority concern
- Effect on production systems- Moderate priority concern
- Involuntary resettlement – Moderate-low priority concern
- Project effect on cultural heritage and others – Low priority concern

Note: Priority sites were selected using the screening format in annex of this document. General benchmarks used included:

- Site proximity to affected communities
- Degree of erosion at sites
- Level of complaints raised by communities
- Geomorphology of the surveyed sites
- Degree of risks
- If sites were located on major access routes

CHAPTER TEN

PREPARATION OF SITE SPECIFIC ESIA and ESMP

10.1 Introduction

This chapter provides a brief on the ESIA process required before the implementation of sub-projects for which the screening process has determined that an ESIA is necessary. The ESIA will identify and evaluate potential environmental and social impacts that NEWMAP sub-projects activities may pose. The preparation of the ESIA will be done in consultation with stakeholders, including PAPs. Public consultations are critical in preparing proposals for sub-project activities likely to have impacts on the environment and populations within project states. The public consultations should identify key issues and determine how concerns of all stakeholders will be addressed in ESIA. Major processes under the ESIA process are provided below.

10.2 Scoping

Scoping is the process of determining the most critical issues to study and will involve community participation to some degree. It is at this early stage that ESIA can most strongly influence the outline proposal.

For successful implementation of sub-project activities requiring ESIA under the NEWMAP, scoping will occur early in the project cycle, as is consistent with international best practices including World Bank OP/BP 4.01 and the Nigerian EIA Law. It will begin at the same time as outline planning and pre-feasibility studies. The scoping process will aid in the identification of the key environmental and social issues and is perhaps the most important step in an ESIA. The scoping process under the NEWMAP will involve participation from several stakeholder groups, particularly decision makers (Federal and State governments), MDAs, CBOs, NGOs, the project affected communities and the scientific community. All these groups will have an interest in helping to deliberate the issues, which should be considered (scoping is designed to canvass their views).

Scoping is important for two reasons. Firstly, so that problems can be pinpointed early allowing mitigating design changes to be made before expensive detailed work is carried out. Secondly, scoping is done to ensure that detailed prediction work is only carried out for important issues. It is not the purpose of an ESIA to carry out exhaustive studies on all environmental impacts for all projects. If key issues are identified and a full scale ESIA considered necessary then the scoping should include terms of reference for these further studies. At this stage the option exists for cancelling or drastically revising the project should major environmental problems be identified. Equally the need for the ESIA process may be terminated should the impacts be found to be insignificant. Once this stage has passed, the opportunity for major changes to the project is restricted.

10.3 Baseline Data Information

Baseline data information is an important reference point for conducting ESIA. The term "baseline" refers to the collection of background information on the biophysical, social and economic settings of the proposed project area. Normally, information is obtained from secondary sources when there exists facility of database, or the acquisition of new information through field samplings. The task of collecting baseline data starts right from the

period of project inception however; a majority of this task may be undertaken during scoping.

Objectives of Baseline Data Collection

- To provide a description of the status and trends of environmental factors or variables (e.g., gully size, soil, vegetative cover, topography, geomorphology, drainage system¸ water quality, suspended particulate, sediment transport and waste management etc) against which predicted changes can be compared and evaluated in terms of importance, and
- To provide a means of detecting actual change by monitoring once a project has been initiated.

The ESMF requirements for ESIAs maintain that for each site-specific ESIA, baseline data on the original environmental, socio-economic (demographic structure, settlement pattern, occupation, social networks) and health conditions around the NEWMAP prioritized erosion and watershed sites within the project states be described and reported in project ESIA documents. This process will help establishments responsible for ESMF implementation (FNEWMAP-PMU, SNEMAP-PMU etc.) understand the baseline conditions of project areas before civil work activities begin, and as well provide a platform to monitor changes that may occur in the physical, biological and social environments due to developmental works. In particular, results of the documentation and analysis of the baseline conditions will inform the engineering designs and point to potential livelihood options subsequently.

The NEWMAP as a whole is geared towards maximization of positive impacts. The gathering of baseline data information will aid in the development of indicators to demonstrate the effect of civil work activities on all baseline conditions. Information on general baseline conditions of the States benefiting from the NEWMAP is found in this ESMF document (Chapter 4), however precise baseline information on gully sizes especially for prioritized sites will be provided during and after the conduct of site-specific ESIAs.

10.4 Public Consultation

Public consultation is very important because it will give the communities and the potentially Project Affected Person(s) the opportunity to contribute input and feedback information, aimed at strengthening the development project and avoiding negative impacts or mitigating them where they cannot be avoided. The following below are very important for consultation under ESIA.

10.4.1 Venue

A suitable venue must be selected for in-depth public consultation, especially at the community level. Venues can range from town halls to open fields used by the communities for meetings.

10.4.2 People Required For Public Consultation

Public consultation is a very delicate process and most comprise individuals other than the party who is organizing the consultation. At the level of the NEWMAP, public consultation will involve the following groups of people:

- Independent Consultants
- Federal and State NEWMAP-PMU
- MDAs, CBOs, NGOs and Civil Societies

- Member of project affected communities.

10.4.3 Public Consultation Gender Selection Strategy

Consultation should be based on gender separation. This is viewed to be very important as both genders (male and female) may have different views on the impacts of the project. In some communities, female opinions may be viewed to be insignificant and of no importance. For good and proper consultation, views/comments from all genders is very important especially to inform the project implementation bodies on the gender-specific perceptions of inhabitants within project affected states.

10.4.4 What should be recorded?

All comments made by Project Affected Persons must be recorded. This is important in order to understand or know the perceptions of the communities and further proffer appropriate sustainable solutions. It is expected that the following be recorded:

- What are the concerns of the communities; what do they like and/or don't like about the project?
- What are their suggestions for project success
- How did team respond to these comments, and how will the ESIA and NEWMAP as a whole address these issues.

10.5 ESIA Preparation and Evaluation

Here, the steps that will be taken in preparing site-specific ESIA in accordance with World Bank Safeguards Policy OP/BP 4.01 and the EIA Act of Nigeria are provided. The ESIA process will start with:

1. Preparation of the TOR in consultation with the EIA department of the FME, and key stakeholders within a given watershed.
2. The draft TOR will be sent to the World Bank for review.
3. Screening and Scoping.
4. The report of the screening and scoping exercise will be sent to the FME and World Bank for evaluation and concurrence.
5. Depending on the outcome of the screening and scoping exercise, the TOR may be adjusted accordingly.
6. Execution of the ESIA study including collection of baseline data and elaborate consultation with key stakeholders especially potential PAPs within a given watershed where the intervention is taking place.
7. The draft report will be shared with the communities in a format of town hall meeting or stakeholder workshop.
8. The draft report would be sent to the World Bank and the FME for review. Depending on the feedback from the workshop, the draft ESIA report will be reviewed and forwarded to the World Bank and the FME for evaluation.
9. Upon being cleared, the ESIA will be disclosed publicly and at the World Bank INFOSHOP.

10. The ESIA will contain a dedicated section on Environment and Social Management Plan (ESMP). The ESMP will be implemented by the client under the supervision of the Environment and Social Safeguards Officer(s) or official of NEWMAPM –PMU specifically; contractors would be required to adopt the ESMP as site-specific contractors ESMP with a dedicated officer usually the site environmental engineer responsible and accountable for its faithful implementation. The World Bank and the Federal and State EIA department will carry out supervision missions to ensure compliance.

10.6 Waste Management and the NEWMAP

During the field visits, the contribution of poorly managed or complete absence of waste management system in initiating and worsening erosion problem was evident. This is especially prominent in urban and peri-urban areas where the existing drains are clogged. The ESIA will provide detailed information on waste management including the amount and type of wastes generated, the sources, the existing waste management practices in the concerned watershed and proffer mitigation measures which will involve: (a) community sensitization and mobilization on the adverse consequences of poor waste management. In addition, the ESIA will detail how wastes that will be generated at construction sites would be managed in an environmentally sustainable and socially acceptable manner. To be practical and effective in handling of wastes, (Solid, liquid and hazardous) the ESIA would follow the fundamental principles of was**te** management:

- Minimize the production of waste that must be treated or eliminated.
- Identify and classify the type of waste generated. If hazardous wastes are generated, proper procedures must be taken regarding their storage, collection, transportation and disposal.
- Identify and demarcate disposal areas clearly indicating the specific materials that can be deposited in each.
- Control placement of all construction waste to approved disposal sites (>300 m from rivers, streams, lakes, or wetlands). Dispose in authorized areas all of waste, metals, used oils, and excess material generated during construction, incorporating recycling systems and the separation of materials.
- Identify and demarcate equipment maintenance areas (>15m from rivers, streams, lakes or wetlands).
- Ensure that all equipment maintenance activities, including oil changes, are conducted within demarcated maintenance areas; never dispose spent oils on the ground, in water courses, drainage channels.
- Identify, demarcate and enforce the use of within-site access routes to limit impact to site vegetation.
- Install and maintain an adequate drainage system to prevent erosion on the site during and after construction.
- Erect erosion control barriers around perimeter of cuts, disposal pits, and roadways.
- Spray water on dirt roads and stockpiled soil to reduce wind-induced erosion, as needed.
- Maintain vehicle speeds at or below 10kph within work area at all times.
- Identify and demarcate locations for stockpiles and borrow pits, ensuring that they are 15 meters away from critical areas such as steep slopes, erosion-prone soils, and areas that drain directly into sensitive water bodies.
- Limit extraction of material to approved and demarcated borrows pits.

- Establish and enforce daily site clean-up procedures, including maintenance of adequate disposal facilities for construction debris.

CHAPTER ELEVEN

ESMF IMPLEMENTATION AND MANAGEMENT

11.0 Introduction

The successful implementation of the ESMF depends on the commitment of the sector and related institutions, and the capacity within the institutions to apply or use the framework effectively, and the appropriate and functional institutional arrangements, among others. This section addresses the key ESMF areas relevant to its successful implementation:

- Implementing the ESMF;
- Institutional arrangements;
- Capacity building;
- Grievance Redress Mechanism;
- Monitoring and Evaluation
- Environment and Social Audit;
- Health Impact Assessment
- Disclosure of the Safeguard Policies

11.1 Implementing the ESMF

For effective implementation of the ESMF, environmental and social planning is relevant. The environmental and social planning covers the environmental and social impact assessment (ESIA) and the pre-project/project planning process. It is a process that identifies and assesses the potential concerns and implications that may arise with the implementation of a project, in order to influence the design and other engineering feasibility options and decisions, for informed and sustainable project development.

Key stages of the EISA include proposal screening, Scoping, EIA and mitigation measures, while the pre-project/planning process involves project concept, identification, design and appraisal (See Annex 006).

11.2 Institutional Arrangements

The NEWMAP will be implemented and monitored by the Technical Steering Committee (Board) made up of relevant stakeholders from relevant institutions with the PMUs managing every day affairs of the entire project in each State. The individual implementing agencies will constitute their Project Implementing Units (PIUs). The PMU has the responsibilities to :

- Co-ordinate the NEWMAP programmes and actions in the various States
- Plan, coordinate, manage and develop the various sub-project activities
- Prepare plans for NEWMAP management and development.

The PMU shall liaise with the various levels of government and other identified stakeholders, namely relevant Federal MDAs, State MDAS, Federal Local Government Council Offices, the communities, NGOs/CSOs, Traditional Rulers; Trade Unions/Local social and professional groups e.g., farmers, fisher folk, market women, road transport workers, and the General Public

The roles and responsibilities of these levels of institutions have already been defined in chapter 5 of this ESMF.

11.3 Capacity Building

For effective implementation of the ESMF, there will be need for technical capacity in the human resource base of implementing institutions as well as logistical facilitation. Implementers need to identify and understand the social and environmental issues

Appropriate understanding of the mechanisms for implementing the ESMF will need to be provided to the various stakeholders implementing NEWMAP. This will be important in other to support the NEWMAP-PMU and SNEWMAP.
To enhance the respective roles and collaboration of the relevant stakeholders, the following broad areas (not limited to) for capacity building have been identified as deserving of attention for effective implementation of the ESMF:

1. Project Management
2. Watershed management
3. Erosion Control
4. Urban drainage management
5. Environmental Impact Assessment (EIA);
6. Occupational Health and Safety
7. Environmental Management Planning;
8. Monitoring and Environmental Audit;
9. Annual Environmental Report preparation and other reporting requirements;
10. Public participation techniques Public Hearing Procedure;
11. Public awareness creation / educational techniques (on environmental, social and health issues).

Capacity building efforts are needed at three different levels to enable taking specific responsibilities in the promotion of erosion control and watershed management programs at Federal, state and local levels. It has to be ensured that all authorities, institutions and organizations involved integrate their activities within appropriate co- coordinating mechanisms in order to give consistent signals for the management of erosion and watershed.

Capacity Building at Federal Level

At the federal level, capacity building needs to build upon the already existing ministerial institutions. They are primarily concerned with development and promotion of institutions and organizations that deal with policymaking and legislation. Already there is an existing unit in the Federal Ministry of Environment responsible for Erosion and Flood control managements; Department of Erosion and Flood Control.
The NEWMAP PMU, which has already been established, consists of a multidisciplinary interdepartmental (inter-ministerial) committee for erosion control and watershed management and exchange of related expertise. The committee should consist of the major ministries concerned, such as Ministries of Agriculture, Environment, Forestry, Water Resources, and others, as appropriate.

Capacity Building at State Level

Capacity building at the state level provides the link for the two- way feedback process between federal and local level activities. The state level will require more detailed integrated planning and management capacity building.
Capacity building is a continuous process and for proper implementation at the state level the following stages may be considered:

Motivation stage: Using mass education techniques to create awareness of the NEWMAP to the people in their various communities and to promote participation in

the program.

Technical assistance stage: Training on actual planning, design, layout and physical or biological engineering interventions.

Follow-up stage: assistance to selected target groups by the extension agency in obtaining loans for farming inputs and in marketing their produce; and by the responsible government institutions in the maintenance of conservation structures and practices.

Capacity Building at Local Level

Detailed planning, development and implementation take place at the local level. A necessary precondition for sustainable adoption of solutions is that the changes must be profitable and provide tangible benefits to the land users. Mechanisms need to be developed to influence the behaviour of land users in such a way as to motivate them to adopt the desired measures. Capacity building efforts for erosion control and watershed management will mainly involve generation of scientific, technological and administrative knowledge, policy integration, creating of public awareness and making available material and human resources, as well as promoting strong responsible organizations and institutions based upon the existing institutional set-up.

Capacity development for community facilitators, GRC and field-level staff will be implemented because they are the organs that will reach out to the communities, and it becomes necessary for these staff and representatives to be well grounded with adequate information on the project. They will be able to communicate effectively in the local languages, understanding community dynamics and processes, negotiation and conflict resolution, and empathizing with communities and their needs. Building trust and maintaining good rapport with the people in the Project areas by providing relevant information on the project and responding effectively to their needs and concerns will help solve issues before they even become grievances. It is also important that the community facilitators, GRC and field-level staff provide feedback to the PMU.

The Tables below (11.0,11.1,11.2) highlights specific areas for effective institutional capacity needs. Training programs are scheduled for Environmental and social accountability, Health Impact Assessment (HIA), table and Occupational health and safety management plan (OHSMP)

Table 11.0: Training Programs (Environmental and Social Accountability)

Training Required	Who to train	When	Training to be conducted by who	Institutional Responsibility to organize training	Training type	Training Costs USD ($)
WB Safeguards Awareness	NEWMAP-PMU (Federal), NEWMAP-PMU (Federal), FME, project affiliated MDAs	During project preparatory stage	World Bank	World Bank	All relevant cadre	Not inclusive in costs
WB Social accountability system	NEWMAP-PMU (Federal), NEWMAP-PMU (Federal), FME, project affiliated MDAs	During project preparatory stage	World Bank	World Bank	All relevant cadre	
Nigerian Environmental Guidelines	NEWMAP-PMU (Federal), NEWMAP-PMU (Federal), FME, project affiliated MDAs	During project preparatory stage	ESIA Consultant	FME/NEWMAP-PMU (Federal),	All relevant cadre	400,000

Training Required	Who to train	When	Training to be conducted by who	Institutional Responsibility to organize training	Training type	Training Costs USD ($)
Project Screening and Scoping	NEWMAP-PMU (Federal), NEWMAP-PMU (Federal), FME, project affiliated MDAs	During project preparatory stage	ESIA Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	
Preparation of ESIA, EA and EMP Term of Reference/Implementation	NEWMAP-PMU (Federal), NEWMAP-PMU (Federal), FME, project affiliated MDAs	During project preparatory stage	ESIA Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	
Preparation and administration of questionnaires and stakeholders consultation/FDG	NEWMAP-PMU (Federal), NEWMAP-PMU (Federal), FME, project affiliated MDAs	During project preparatory stage	ESIA Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	

Training Required	Who to train	When	Training to be conducted by who	Institutional Responsibility to organize training	Training type	Training Costs USD ($)
Project Management (scope, implementation, time, budget, costs, resource, quality, procurement, monitoring and evaluation)	NEWMAP-PMU (Federal), NEWMAP-PMU (Federal), FME, project affiliated MDAs	During project preparatory stage	Project Management Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	
Environmental and Watershed management systems						
Environmental and Social Audits	NEWMAP-PMU (Federal), NEWMAP-PMU (Federal), FME, project affiliated MDAs	During project preparatory stage	ESIA Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	

Training Required	Who to train	When	Training to be conducted by who	Institutional Responsibility to organize training	Training type	Training Costs USD ($)
GPS/GIS Interpretation	NEWMAP-PMU (Federal), NEWMAP-PMU (Federal), FME, project affilia ted MDAs	During project preparatory stage	ESIA Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	
Geo-morphology and climate change	NEWMAP-PMU (Federal), NEWMAP-PMU (Federal), FME, project affiliated MDAs	During project preparatory stage	ESIA Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	
Grievance redress	NEWMAP-PMU (Federal), NEWMAP-PMU (Federal), FME, project affiliated MDAs	During project preparatory stage	ESIA Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	

Training Required	Who to train	When	Training to be conducted by who	Institutional Responsibility to organize training	Training type	Training Costs USD ($)
Logistic and planning	NEWMAP-PMU (Federal), NEWMAP-PMU (Federal), FME, project affiliated MDAs	During project preparatory stage	Project Management Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	

Table 11.1: Training Programs (Health Impact Assessment) HIA

Training Required	Who to train	When	Training to be conducted by who	Institutional Responsibility to organize training	Training type	Training Costs USD
Overview of HIA	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs	During project preparatory stage	HIA Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	100,000
Screening—How to Decide Whether to Conduct an HIA	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs	During project preparatory stage	HIA Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	

Training Required	Who to train	When	Training to be conducted by who	Institutional Responsibility to organize training	Training type	Training Costs USD
Environmental Health Areas	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs	During project preparatory stage	HIA Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	
Scoping—How Comprehensive Should the HIA Be	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs	During project preparatory stage	HIA Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	
Baseline Data—What, When, and How Much?	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs	During project preparatory stage	HIA Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	
Risk Assessment—Assessing and Ranking Impacts	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs	During project preparatory stage	HIA Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	

Training Required	Who to train	When	Training to be conducted by who	Institutional Responsibility to organize training	Training type	Training Costs USD
Health Action Plan	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs	During project preparatory stage	HIA Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	
Monitoring and Verification	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs	During project preparatory stage	HIA Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	
Resourcing	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs	During project preparatory stage	HIA Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	

Table 11.2 Training Programs [Occupational Health and Safety Management Plan (OHSMP)

Training Required	Who to train	When	Training to be conducted by who	Institutional Responsibility to organize training	Training type	Training Costs USD

Training Required	Who to train	When	Training to be conducted by who	Institutional Responsibility to organize training	Training type	Training Costs USD
Occupational Health and Safety Leadership Management	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs, Contractors, Project affected Community representatives	During project initiation stage (Before commencement of civil works)	OHS Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	150,000
Safety performance assessment	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs, Contractors	During project initiation stage (Before commencement of civil works)	OHS Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	
Hazard Analysis and Control	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs, Contractors	During project initiation stage (Before commencement of civil works)	OHS Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	
Hazard Communication Program	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs, Contractors	During project initiation stage (Before commencement of civil works)	OHS Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	

Training Required	Who to train	When	Training to be conducted by who	Institutional Responsibility to organize training	Training type	Training Costs USD
Effective Accident Investigation	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs, Contractors	During project initiation stage (Before commencement of civil works)	OHS Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	
Conducting Health and Safety Audits	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs, Contractors	During project initiation stage (Before commencement of civil works)	OHS Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	
Job Hazard Analysis	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs, Contractors	During project initiation stage (Before commencement of civil works)	OHS Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	
Occupational Health Risk Assessment	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs, Contractors	During project initiation stage (Before commencement of civil works)	OHS Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	

Training Required	Who to train	When	Training to be conducted by who	Institutional Responsibility to organize training	Training type	Training Costs USD
Work Stress Risk Assessment	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs, Contractors	During project initiation stage (Before commencement of civil works)	OHS Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	
Electrical safety	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs, Contractors	During project initiation stage (Before commencement of civil works)	OHS Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	
Fire Safety	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs, Contractors	During project initiation stage (Before commencement of civil works)	OHS Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	
Fall protection Plan	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs, Contractors	During project initiation stage (Before commencement of civil works)	OHS Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	

Training Required	Who to train	When	Training to be conducted by who	Institutional Responsibility to organize training	Training type	Training Costs USD
Fleet Safety Management	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs, Contractors	During project initiation stage (Before commencement of civil works)	OHS Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	
Disaster Management and Emergency Planning	NEWMAP-PMU (Federal), NEWMAP-PMU (State), FME, project affiliated MDAs, Contractors	During project initiation stage (Before commencement of civil works)	OHS Consultant	FME/NEWMAP-PMU (Federal),	Training of Trainers	

Note:
Trainings will be conducted by International and Local Consultants

11.4 Grievance Redress Mechanism

The PMU will establish a grievance redress mechanisms (GRM) that will allow general public in the project area, affected IP communities or individuals, and PAPs to file complaints and to receive responses in a timely manner. The system will also record and consolidate complaints and their follow-up. This system will be designed for handling complaints perceived to be generated by the project or its personnel. It may also include disagreements about compensation and other related matters. The PMU will assign a specific staff member to oversee that this is functioning properly. The consultants should review any existing GRM systems (government/traditional) that are operative in the area and propose ways that the GRM may fit within these systems. Ideally the GRM should have second and third levels of appeal (including the court system, if appropriate, for legitimate claims that cannot be resolved at lower levels). The functioning of the GRM system, how to register complaints (written, by phone, or in person), where to go and hours of service, all should be clearly explained in local language during initial public consultations on the project. Local language brochures should be provided reiterating the functioning of the GRM.

Purpose of Grievance Redress Mechanism

The people affected by the NEWMAP will raise their grievances about actual or perceived impacts in order to find a satisfactory solution. This is an important aspect in this NEWMAP because land acquisition is indispensable through the course of the project.
These grievances, influenced by their physical, situational (e.g., employment), and/or social losses, can surface at different stages of the project cycle. Some grievances may arise during the project design and planning stage, while others may come up during project implementation. Not only should affected persons (AP's) be able to raise their grievances and be given an adequate hearing, but also satisfactory solutions should be found that mutually benefit both the APs and the NEWMAP PMU. It is equally important that APs have access to legitimate, reliable, transparent, and efficient institutional mechanisms that are responsive to their complaints.

Members of the Grievance Redress Committees (GRC)

The Grievance Redress Committees, GRC, will be mandated to deal with all types of grievances arising at the community level due to the NEWMAP and its sub-projects. The GRC members will comprise of qualified, experienced, and competent personnel who will be able to interact and gain the trust of the AP's in their communities. The GRC should consist of both male and female representatives. They should be able to accept complaints, provide relevant information on the process, discuss the complainants' situations with AP's, and explore possible approaches for resolution.

The committee will include the following members:

- The Resettlement Policy Framework Consultant
- Social officer of the PMU;
- A representative of women residing the affected Project study area;
- A representative from the Private sector (if a private company is located within the affected area);
- A representative of a voluntary organization, NGOs;
- A representative of the World Bank;
- Members of Local Government area included in the affected area;

- A representative appointed by the Community head.

The Grievance Redress Committee will be responsible for:

- Communicating with the Affected persons (AP's) and evaluate if the are entitled to recompense;
- to publicize within the Communities the list of affected persons and the functioning of the established grievance redressal procedure;
- to recommend to the Social Officer of the PMU solutions to such grievances from affected persons;
- to communicate the decisions to the AP's;

  to acknowledge appeals from persons, households or groups who rightfully will not be affected by the NEWMAP and its sub-projects, but claim to be, and to recommend to the PMU whether such persons should be recognized as AP's, and to communicate back the decisions to the Claimants.

Summary of the Community Grievance Procedure

- Many grievances arise due to failure to provide sufficient and timely information to communities. Accurate and adequate information about a project and its activities, and approximate implementation schedule, will be communicated to the communities, especially AP's, regularly throughout the NEWMAP process.

- Stakeholders from the community and PMU in the state and local level will be involved in the grievance mechanism design. The PMU will engage community representatives to identify key issues such as the types of disputes that could arise during the project activities, how people in the community actually want to raise concerns, the effectiveness of current NEWMAP PMU procedures for resolving complaints, and the availability of local resources to resolve conflicts. This will assist in shaping both the design and future improvements.

- All grievances related to resettlement will be managed though the Grievance Redress Committee (GRC). The objective of the Community Grievance Procedure is to receive, respond and address any grievances made to the Project. Grievances will be responded to as quickly and efficiently as possible, avoiding escalation of the issue, reducing negative impacts on the local population and maintaining a positive attitude towards the Project amongst stakeholders.

- The Grievance Procedure will be available to local populace residing in the Project areas and other stakeholders directly affected by the Project (which may include landowners residing in urban centers). The Grievance Redress Committee representatives serving, as focal points are most effective if they are trustworthy, trained, knowledgeable, and approachable regardless of the ethnicity, gender, or religion of the complainant. Therefore, efforts will be made to ensure this. Local populations residing in the Project areas and other stakeholders directly affected by the Project will be informed about the grievance process transparency and credibility of the process and they will be provided with both verbal (through regular Stakeholder meetings) and written forms(such as newsletters).

- Other channels of presenting complaints could include presentation of complaints via third parties (e.g., village elites, community-based organizations, lawyers, NGOs etc.); community meetings; suggestion boxes (maybe placed in churches, village and market squares) allowing for anonymity; face-to-face meetings; written complaints etc. This will be accessible to all especially more vulnerable groups such as women and youth. Confidentiality and privacy for complainants should be granted.

- The grievance mechanism will be open to a wide range of concerns both those based in factual data and those arising from perceptions or misperceptions. Perceived concerns can be as critical to address as actual hazards. The mechanism should also be able to address multi-party and multi-issue complaints.

- Community consultations and dialogue for the project will be implemented. Efforts will be made to provide community members with opportunities to express their concerns, clarifying and respond to their issues and to find out their views. Receiving these feedbacks will benefit the community members, GRC and the NEWMAP PMU in all levels.

- Capacity development for community facilitators, GRC and field-level staff will be implemented because they are the organs that will reach out to the communities, and it becomes necessary for these staff and representatives to be well grounded with adequate information on the project. They will be able to communicate effectively in the local languages, understanding community dynamics and processes, negotiation and conflict resolution, and empathizing with communities and their needs. Building trust and maintaining good rapport with the people in the Project areas by providing relevant information on the project and responding effectively to their needs and concerns will help solve issues before they even become grievances. It is also important that the community facilitators, GRC and field-level staff provide feedback to the PMU.

- The design and operation of the grievance mechanism will consider cultural differences, such as communities' preferences for direct or indirect negotiation; attitudes toward competition, cooperation, and conflict; the desire to preserve relationships among complainants; authority, social rank, and status; ways of understanding and interpreting the world; concepts of time management; attitudes toward third parties; and the broader social and institutional environment.

- The GRC will make efforts to provide regular feedback to relevant stakeholders in order to clarify expectations about what the mechanism does and does not do; to encourage people to use the mechanism; to present results; and to gather feedback to improve the grievance system.

Scope of Grievances

Using the information gathered through the assessment of the situation in the community, the GRC will endeavor to review the type of grievances that are likely to arise. Generally, grievance mechanisms should be open to a wide range of concerns: both those based in factual data and those arising from perceptions or misperceptions. Perceived concerns can be as critical to address as actual hazards. They often arise when people do not have adequate information. The mechanism should also be able to address multiparty and multi-issue complaints. The members of the GRC have to establish the types of complaints that the mechanism will primarily target.

Community Expectations When Grievances Arise

The members of the community will expect that their grievances will be addressed by the NEWMAP PMU especially at the local level, which we will aim to achieve through the GRC. When local people present a grievance, they generally expect to receive one or more of the following:

- A concession in recognition of their problem
- An honest response to questions about NEWMAP activities
- An apology
- Compensation when applicable
- Modification of the activities that caused the grievance
- Some other fair remedy.

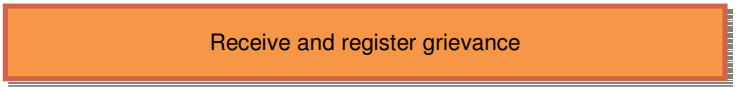
Steps in carrying out a Grievance Redress Mechanism

There is no ideal method of approach to grievance resolution however; the best solutions to conflicts are generally achieved through localized mechanisms that take account of the specific issues, cultural context, local customs, and the project state and its magnitude.
The Grievance Redress Committees of the NEWMAP will endeavor to be holding meetings with the aggrieved person(s) or groups within a maximum of 3 weeks from the time of receiving the complaint.
The following steps will be followed throughout the Grievance Redress Mechanism process in the various Communities.

No Yes

Fig: Likely steps in carrying out a Grievance Redress Mechanism

Methods that can be used to receive, & Register, Screen, Assess, and Respond to Grievance

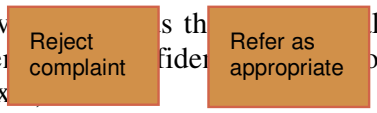


To Receive and Register a Complaint

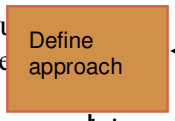
The channels for receiving and registering complaints is a simple process where local people can inform the GRC about concerns directly and, if necessary, anonymously or via third parties. Reception procedures are most effective if they are convenient, culturally appropriate, simple to understand, and easy to use.

Multiple channels should be available to gather and forward the AP's concerns. At least one member of the committee should be independent of the Project team. The GRC will accept complaints, whether written or oral, record them on a simple form, to deal with the issue or if need be, forwarded to the focal point of contact at the NEWMAP PMU for further action.

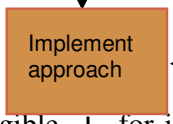
Div s th lly appropriate shou including self-ider fider onymous procedure suggestion box



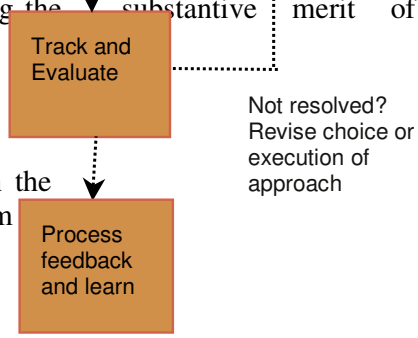
A member of the GRC should be available to receive complaints and log them into a central register.



Screening for Eligibility of Complaints



This process determines whether a complaint is eligible for inclusion in the grievance mechanism. The GRC should develop a screening procedure based upon few simple eligibility criteria that do not involve judging the substantive merit of the complaint.



Eligible complaints may include those where:

- The complaint is related to the project.
- The issues raised in the complaint fall within the scope of issues the grievance mechanism authorized to address.
- The complainant has standing to file.

Ineligible complaints may include those where:

- The complaint is not related to the NEWMAP project ;
- The nature of the issue is outside the mandate of the grievance mechanism;
- The complainant has no standing to file;
- Other community procedures are more appropriate to address the issue;

If the complaint is rejected, the complainant is informed of the decision and the reasons for the rejection. If eligible, the complainant will be notified, and the grievance will be processed and the next stage, which implies that assessment, will follow.

The GRC will ensure that that all grievances are truly understood before they are responded. It must be established that all complaints received from the AP's receive a favorable judgment before rejecting.

A Checklist of Grievance Handling Procedures

*	Assessment procedures (who conducts the assessment and how is the assessment conducted)
*	Procedures to identify appropriate people in to whom a specific concern should be forwarded
*	Procedures to determine the appropriate resolution process (in consultation with complainant)
*	Procedures for making decisions on proposed settlements
*	Appropriate time frames for each step in the grievance resolution process (including screening, assessment, and resolution)
*	Notification procedures to the complainant about eligibility, assessment results, proposed settlement, and the like.

Assess the Grievance
At this stage the GRC will gathers information about the case and the key issues of concerns which will help to determine whether and how the complaint might be resolved.

Procedures for Assessing Grievance are as follows:

- Determine who will conduct the assessment. A Complaints Coordinator will be appointed to perform this task or directs it to an appropriate person(s) for assessment (production, procurement, environment, community relations, human resources).

- A representative from the GRC will endeavor to engage directly with the complainants to gain understanding of the nature of the complaint.

- Clarify the parties, issues, views, and options involved which includes:
  - Identify the parties involved
  - Clarify issues and concerns raised by the complaint.
  - Gather views of other stakeholders, including those in the GRC and PMU.

- Determine initial options that parties have considered and explore various approaches for settlement.

- Classify the complaint in terms of its seriousness (high, medium, or low). Using this category, seriousness, will measure the potential to impact the community. The factors to consider will include: the gravity of the allegation, the potential impact on an individual's or a group's welfare and safety, or the public profile of the issue.

- Engage more directly with the complainant in the assessment process, and involve the complainant in influencing the resolution process to be selected, and settlement options.

Formulate a Response

Procedures to formulate responses are as follow:

- The Complaint Coordinator will be responsible for preparing the response that will consider the complainants' views about the process for settlement as well as provide a specific remedy. The response may suggest an approach on how to settle the issues, or it may offer a preliminary settlement.

- Meeting may be coordinated which will serve as a forum for the complainant to present the persons complaints; discussion amongst the complainant, the Complaint Coordinator, member(s) of the GRC will follow. If a direct meeting is not possible, consider meeting with a neutral third party serving as facilitator. The group would also discuss appropriate next steps during this meeting. If the proposal is a settlement offer and it is accepted, the complaint is resolved successfully and there is no need to proceed to the next step of selecting a resolution approach. If the complainant is not happy with the response about a resolution process or substance, the group should try to reach an agreement that would be mutually acceptable.

- If the case is complex and a resolution time frame cannot be met, provide an interim response facilitated through oral or written communication (best to the complainants preference) that informs the person of the delay, explains the reasons, and offers a revised date for next steps.

Process of Selecting Grievance Resolution Approaches

A variety of Grievance Resolution Approach will be incorporated which will accommodate differences in personal and cultural preferences. The grievance mechanism will offer a variety of grievance resolution approaches and the complainant should have influence over which approach to select. They approaches include the following:

Scenario 1: Where the GRC proposes a solution

This should be conducted as an Informal approach that will involve direct involvement of the GRC or a representative with the complaint. The GRC will propose a solution and offers it to the complainant. The GRC and community would jointly decide if the solution is acceptable and, hence, share decision-making authority. This process can be facilitated if the GRC conducts an initial assessment, and then make a settlement proposal that they hope the

complainant will accept. The proposal should be based on consistent standards and criteria so that similar complaints receive similar remedies.

The following measures can help increase the acceptability of responses:

- There should be a rationale for the decision and presentation of any data that will be used to reach a conclusion (for example, value of land, crop, or animals; costs to repair a road).

- There should be an opportunity for the complainant to verbally present his, her, or their case to a GRC or representative. The representative should listen to and acknowledge the complainant's statement to help reach emotional closure and restore positive relations between the complainant and the PMU.

- Timely delivery of a response and rapid restitution once a decision has been made.

- Delivery of the GRC's response in writing and, when appropriate, a visit by a representative to explain the decision in person.

If the complainant rejects the proposal, Scenario 2 may be used.

Scenario 2: Where the Community and the GRC decides to make the decision together.

This option involves the GRC representatives and complainants sharing the decision-making and jointly engaging in a problem-solving approach to reach a resolution of the grievance by themselves. The process may involve only the GRC and complainant, or may be facilitated by a neutral third party without decision-making authority, such as a mediator.
This approach is likened to be the most accessible, natural, and unthreatening ways for communities and Project team to resolve differences. With the potential to resolve perhaps 90 percent of all grievances, "decide together" should be the center of any grievance mechanism's resolution options. The complaints and the GRC representative however need to furnish themselves in their communication skills, dialoguing and negotiating skills for ease in relating with the people.

Scenario 3: Formal independent redress approach, such as arbitration using a neutral third party.

This approach can be used when the GRC and the complainants are unable to resolve a complaint themselves. The decision-making will lean on the independent, neutral party. The neutral party may be a trusted individual or a group in the community, a respected technical expert, or an independent arbitrator. In a typical arbitration case, the parties engaging in the process would decide if the decision is binding (the parties promise at the beginning of the process to implement the intermediary's decision) or non-binding (the intermediary's decision is a recommendation to the GRC and the community, and can be appealed in court or to some higher authority).

Scenario 4: The GRC and community engage traditional and customary practices

Rights-based approach based on legal, contractual, local and customary ways of grievance resolution, which will be evaluated and incorporated into the system. All societies

have internal ways of handling their differences. The local people may decide to find succor in resolving the disputes from their traditional or religious leaders. Therefore the GRC will inventory traditional, religious and customary approaches for solving conflicts and consider how to adapt traditional, religious and customary dispute- resolution mechanisms to deal with community-GRC grievances. For this scenario, observers, testifiers, witnesses can be employed to verify the fairness, and assure that agreements comply with widely accepted community values and norms. Advisors and mediators can also be used which may include respected people in their communities. Members of traditional communities often seek advice from respected or wise members on how their differences can best be resolved. Disputants often ask for recommendations that comply with community norms and restore harmonious relationships.

11.5 Environmental and Social Management Plans (ESMPs)

ESMPs will be very important aspects and useful implementation tools for the management and mitigation of identified environmental and social impacts under the NEWMAP. a generic, yet project related ESMP is provided below.

11.5.1 Monitoring and Evaluation

The objectives of monitoring and evaluation for the ESMF are as follows:

- To alert the PMU by providing timely information about the success or otherwise of the environmental management process outlined in the ESMF. This will ensure continuous improvement in the environmental and social management process of the NEWMAP even after the project is concluded.
- To make a final evaluation in order to determine whether the mitigation measures incorporated in the technical designs and the EMP have been successful.

This section sets out requirements for the monitoring of the environmental and social impacts of the NEWMAP activities. Monitoring of environmental and social indicators will be mainstreamed into the overall monitoring and evaluation system for the project.

Monitoring will be used to measure the success rate of the project; it will also be used to determine whether the established mitigation measures have resulted in dealing with the negative impacts associated with the project. It will be used to establish whether further monitoring is to be extended in some areas.

The key issues to be considered in the NEWMAP subprojects include construction activities, monitoring of water quality, agricultural production, land use and acquisition, income generation and population influx.

Monitoring and surveillance of subprojects should take place on a “spot checks” basis, which means that the investigation should be carried out at random or limited to a few instances.

<u>Indicators for monitoring the participation process</u>

The following are indicators for monitoring of the participation process involved in the project activities.

- Number and percentage of affected households consulted during the planning stage;
- Levels of decision-making of affected people;
- Level of understanding of project impacts and mitigation;
- Effectiveness of local authorities to make decisions;
- Frequency and quality of public meetings;
- Level of involvement of women and youth or disadvantaged groups in discussions;

Evaluation of Results

The evaluation of results of environmental and social mitigation can be carried out by comparing baseline data collected in the planning phase with targets and post project

situations.

Monitoring of ESMF Implementation

In addition to the project reports required, the Independent Consultant will prepare a quarterly audit on ESMF implementation, which will be delivered to NEWMAP-PMU. In addition, each subproject required in the various States that may require an EIA study (or RAP etc) will also be required to produce an annual audit report for delivery to the NEWMAP-PMU.

The table 11.3 below describes the Monitoring and Evaluation framework for the EMP.

Environmental and Social Management Plan Framework for NEWMAP (Generic)					
Activity	**Threat or Impact**	**Mitigation**	**Responsibility**	**Costs USD**	**Performance Indicator**
Pre-construction phase	**Social Impacts** • *Community resources e.g. Land* • *Community perception*	Assessment of all possible social impacts and threats with respect to the NEWMAP as a basis for defining social protection, putting in place measures and procedures for enforcing social protection and social accountability, and setting up monitoring mechanisms to ensure adherence to measures proffered. Establishment of Grievance-address systems and Indigenous Peoples Planning Frameworks. Conduct ESIA. Baseline elemental Studies (water, air, soil quality). Conduct Health Impact Assessment	NEWMAP-PMU (Federal) NEWMAP-PMU (State) World Bank Task Team Independent Consultant NEWMAP-PMU (Federal) NEWMAP-PMU (State) NEWMAP-PMU (Federal) NEWMAP-PMU (State) Independent Consultant NEWMAP-PMU (Federal) Independent Consultant	310,000 500,000	Have studies been carried out and plans prepared? Have environmental and social monitoring mechanisms been established? Have Grievance Address Mechanisms been established? Is there effective feedback from project affected persons? Have environmental, social, health and broader impacts been identified and mitigation measures designed. Has HIA been conducted, and impacts identified (health, social, environmental
Activity	**Threat or Impact**	**Mitigation**	**Responsibility**	**Costs USD**	**Performance Indicator**
	Physical Impacts *Land degradation & Subsidence*	Integration of community driven interventions (legal, scientific and social) for achieving community	World Bank Task Team NEWMAP-PMU (State)	160,000	Is there community driven approach in-

Table 11.3. Environmental and Social Management Plan- ESMP

Table 11.3.1 Monitoring & Evaluation Framework for the ESMP

	Phase Being Monitored	Institution Responsible	Performance Indicator	Period to be conducted	Costs (US$)
1.	**Pre-construction phase**)	NEWMAP-PMU (Federal) NEWMAP-PMU (State) World Bank Task Team Independent Consultant	6 Have environmental and social accountability trainings been conducted 7 Have studies been carried out and plans prepared? 8 Have environmental and social monitoring mechanisms been established? 9 Have Grievance redress Mechanisms been established? 10 Is there effective feedback from project affected persons? 11 Have environmental, social, health and broader impacts been identified and mitigation measures designed	Before initiation of civil works	100,000
2.	**Construction phase**	World Bank Task Team NEWMAP-PMU (Federal) NEWMAP-PMU (State) CONTRACTOR/INDEPENDENT CONSULTANT	5 Is there community driven approach in- use/how are community reaction 6 Is the Grievance redress mechanism effective 7 Have standard operating procedures for best environmental practices been established? 8 Does the contractor have a HAZCOM program? 9 Are there Material Safety Data Sheets (MSDS) 10 Is a sustainable afforestation program in progress?	In the course of civil works implementatio n	80,000

			11 Does the contractor have a safe-works procedure? 12 Is there an emergency planning framework?		
	Phase Being Monitored	**Institution Responsible**	**Performance Indicator**	**Period to be conducted**	**Costs (US$)**
3.	Operation & Maintenance Phase	World Bank Task Team NEWMAP-PMU (Federal) NEWMAP-PMU (State	• Are environmental and social monitoring mechanisms being implemented? • EMP document • Is disaster and emergency planning proactive? Has training on disaster management been conducted? • Is the traffic management plan being implemented? who is responsible and why? • Is the EMP being implemented? • Success in mitigation measures. • Is disaster management in-place. • No of land slides • No of casualties. • Complaints from communities	Operational stage to project closure	80,000

11.6 Environmental and Social Auditing

Auditing refers to the examination and assessment of a certain type of performance. In the case of the NEWMAP, an audit will assess the actual environmental and social impacts of sub-projects, their accuracy of prediction, the effectiveness of impact mitigation measures, and the functioning of monitoring mechanisms. The audit should be undertaken upon a sub-project run in operation, for some time, and it must be performed once or twice in the entire sub-project cycle.

Types of Audit

- Decision Point Audit - examines the effectiveness of ESIA as a decision-making tool.
- Implementation Audit - ensures that approved conditions have been met.
- Performance Audit - examines the responses of stakeholders/agencies concerned with project management.
- Project Impact Audit - examines environmental changes arising from project implementation.
- Predictive Technique Audit - examines the accuracy and utility of predictive techniques by comparing actual against predicted environmental effects
- EIA Procedures Audit - critically examines the methods and approach adopted during the EIA study

Not all the audit types mentioned above are required to be implemented in the NEWMAP ESIA process. However, at the sub-project approval stage, both project proponent and authorizing agency should consider whether an application of a particular audit technique is likely to result in new information or an improvement in management practices. Particular attention should be given to the project cost-effectiveness of any proposed audit and to technical difficulties likely to be encountered.

Since the ESIA concept is relatively recent, the use of environmental audits will play a significant role in the success of the NEWMAP. In addition, environmental and social auditing should compare monitoring results with information generated during the pre-project period. Comparisons can be made with similar sub-projects or against standard norms.

Relating actual impacts with predicted impacts will help in evaluating the accuracy and adequacy of ESIA predictions.

Environmental Auditing Plan

Environmental Audit should be carried out upon the completion of project construction and after 2 years of project operation in order to obtain information on:

- the condition of natural/social/economical resources prior to sub-project implementation and after the sub-project construction is completed,
- whether or not, all the mitigation measures implemented are effective to control adverse impact, or enhance beneficial impacts,
- whether or not all degraded landscape due to sub-project implementation have been restored into original condition,

- what are the impacts of boom-bust scenario among the workforce involved in the sub-project implementation and the local economy, and
- The effect on the local economy of project implementation.

In Summary, Information from monitoring output should also be utilized for carrying out environmental audit.

11.7 HEALTH IMPACT ASSESSMENT (HIA)

Purpose

This document is intended to provide good practice guidance for conducting a Health Impact Assessment (HIA) to determine potential impacts on community health as a result of project development.

This document has three objectives:

- To present methodological approaches to assess and address potential community health impacts that might typically be encountered in the development or review of future sub-projects.

- To assist in the development of the terms of reference (TOR) that may be needed to conduct the HIA

- To help ensure inclusion of health impact aspects in the social and environmental impact assessment process or in the conduct of independent HIAs for sub-projects.

Key Characteristics

Consultants should possess the experience and expertise in the identification of major characteristics, which define HIAs. These will include, to a minimum, the following:

- Predicting the consequences of project-related actions
- Providing information that can help decision makers prioritizes prevention and control strategies throughout the project lifecycle.

Major Processes in Identifying the Need for HIA

Screening - Preliminary evaluation to determine whether a proposed project is likely to pose any significant health questions. Specialists should generally assume that projects requiring environmental or social impact assessments are also likely to have potential health impacts. During the screening step, the need for an HIA can be determined. The NEWMAP-PMU and relevant stakeholders should handle this.

Scoping – This is a process for outlining the range and types of hazards and beneficial impacts. The overall types and categories of questions that should be addressed are defined at this stage of the HIA. The input of key stakeholders and the relevant host- country health authorities is critical, so that the HIA adequately addresses a realistic range of health concerns. This stage also is the time to develop the TOR for the scoping. The HIA effort should be “fit to purpose,” and it should adequately and realistically match the complexity of the project. The NEWMAP-PMU and relevant stakeholders should handle this.

Risk Assessment- This should address activities to investigate, appraise, and qualitatively or quantitatively rank the impacts the project is likely to have, on the health of the defined communities. The spectrum of potential impacts—their relative importance and at what level they are expected to occur is determined in this step.

Health Action Plan (HAP) - Considers the rankings developed in the risk assessment and develops a written health action plan (HAP). The HAP, also known as a health management plan, it should establish the proposed actions needed to mitigate identified impacts and promote health opportunities in the project. HIA consultants should include information on mitigation. Mitigation is a systematic process by which to avoid, reduce, remedy, or even compensate for potentially negative impacts. Review and analysis by key stakeholders, including host-country health authorities, is should be a critical aspect of HIAs to be conducted under the NEWMAP sub-projects.

Implementation and Monitoring – This should occur after the Health Action Plan(s) for sub-projects have been developed. At this point it is necessary to decide how the mitigation actions will be implemented and monitored, and to establish the roles and responsibilities of the NEWMAP-PMU and key stakeholders. During this process, the project should establish action frameworks and allocation of resources, and it should design monitoring systems to ensure that mitigation progress is satisfactory. In addition, the monitoring system should be designed to capture unanticipated effects or provide an early-warning system to alert that problems are occurring at the community level. The monitoring plan should define appropriate key performance indicators.

Evaluation and Verification of Performance and Effectiveness- HIA documents for the project should include a system for determining that implementation has been accomplished and is achieving the intended results.

Types of HIAs

When gathering new field data for the HIA, the project will encounter different levels of effort and needs. The key descriptive terms for these cases *"comprehensive"* and *"rapid appraisal"* indicate the different depths of analysis and consultation required, and whether the performance of the HIA involves collecting new field data. In many situations, a rapid appraisal HIA will be sufficient; however, this assessment may uncover significant data gaps and trigger the need for a more comprehensive HIA, that is, new data collection.

Comprehensive HIA

A comprehensive HIA includes screening, scoping, stakeholder consultation, risk assessment, appraisal, implementation and monitoring, and verification. Stakeholder communication and consultation should take place at all stages—from screening through implementation and monitoring. During the project concept and feasibility studies and project planning phases, the project also will perform a limited level of local community stakeholder consultation.

A comprehensive HIA is more likely to be considered for large, complex projects, particularly if resettlement or relocation of existing communities is involved or if a significant influx of persons is expected, regardless of whether it is a new-project or new-location situation or a significant expansion of an existing facility. An essential element of the comprehensive HIA is the need for some type of new data collection in potentially

affected communities, and for helping to predict changes in health determinants, the associated risks, and health outcomes. This data collection typically consists of health-questionnaire surveys.

Rapid Appraisal HIA

These assessments require less-intensive efforts; however, in-country investigation may be triggered. Typically, rapid appraisal HIAs are subdivided into desktop HIAs and limited in-country HIAs.

Desk Top HIA

It is a qualitative review of potential health impacts and is used to internally inform and comment on the proposed design of the project. It is also useful for determining whether a more detailed review is needed.

Limited in- Country HIA

This uses information that is already available or easily accessible. Thus, no specific new data collection is required. Data sources may include peer-reviewed scientific literature and 'grey literature," that is, health department data. Workshops or discussions with key internal and external stakeholders, which are usually planned in the context of other social and environmental assessment efforts, also can provide useful health-related information. The overall results are typically incorporated into the social and environmental impact assessment, although the limited in-country HIA may also be issued as a stand-alone report. Limited in-country HIAs are appropriate for many expansion scenarios where new data collection is not needed. In some situations large health databases are available, sufficient for documenting current baseline community conditions, making new field collection efforts unnecessary.

11.8 Integrated Pest Management Plan (IPMP)
See Annex 008 for IPMP format

11.9 Forestry Development Plan
The anticipated impacts of NEWMAP on the forest resources of Nigeria would be positive. The project objectives include protection of the pristine forest and buffer zones in the project area, as well as on the ground investments in afforestation and re-grassing and strengthening of the institutions that protect forests in the project area. Furthermore, the preparation of the Forestry Development Plan will be a prerequisite for subprojects to be financed in the forest areas. The Plans will also be disclosed in specific locations at forest communities or at the Department of Forestry at Federal, state and local government levels. The Forestry commissions in some of the states have the capacity to monitor and follow up on the Plans. Small dams are normally less than 15 meters in height. This category includes, for example, farm ponds, local silt retention dams, and low embankment tanks. For small dams, generic dam safety measures designed by qualified engineers are prepared.

11.10 Chance Find Procedures
In the event of chance finds of items of cultural significance, all forms of excavation in and around the site will be stopped. Subsequently, experience archaeologists and anthropologist would be recruited to carry out an investigation and proposed plans for the preservation of such cultural artefacts.

During the project site induction meeting, all contractors will be made aware of the presence of an on-site archaeologist who will monitor earthmoving and excavation activities.
The following procedure is to be executed in the event that archaeological material is discovered:

- All construction activity in the vicinity of the find/feature/site will cease immediately.
- Delineate the discovered find/ feature/ site will be delineated.
- Record the find location, and all remains are to be left in place.
- Secure the area to prevent any damage or loss of removable objects.
- The on-site archaeologist will assess, record and photograph the find/feature/ site.
- The on-site archaeologist will undertake the inspection process in accordance with all project health and safety protocols under direction of the Health and Safety Officer.
- In consultation with the statutory authorities the on-site and Project Archaeologist will determine the appropriate course of action to take.

11.11 Disclosures of Safeguard Instruments

Copies of this ESMF, like other Safeguard Instruments (such as EA/ESMP/RAP/ARAP) that would be prepared for NEWMAP and its subprojects shall be made available to the public by PMUs at their offices in Abia, Anambra, Cross Rivers, Ebonyi, Edo, Enugu and Imo States, and in the various relevant local government councils and project affected communities, State Ministries of Environment and other stakeholders and at the Federal Ministry of Environment.
All reasonable efforts must also be made to exposure them at strategic points within the project's area of influence so as to allow all stakeholders to read and understand how they stand to be affected by the project
The PMUs/State Agencies will also disclose this ESMF and other safeguards instruments electronically through the World Bank Info Shop. Table 11.4 outlines information to be disclosed.

Table 11.4: Some information to be disclosed

Topic	Documents to be disclosed	Frequency	Media
Public Consultation	Minutes of Formal Public Consultation Meetings	Within two weeks of Meeting	Implementation agency's website. Ministry of Environment Project Management Unit & Project Implementation Units (PIU) Local government Secretariat
Environment Management	ESMF, Environment Assessment Report & Environment Management Plans	Prior to awarding works and to remain on website	World Bank's Infoshop. Implementation agency's website. Ministry of Environment Project Management Unit & Project Implementation Units (PIU) Local government Secretariat
Resettlement, Rehabilitation and Land Acquisition	RPF, Resettlement Action Plan (RAP)	Once in the entire project cycle. But to remain on the website and other disclosure locations throughout the project period.	World Bank's Infoshop. Implementation agency's website. Ministry of Environment Project Management Unit & Project Implementation Units (PIU) Local government Secretariat
	Information regarding impacts and their entitlements	Once at the start of the project and as and when demanded by the PAPs.	Through one-to-one contact with PAPs. Community consultation List of PAPs with impacts and entitlements to be pasted in the PMU offices
	R&R and LA monthly progress report.	10th day of every month	MDAs / Implementation agency's website. Project Management Unit & Project Implementation Units (PIU)
	RAP Impact Assessment Report	After substantial completion of each phase	Implementation agency's website.
	Land Acquisition Notifications	After substantial completion of each phase	Implementation agency's website.

	Grievance redressal process.	Continuous process throughout the project cycle.	Implementation agency's website. Ministry of Environment Project Management Unit & Project Implementation Units (PIU) Local government Secretariat Project Management Unit & Project Implementation Units (PIU) One to one contact with PAPs.

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Annexures

ANNEX 001: FEDERAL GUIDELINES FOR EIA PROCESS

The process for undertaking EIA and other forms of environmental assessment in Nigeria is presented in the EIA Decree No. 86 of 1992. The Federal Government of Nigeria enacted the Environmental Impact Assessment (EIA) No. 86 of 1992 as a demonstration of her commitment to Rio declaration. Prior to the enactment of EIA act in Nigeria, project appraisals were limited predominantly to feasibility studies and economic – cost – benefits analysis. Most of these appraisals did not account for environmental costs, public opinion, and social and environmental impacts of development projects.

EIA ACT No.86 of 1992

The EIA Act gave the Federal Ministry of Environment the implementing mandate and requires that the process of EIA be mandatory applied in all major development projects right from the planning stage to ensure that likely environmental problems, including appropriate mitigation measures to address the inevitable consequences of development are anticipated prior to project implementation and addressed throughout the project cycle.

The EIA Act stipulates that all Agencies, Institutions (whether public or private) except exempted by the Act, shall, before embarking on proposed projects, apply in writing to The Federal Ministry of Environment so that subject activities can be quickly identified and allow for the conduct of environmental assessment(s) as the activities are being planned. The Act made provision for all stakeholders (agencies, public, experts, NGOs, communities, etc) to be notified, consulted and or given the opportunity to make comments on the EIA of a project prior to approval or disapproval.

The objectives of the EIA Act of 1992 among others include:

- The establishment of the environmental effects of proposed activities before a decision is taken to embark upon them.

- Promotion of the implementation of appropriate policy in all Federal land, states, and Local Government Area consistent with all laws and decision making process through which these goals in (1) above may be reached.
- It encourages the development of procedures for information exchange, notification and constitution between organs and persons when proposed activities are likely to have significant effects on boundary or trans – state or on the environment bordering towns and villages.

Minimum content of an EIA study

Section 4 of the EIA Act specifies the minimum content of an EIA to include the following;

- A description of the proposed activities,
- A description of the potential affected environment, including detailed information necessary to identify and assess the environmental effects of the proposed activities,
- A description of the practical activities,
- An assessment of the likely or potential environmental impacts of the proposed activity and the alternatives, including the direct or indirect, cumulative, short-term and long-term effects,
- An identification and description of measures available to mitigate adverse environmental impacts of the proposed activity and assessment of those measures,
- An indication of gaps in knowledge and uncertainty, which may be encountered in computing the required information
- An indication of whether the environment of any state or local government areas outside Nigeria is likely to be affected by the proposed activity or its alternatives, and
- A brief and non-technical summary of the information provided under the above listed paragraphs.

EIA procedural guideline in Nigeria

After the dissemination of the EIA Act 86 in 1992, the Federal Ministry of Environment (formally called FEPA) came up with the ***EIA Procedural Guideline and Sectoral Guidelines*** for some Nigerian Economic sub-sectors. The EIA Procedural Guideline contains a list of steps which when carefully followed shall result in better project planning and a streamlined decision making process. These steps include, brief descriptions of the project environment and process, legal framework, identified impacts etc. These steps are;

- Project proposal
- Initial environmental examination (IEE) / preliminary assessment
- Screening
- Scoping
- EIA study
- Review
- Decision making
- Monitoring, and Auditing

EIA Sectoral guideline in Nigeria

The sectoral Guidelines provide sector-specific guide for preparation of EIA reports. Sectoral guidelines have been developed for the following sectors.

1. Oil and Gas, including petroleum refining, petrochemical industry pipelines, on-shore, offshore exploration and drilling etc.

2. Infrastructures – including airports, construction, harbours, construction and expansion, railways highways, etc
3. Industries – including all other manufacturing industries, besides those in the oil and gas sector.
4. Agriculture - all agricultural practices including land clearing, afforestation projects, etc.
5. Mining – including solid minerals prospecting and exploration.

In practice, sectoral guidelines:

- are most useful in the early stages of an environmental assessment when TOR for the EIA are unavailable or are being prepared;
- help with impact identification and in the development of detailed TOR for conducting an EIA;
- provide guidance on how to present information in the proper format to aid in review; and
- provides useful information against which to evaluate the actual results of the EIA.

EIA Studies / Report Preparation

EIA studies and report preparation are the responsibilities of the Project Proponent. In the course of preparing an EIA Report of a proposed sub-project, all stakeholders should be consulted. The objective of such consultation is to identify early in the EIA process, the worries of stakeholders regarding the impacts of the proposed sub-project in order to address such issues during the actual study and to reflect such comments in the sub-project's EIA report.

EIA Review Process

To establish the type of review to be adopted, a draft EIA Report should be submitted to The Federal Ministry of Environment by a proponent for evaluation by the Ministry. There are different forms of reviews, depending on the nature, scope, anticipated impact, risks, etc that may arise in project planning and implementation, and an EIA report may be subject to any or a combination of these reviews. The various types of review are an in-house review, public review, panel review and mediation.

In – House Review

In order to assess how far issues raised in the Terms of Reference (TOR) have been addressed and to determine if the draft EIA reports are suitable for public review (if necessary), all draft EIA reports forwarded to the Ministry are reviewed in-house. If the in-house review finds that the issues in the report do not merit putting it on public display, the review process may be terminated at the in-house review stage. Some projects (e.g. those that fall under Category III of the EIA Act) may be recommended for approval by the Ministry's In-House Panel of Experts.

Public Review (Public Display)

The provisions of Section 25 of the EIA Act states that, 'interested members of the public are given the opportunity to participate in the EIA review process through comments on project reports that are put on display'. Displays are usually done for a 21 working day period at strategic locations. Notices of such venues of display are usually published in the National and relevant State daily newspapers and information about such display are complemented with further announcements on the relevant state electronic media. Often times, the venues of displays include the Local Government Headquarters, where a project is located, the State Ministry of Environment or Environmental Protection Agency(s), The Federal Ministry of Environment's zonal Offices. Comments received from the display venues are forwarded to the Federal Ministry of Environment Headquarters for collation and evaluation preparatory to the Review Panel meeting for the project.

Review Panel

After the public display exercise, The Federal Ministry of Environment may decide to set up a review panel to review the draft EIA report depending on the sensitivity or significance of the comments received.

The review panel meetings are held in the public so that stakeholders can utilize this opportunity to put forward their views and concerns for consideration. The choice of members of the review panel depends on the type of project, its scope as well as the ecosystem to be affected. However, the Chairman of the affected Local Government(s) and the Commissioner of Environment of the project location are always included in the Panel.

Mediation

Projects that are likely to cause significant adverse effects that are immitigable, or of public concerns are referred to Federal Ministry of Environment Ministerial council for subsequent referral to mediation. For a mediation to be set up, Ministerial Council would have been convinced that the parties involved are willing to participate in the mediation and to abide by its decisions.

EIA Approval

After the submission of a satisfactory Final EIA report, the Federal Ministry of Environment could decide to set a number of conditions for the approval of the implementation of the project. Such conditions usually include a statement that mitigation measures highlighted in the projects EIA report shall be complied with.

Impact Mitigation Monitoring (IMM)

The following are the objectives of an EIA Impact mitigation monitoring:

- Check that mitigation measures are implemented as appropriate.
- Determine whether environmental changes are as a result of project developments and/or natural variation.
- Monitor emissions and discharges at all stages of project development for compliance with regulatory standards.
- Compare effluent quality/quantity with design specifications and statutory standards.
- Determine the effectiveness of Environmental Management Plans, Environmental Monitoring Plans and especially the mitigation measures to predicted impacts and to also act as a feedback mechanism towards the improvement of the EIA Evaluation and Approval process.
- Determine duration of identified impacts.
- Create a data bank for future development of predictive tools.

The Legal requirements for Impact Mitigation Monitoring in the EIA process are specified in Sections 16 (c), 17 (2) (c), 37 (c), (1), 40 (1) (a) (2), 41(1) and 41 (2) of the EIA Act as well as Section 11 of the EIA procedural guideline

Environmental Impact Monitoring is designed to monitor the Environmental Management Plan (EMP), and concerns during project operations. It is also designed to ascertain the extent to which commitments contained in EIA reports are reflected during the various phases of project development and operations.

Impact Mitigation Monitoring (IMM) exercises are conducted to assess the degree and effectiveness of the mitigation measures offered in an EIA report. Hence, relevant documents, in-house monitoring records as they affect the project, the project implementation schedule, as well as all other documents to support the environmental good housekeeping of the project are scrutinized and verified.

In a typical Impact Mitigation Monitoring exercise, the following statutory actions are carried out,

- Facility inspection
- Interactive session with project managers on the Mitigation Checklist for the EIA of that sub-project.
- Interview and interaction with the action party responsible for ensuring full implementation of a particular action
- Inspection and Verification of the parameters that shall be monitored to ensure effective implementation of that action
- Check the timing for the implementation of the action to ensure that the objectives of mitigation are fully met.
- Interact with project Engineers and Technicians on mitigation measures that are not applicable, or not enforceable or still not practicable in line with good environmental principles with a view to finding out practical alternatives.

At the conclusion of an IMM exercise, a report should be written for the Minister/Head of Department's approval, after which, necessary suggested corrective measures would be communicated to proponents.

ANNEX 002: TERMS OF REFERENCE FOR THE ESIA

TERMS OF REFERENCE

Environmental and Social Impact Assessment (ESIA) for the Nigeria Erosion and Watershed Management Project (NEWMAP)

1.0 INTRODUCTION

1.1 The Purpose of the ESIA

There is need to carry out an Environmental and Social Impact Assessment (ESIA), which will have to comply with the environmental procedures of the Federal Republic of Nigeria and with the environmental guidelines of the financing institutions, World Bank.

2.0 Objectives of the ESIA

The objectives of the ESIA are to:

- Thoroughly document baseline conditions of the seven (7) study area and the socio-economic conditions of the affected communities.
- Place the ecological baseline conditions of the concession area in the context of the surrounding region.
- Inform, obtain and address contributions from stakeholders including relevant authorities and the public.
- Assess in detail, the environmental and social impact that would result from the project
- Identify mitigation measures that would reduce the significance of predicted

negative impacts or enhanced predicted benefits of the proposed mining projects.

- Develop an appropriate Monitoring Plan for the proposed NEWMAP project

- Meet the requirements of the National environmental regulatory agencies in Nigeria as well as international best practice for project of this nature.

The ESIA will identify the potential impacts associated with the development and then provide the measures that will be required to manage those impacts, which will be incorporated into an Environmental Management and Monitoring Plan. A multi-disciplinary team of experts will conduct the ESIA with the stages identified as follows:

3.0 Phase Description

Screening/Scoping- Identification of key issues and concern that are to be addressed by the specialist studies
Baseline -Characterize current broadly defined environmental conditions on and near the site to serve as a basis against which impacts can be measured and monitored.
Assessment and Mitigation - Identification of positive and adverse impacts. The potential spatial extent, severity, duration and probability of impacts are described along with mitigation actions.
Integration - Collation of specialist studies and assessments and the compilation of the ESIA Report.
Review - The ESIA Report is review by EPA, EAB, sector agencies and stakeholders
The ESIA process will be guided by the Federal Guidelines for EIA process as stipulated in Annex 1 and international best practice guidelines for projects of this nature such as the World Bank.

4.0 Tasks

In the conduct of the ESIA the consultant team will undertake the following tasks:
Assemble relevant baseline information on the project area including its geology, soils, hydrology, climate, surface water quality, noise, air quality and terrestrial and aquatic flora and fauna.

- Collect Information on the socio-economic background of the project areas

- Provide a detailed description of the projects

- Identify the relevant laws, guidelines, regulations and standards that would define the operating framework of the project.

- Identify, as far as is possible, and assess the physical, biological, socio-economic as well as cumulative impacts of the project which will include the transport and processing components of the project.

- Describe alternatives examined in developing the project, and identify other alternatives that would achieve the same objectives. This will include alternative methods for Erosion and Watershed management, and the rationale for the preferred choice.

- Prepare an Environmental Management Plan that recommends measures to address those adverse impacts that can be avoided, or reduced to acceptable levels including a plan for monitoring during project implementation. The Management Plan will include a Mitigation Plan, Emergency Response Plan, Monitoring Plan and provisions for Environmental Auditing.

5.0 Specific Issues to be addresses by the ESIA

The consultant team will address the full range of issues as it pertains to the proposed project. Specific issues include:

- A detailed description of the project areas including maps showing the boundaries of the Project areas, layout of current land uses of the surrounding areas and network of drainage systems.
- Current water quality data from surrounding streams, rivers which include pH, TSS or turbidity, conductivity, TDS, ammonia and sulphates and the establishment of fixed stations for continuous monitoring .
- Dust and noise management in particular from haul roads, crushing plant and
- Stockpiles
- Impacts to aquatic and terrestrial flora and fauna
- Water Use and effluent management
- Waste management
- Land use
- Cultural and archaeological resources
- Occupational Health and Safety
- Social and economic impacts to the local communities including direct benefits such as jobs.
- Cumulative Impacts of the project
- Presentation of the proposed NEWMAP plan with all relevant information concerning potential impacts on the environment and develop mitigation strategies to reduce the identified impacts.
- Presentation of a Sediment Control Plan as part of the NEWMAP Plan
- A Monitoring Plan with focus on reclamation efforts and on discharge and receiving water quality limits with provisions for effluent discharge monitoring. This will be base on the results of the ESIA and the management plan.
- A Detailed Emergency Response Plan to respond to environmental emergencies and issues with respect to worker's safety as well as residents. The Plan will consider identification of emergencies, response mechanisms, personnel responsibilities and equipment and training requirements.

6.0 Site Visit and Scoping

The NEWMAP will cover the cost of site visits associated with the conduct of the ESIA, public notices and other costs associated the ESIA.

7.0 ESIA Report

Outline for an Environmental and Social Impact Assessment Report

An Environmental and Social Impact Assessment process should not exclusively be perceived as a matter of preparing a report and obtaining approval only, instead the use of the ESIA should help ensure that the environmental and social concerns of local communities and other stakeholders are taken into account throughout the life of the NEWMAP. The ESIA

should be tailored to the specific sub-project and to the legal requirements, environmental and social conditions where it is situated. The coverage of the ESIA report itself will therefore depend on local circumstances.

To describe and agree on the extent and boundaries of the proposed sub-projects, a system map may be useful. The Identification of relevant stakeholders would be part of this mapping exercise, and these stakeholders can then be involved in the mapping process, which can help everyone understand the complex flow of impacts and feedback loops more easily.

The following outline for a typical ESIA report is offered on the basis that identified issues will not necessarily have the same degree of relevance for all sub-projects in the NEWMAP.

I. **Executive summary / non-technical summary** - The summary should be written in non-technical language and be accessible and understandable to the relevant stakeholders and/or affected communities.

II. **Methods and Key issues** – This provides the opportunity to clarify some basic information about the ESIA including what difficulties have been encountered and the limitation of the assessment.

III. **Legislative Framework** – The legislative framework should include the relevant legislation and requirements of the country and region where the project is situated. It is also important to include a statement that commits the project to compliance.

IV. **Consultation Process** – Should contain the step by step approach and views expressed. If clear recommendations resulting from the consultation process were not followed, the reasons for those decisions should be provided.

V. **Description of the existing Social and Environmental Baseline** – should describe information collected on the past, present and future context for the NEWMAP in order to provide a picture of existing trends resulting from natural events or human activities, the current state of the environment, the current socio-economic conditions in the region, and any potential future changes which may occur as a result of planned developments.

VI. **Consideration of Alternatives** – this section should present the results of a well thought-out process that has ensured that reasonable alternatives of different types have been considered.

VII. **Description of the proposed development** – this section should cover the objectives and scope of the sub-projects, an overview of the sub-project and its location, a detailed description and layout, the site preparation and construction, and the nature of the process, resources and technologies to be used.

VIII. **Prediction and Evaluation of significant social and environmental impacts** – this should emphasize the most important impacts, who or what these will affect, and how significant the effect will be.

IX. **Mitigation / offset measures** – this section should provide an assessment of the hierarchy of impacts and whether mitigation measures proposed to alleviate the impacts and residual and/or cumulative effects. Proposed methodology to reduce negative impacts should also be included.

X. **Environmental and Social management and monitoring plans** – This section should provide a framework for managing and monitoring impacts (implementation costs inclusive) for the duration of the sub-projects and also ascertain the necessity of introducing corrective measures. It should be designed to ensure that the commitments made in the ESIA, and in any subsequent assessment reports, together with any license approval or similar conditions are implemented.

XI. **Bibliography** – A list of all references cited should be included in the report.

Roles and Responsibilities

In undertaking an ESIA, it is important that the roles, responsibilities, rights and involvements of all stakeholders in the process are clearly defined and agreed before commencement.

The level of involvement of stakeholders in the NEWMAP ESIA will depend (not limited) on the following factors;

- Location of the sub-project
- Legislation
- Source for financing of the sub-project
- Public profile of the sub-project.

Stakeholders in the ESIA process may include, but are not limited to the following groups:

- The project proponent and / or developer
- Teams of specialists (possibly including independent consultants)
- External reviewers
- Relevant local public authorities, government departments and government agencies.
- Financial institutions
- Local residents and communities
- NGOs and community interest groups/project affected persons

Other institutional bodies, such as regional development forums and resource management organizations.

8.0 The Technical team for the ESIA will be procured by the NEWMAP PMU.

9. 0 Management of the ESIA process

The consultant will manage the overall ESIA process and will be responsible for the compilation and presentation of the ESIA Report. The consultant will plan, coordinate and execute all activities of the ESIA process and will assist NEWMAP PMU in the planning and execution of the public scoping meeting and public hearing if required. The consultant will provide updates to all relevant agencies on the ESIA process.

10. Duration

This will be discussed with the NEWMAP PMU

11. ESIA Submission

This will be discussed with the NEWMAP PMU

ANNEX 003: ENVIRONMENTAL AND SOCIAL SCREENING CHECKLIST

The Environmental and Social Screening (ESSC) checklist has been designed using the World Bank Environmental and Social safeguards, and Nigerian EIA guidelines as checklist benchmarks to assist in the evaluation of proposed sub-projects under the NEWMAP. The checklist is designed to place information in the hands of reviewers so that mitigation measures, if any, can be identified and/or that requirements for further environmental analysis be determined. The ESSC also identifies potential socioeconomic impacts that will require mitigation measures.

Issues	Site Sensitivity			Responsibilities
	Low	**Medium**	**High**	
Natural Habitats	No natural habitats present of any kind	No critical natural habitats; other natural habitats occur	Critical natural habitats present	**FNEWMAP,SNEWMP, Independent Consultants**
Water quality and water resource availability and use	Water flows exceed any existing demand; low intensity of water use; potential water use conflicts expected to be low; no potential water quality issues	Medium intensity of water use; multiple water users; water quality issues are important	Intensive water use; multiple water users; potential for conflicts is high; water quality issues are important	**FNEWMAP,SNEWMP, Independent Consultants**
Natural hazards vulnerability, floods, soil stability/ erosion	Flat terrain; no potential stability/erosion problems; no known volcanic/seismic/ flood risks	Medium slopes; some erosion potential; medium risks from volcanic/seismic/ flood/ hurricanes	Mountainous terrain; steep slopes; unstable soils; high erosion potential; volcanic, seismic, or flood risks	**FNEWMAP,SNEWMP, Independent Consultants**
Cultural Property	No known or suspected cultural heritage sites	Suspected cultural heritage sites; known heritage sites in broader area of influence	Known heritage sites in project are	**FNEWMAP,SNEWMP, Independent Consultants**
Involuntary resettlement	Low population density; dispersed population; legal tenure is well-defined; well-defined water rights	Medium population density; mixed ownership and land tenure; well-defined water rights	Land issues, High population density; major towns and villages; low-income families and/or illegal ownership of land; communal properties; unclear water rights	**FNEWMAP,SNEWMP, Independent Consultants**

This report is to be kept short and concise.

1. Site Selection:

When considering the location of a sub-project, rate the sensitivity of the proposed site in the following table according to the given criteria. Higher ratings do not necessarily mean that a site is unsuitable. They do indicate a real risk of causing undesirable adverse environmental and social effects, and that more substantial environmental and/or social planning may be required to adequately avoid, mitigate, or manage potential effects

2. Checklist questions:

Physical data:	*Yes/No answers and bullet lists preferred except where descriptive detail is essential.*	
Site area in ha		
Extension of or changes to existing alignment		
Any existing property to transfer to sub-project		
Any plans for new construction		

Preliminary Environmental Information:	*Yes/No answers and bullet lists preferred except where descriptive detail is essential.*
State the source of information available at this stage (i.e., proponent's report, EIA, or other environmental study)	
Has there been litigation or complaints of any environmental nature directed against the proponent or sub-project?	

Identify type of activities and likely environmental impacts:	*Yes/No answers and bullet lists preferred except where descriptive detail is*

	essential.
What are the likely environmental impacts, opportunities, risks, and liabilities associated with the sub-project?	

Determine environmental screening category:	*Yes/No answers and bullet lists preferred except where descriptive detail is essential.*
After compiling the above, determine which category the subproject falls under based on the environmental categories A, B, and C.	

Mitigation of Potential Pollution:	*Yes*	*No*
Does the sub-project have the potential to pollute the environment or contravene any environmental laws and regulations?		
Will the sub-project require pesticide use?		
If so, then the proposal must detail the methodology and equipment incorporated in the design to constrain pollution within the laws and regulations and address pesticide use, storage, and handling		
Does the design adequately detail mitigating measures?		

Environmental Assessment Report or environmental studies required:	*Yes/No answers and bullet lists preferred except where descriptive detail is essential.*
If screening identifies environmental issues that require an EIA or a study, does the proposal include the EIA or study?	
Indicate the scope and time frame of any outstanding environmental study.	
Required Environmental Monitoring Plan:	
If the screening identifies environmental issues that require long term or intermittent monitoring (e.g., effluent, gaseous discharges, water quality, soil quality, air quality, noise), does the proposal detail adequate monitoring requirements?	

Public participation/information requirements:	*Yes/No answers and bullet lists preferred except where*

	descriptive detail is essential.
Does the proposal require, under national or local laws, the public to be informed, consulted, or involved?	
Has consultation been completed?	
Indicate the time frame of any outstanding consultation process	

Land and resettlement:	*Yes/No answers and bullet lists preferred except where descriptive detail is essential.*
What is the likelihood of land purchase for the sub-project?	
How will the proponent go about land purchase?	
What level or type of compensation is planned?	
Who will monitor actual payments?	
Actions:	
List outstanding actions to be cleared before sub-project appraisal	
Approval/rejection	*Yes/No answers and bullet lists preferred except where descriptive detail is essential.*
If proposal is rejected for environmental reasons, should the subproject be reconsidered? What additional data would be required for re-consideration?	

ANNEX 004: GENERIC GUIDELINES FOR PREPARING AND IMPLEMENTING A PLAN FOR AN ESIA

The idea of involving the community is not for the sole purpose of finding an answer to a problem, but to also engage the community in the sub-project so that they can share ownership and to give them the opportunity to be part of the design process. Furthermore, community involvement will also give the community the comfort of knowing early on in the process the mechanism through which affected individuals/households will be treated. In developing a strategy for public involvement there are a number of key issues that must be considered:

- Secure commitment to effective implementation
- Define goals clearly
- Plan consultation timing and phasing
- Provide adequate resources
- Be aware of the historical context
- Be aware of site specific sensitivities
- Recognize the interest of developers/operators
- Be prepared to hear different views.

When planning the process of a public involvement program, the following principles must be followed:

- Identify all stakeholder groups (typically integrated with social assessment)**.** Who will be affected directly and indirectly? Who else might have an interest or feel that they are affected?
- Identify the key issues around which public involvement will be required (scoping).

These key issues would include:

- Environmental and social issues or decisions at stake
- Key organizations and interested parties involved
- Local authorities and the agencies involved
- Size of the issue or importance of the decision
- Urgency and time frame
- Understand the decision making process
- Identification of parties making the decisions
- Where in the project cycle decisions are made

Determine the necessary level of involvement. Meaningful public involvement takes place at three levels:

- conveying information to the public
- listening to the opinions and preferences of the public
- Involving the public in making decisions

The nature and size of the project, combined with both the nature and number of stakeholders and the status of national legislation, will largely define when, where, and at what level public involvement is required for an EA and the Environmental Management Plan.

- Identify key points to be included in the public involvement process.
- Timely disclosure of information is important and it may be useful to develop systems to ensure that stakeholders receive information on time and in an accessible format. Whilst it is important that consultation take place before major decision points, the aim should be to facilitate consultation throughout the preparation and implementation phases. This implies that consultation will often be necessary as part of the research effort of the EA and in the development of mitigation measures during the analysis phase of the study.
- Select most effective involvement techniques to be used
- Define a communication methodology
- Develop a budget

ANNEX 005. Environmental and Social Management Plan Outline

This annex provides a framework for preparing an Environmental and Social Management plan (ESMP). Where applicable, the contractors for the sub-projects should adopt this ESMP in achieving and demonstrating sound environmental performance.

Benefits of Environmental Management Plan

Establishing an ESMP would be able to help the NEWMAP in ensuring legal compliance and effective implementation of control mechanisms and/or mitigation measures. In addition, the ESMP will also help improve environmental management efficiencies and performance.

ESMP Contents usually are:

1. ***Description of adverse impacts***: The anticipated impacts are identified and summarized.

2. ***Description of Mitigation Measure***: Each measure is described with reference to the effects it is intended to deal with. As needed, detailed plans, designs, equipment description, and operating procedures are described.

3. ***Description of monitoring program***: Monitoring provides information on the occurrence of impacts. It helps identify how well mitigation measures are working, and where better mitigation may be needed. The monitoring program should identify what information will be collected, how, where and how often. It should also indicate at what level of effect there will be a need for further mitigation. How environmental impacts are monitored is discussed below.

4. ***Responsibilities:*** The people, groups, or organizations that will carry out the mitigation and monitoring activities are defined, as well as to whom they report and are responsible. There may be a need to train people to carry out these responsibilities, and to provide them with equipment and supplies.

5. ***Cost Estimates and Source of Funds***: These are specified for the initial sub project investment and for the mitigation and monitoring activities as a sub project is implemented.

ANNEX 006: GENERIC GUIDELINES FOR THE DEVELOPMENT OF TERMS OF REFERENCE (TORS) FOR AN ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF)

This annex provides guidelines on the preparation of Terms of Reference (TORs) for an Environmental and Social Management Framework (ESMF). The resulting TORs developed will in turn guide the preparation of an ESMF, in relation to the specific Bank safeguard policies that are triggered by a project. Each ESMF prepared will take on a different form

depending on the safeguard policies that apply and the particular country circumstances involved.

The ESMF should be prepared as a stand-alone document "as early as possible" in the project's preparation phase. However, note that if an ESMF is prepared too far upstream, especially in cases where the participant country is interested only in pursuing legal, regulatory, and/or policy reforms rather than discrete activities having site-specific impacts, then the resulting Framework might not provide a suitable basis for public consultations. In fact, attempts to consult on such a Framework too far upstream under these circumstances could prove misleading for the public. Therefore, this Guidelines assumes that preparation of the initial draft of the ESMF "as early as possible" means that said preparation will take place during the preparation phase but only after decisions stemming from an inclusive public dialogue are taken, and the project begins to take concrete shape on the basis of these decisions.

I. INTRODUCTORY SECTION

Overall this section should state the purpose of the TOR and describe the context for the development of the ESMF, outline the general principles and specific objectives of the ESMF, and explain the institutional arrangements for preparing the ESMF.

1. Background Information

This sub-section should provide pertinent background for preparing the ESMF, relating its preparation to the other activities underway as part of the project's process in the country in question. This would include a brief history of this process, a description of activities to be funded by the **donor**, the interactions between/among the various implementing entities involved, and a description of:

- The main risks to the natural environment or to human communities (environmental and social) associated with the pursuit of project options; and

- The list of World Bank safeguards policies most likely to apply, which serves as a confirmation of the initial determination of these triggers that was made during the project Formulation phase.

2. Principles and Objectives

This sub-section should describe the general principles upon which the ESMF is based, as well as its specific objectives, taking into account the following points:

- The ESMF ensures compliance with World Bank's safeguard policies during both project preparation and implementation. It provides for an examination of the risks and potential impacts associated with one or more project(s), activity(-ies), or policy(-ies)/regulation(s) that may occur in the future as part of project implementation. The ESMF sets out the principles, guidelines, and procedures to assess environmental and social risks, and proposes measures to reduce, mitigate, and/or offset potential adverse environmental and social impacts and enhance positive impacts and opportunities of said project(s), activity(-ies), or policy(ies)/regulation(s).

- The ESMF provides procedures for: (i) consultations with concerned stakeholder groups; (ii) capacity building measures; and (iii) environmental and social impact screening, assessment, and monitoring. The ESMF also specifies the inter-institutional

arrangements for the preparation of time-bound action plans for managing and mitigating adverse impacts related to the future project(s), activity(-ies), or policy(-ies)/regulation(s).

- By doing the above, the output in an ESMF that is compliant with applicable World Bank safeguard policies at the time of the assessment of the project development objectives, while also providing the overall framework for addressing social and environmental risk management issues.

II. MIDDLE SECTION

Overall this section should describe the tasks needed to prepare the ESMF in (i) initial draft form; and (ii) final draft form.

3. Scope of Work

The TOR should make clear that preparation of an initial draft ESMF suitable for disclosure and public consultations would involve the following minimum tasks:

- A description of the indicative project option(s), its main social and environmental considerations, and the various risks involved in its implementation.

- An outline of the legislative, regulatory, and policy regime in relation to forest resources management, land use, etc.

- A description of the potential future impacts, both positive and negative, deriving from the project(s), activity (-ies), or policy(-ies)/regulation(s) associated with the implementation of strategies, and the geographic/spatial distribution of these impacts;

- A description of the arrangements for implementing the specific project(s), activity (-ies), or policy (-ies)/regulation(s) that are finally decided on, with a focus on the procedures for (i) screening and assessment of site-specific environmental and social impacts; (ii) the preparation of time-bound action plans for reducing, mitigating, and/or off-setting any adverse impacts; (iii) the monitoring of the implementation of the action plans, including arrangements for public participation in such monitoring.

- An analysis of the particular institutional needs within the National Management Arrangements for implementing the ESMF. This should include a review of the authority and capability of institutions at different administrative levels (e.g. local, district, provincial/regional, and national), and their capacity to manage and monitor ESMF implementation.

- An outline of recommended capacity building actions for the entities responsible for implementing the ESMF.

- Requirements for technical assistance to public- and private-sector institutions, communities, and service providers to support implementation of the ESMF.

- An outline of the budget for implementing the ESMF.

III. ENDING SECTION

Overall this section should specify the conditions (relating to budget, timeframe, deliverables, etc.) under which the Consultant(s) selected will be expected to develop the ESMF.

4. Schedule and Deliverables

The TOR should specify the consultancy deliverables (e.g. detailed work-plan, initial draft ESMF, final draft ESMF), the schedule for delivery (e.g. detailed work-plan within 2 weeks, initial draft ESMF within 2 months, and final draft ESMF within 6 months of contract signature), and the overall duration of the consultancy (e.g. 6 months from contract signature).

5. Budget and Payments

The TOR should indicate if there is a budget ceiling for the consultancy. It should also specify the payment schedule (e.g. 10% on contract signature, 10% on delivery of detailed work-plan and inception report, 40% on delivery of initial draft ESMF, 40% on delivery of final draft ESMF).

6. Consultant Qualifications and Expected Level of Effort

The TOR should convey that the ESMF preparation team will have to be capable of addressing all of the safeguard policies triggered by the project(s), activity (-ies), or policy (-ies)/regulation(s) that may occur in the future from the implementation of the emerging project(s), and of carrying out all the tasks outlined in the Scope of Work above. Where multiple safeguard policies need to be addressed in an ESMF, the Framework would ideally be prepared by a multi-disciplinary team reflecting the necessary ecological and socio-cultural expertise. The TOR should furthermore state that the team will be expected to manage the preparation of both the overall ESMF and each of its separate sections or "chapters" (corresponding to the EMF, RPF, etc.). This can be accomplished by calling for a Team Leader and Lead Specialists, with accompanying qualifications (training and experience) requirement.

7. Services, Facilities, and Materials to be provided

The TOR should specify what services, facilities, and materials will be provided to the Consultant by the World Bank and the Participant Country. The TOR should also outline the actions to be taken by the Government to facilitate the work of the Consultant by providing access to government authorities, key stakeholders, and potential project sites

ANNEX 007: GENERIC ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES CHECKLIST

Upon completion of the screening form, which would have identified potential sub-project adverse impacts, the NEWMAP-PMU or Stakeholders at various levels may use the checklist below to identify the corresponding mitigation measures to successfully manage these impacts.

	Land Degradation	Water	Bio-diversity, Natural Habitats and Wetlands	People
Planning	Soil Erosion: (i) Training of Subsistence and Cash Crop Farmers and Pastoralists on soil conservation methods. (ii) Rehabilitate anti-erosion infrastructure such as, micro-basins, micro dams, hill side terracing, soil bunds etc. (iii) Construct new anti-erosion infrastructure as listed in (ii) above. (iv) Introduce crop rotation management, use of fertilizers, tree planting and soil drainage (v) Control bush burning and fires. vi) Protection of roadsides by planting of vegetation.	i) Promote potable water and sanitation sub projects. ii) Promote environmental health measures and public health education. iii) Improve management of household and solid waste, including infrastructure for collection and treatment of liquid waste and waste water. iv) Review, update and enforce pollution control legislation. v) Strengthen enforcement capacity. vi) Develop and implement rural water supply and sanitation policy. vii) Locate sub projects at far/safe	i) Consideration of alternative locations/siting of sub projects. ii) Reduce biomass use through provision of alternative energy sources and construction materials (cooking stoves, photovoltaics). iii) Strengthen natural resource management capacities iv) Develop alternatives to slash and burning clearing, decrease overgrazing. v) Promote agro forestry. vi) Wetlands management and small irrigation development. vii) Protect sensitive ecosystems such as forests and wetlands, prevent further encroachment in	i) No involuntary settlement allowed due to land acquisition, denial or restriction of access to economic resources such as trees, buildings etc., used by members of communities. ii) Provide social services in areas of Primary education Primary health care Water supply Micro-finance Feeder roads Soil conservation and natural resources management. Basic and required training at State and local community levels. Ensure that these services are equitably distributed

	Land Degradation	Water	Bio-diversity, Natural Habitats and Wetlands	People
	vii) Protection of outlet of drainage canals and culverts to avoid gully forming downstream of the canal or culvert. viii) Prepare an effective and sustainable maintenance plan.	distances from water points and sources. viii) Increase public awareness.	protected areas. viii) Enforce existing laws. ix) Locate sub projects appropriately. x) Training of communities of sustainable uses of resources. xi) Identify certain species of trees and animals that must be protected. xii) Exclude ecosystems that provided and important habitat for protected species. xiii)Establish buffer zones around protected parksand wetlands	throughout the districts and that access is open to all ethnic groups irrespective of status. iii) Ensure that vulnerable groups in sub project areas are included in project activities and benefit from decision-making and implementation. iv) Provide employment opportunities during contracting of Civil works e.t.c
Construction	• Construction in dry season. Protection of soil surfaces during construction. • Adequate protection from livestock entry by fencing the site perimeters. • Employ all unskilled labour from local community and semi-skilled labour first from local community when available there in. • Source goods and services from local districts first, when available. • Control and daily cleaning at construction sites. • Provision of adequate waste disposal services including proper disposal of chemicals and other hazardous materials. • Dust control by water, appropriate design and siting, restrict construction to certain times. • Appropriate and suitable storage of building materials on site. • Siting of Latrines at safe distances from wells and other water points and using closed systems for sewage drainage. • Restrict construction to certain hours • Minimize loss of natural vegetation during construction; alternative			

	Land Degradation	Water	Bio-diversity, Natural Habitats and Wetlands	People
	sites; various special measures for sensitive species • Restoration of vegetation; cleanup of construction sites. • Safety designs (signage) • Ensure availability of clean potable water for use in latrines, canteens and for drinking. Use of appropriate building materials. No asbestos etc			
Day to Day Operations	i) Use facilities/infrastructure as designed and as intended. ii) Employ trained staff to man and secure facilities. iii) Log and report any damages done and repairs needed. iv) Perform periodic monitoring of all aspects as contained in the sub project Environmental and Social Monitoring Plan.			
Maintenance	i) Prepare and adopt suitable maintenance plan. ii) Maintain appropriate budget necessary to implement maintenance plan. iii) Implement maintenance plan in two stages: for activities requiring day-to-to maintenance such as repairs to damages done, regular inspections etc and longer/periodic term maintenance. iv) Have suitably trained staff to carry out maintenance and access to materials/goods/equipment.			

ANNEX 008: INTEGRATED PEST MANAGEMENT PLAN

Introduction

An IPMP is a comprehensive plan, developed when there are significant pest management issues such as (a) new land-use development or changed cultivation practices in an area, (b) significant expansion into new areas, (c) diversification into new crops in agriculture (d) intensification of existing low-technology systems, (e) proposed procurement of relatively hazardous pest control products or methods, or (f) specific environmental or health concerns (e.g. proximity of protected areas or important aquatic resources; worker safety). An IPMP is also developed when proposed financing of pest control products represents a large component of the project. A pest management plan reflects the policies set out in OP 4.09, Pest Management. The plan is designed to minimize potential adverse impacts on human health and the environment and to advance ecologically based IPM.

The importance of the World Bank safeguard policy on Pest Management (OP 4.09) is to promote the use of biological or environmental control methods and reduce reliance on synthetic chemical pesticides and ensure that health and environmental hazards associated with pesticides are minimized. A major provision of the Safeguard Policy is the preparation of a comprehensive Pest Management Plan, or PMP, that will outline the various elements of and actions needed to be taken to adequately address these concerns during project implementation. Pest populations are to be controlled through Integrated Pest Management (IPM) approaches such as biological control, cultural practices, and the development and use of crop varieties that are resistant or tolerant to the pest.

Note: The Bank may finance the purchase of pesticides when their use is justified under an IPM approach and following some criteria concerning selection of pesticides:

(a) They must have negligible adverse human health effects.

(b) They must be shown to be effective against the target species.

(c) They must have minimal effect on non-target species and the natural environment. The methods, timing, and frequency of pesticide application are aimed to minimize damage to natural enemies. Pesticides used in public health programs must be demonstrated to be safe for inhabitants and domestic animals in the treated areas, as well as for personnel applying them.

(d) Their use must take into account the need to prevent the development of resistance in pests.

Executive Summary

The IPMP must contain a non-technical Executive Summary which will precede the Chapter on Introduction

Introduction

The IPMP Chapter on '***Introduction***', should describe the NEWMAP and its components and sub-projects, its areas of focus, vegetation and crops of economic and social importance, livelihood and general demographics of the project states.

Objective

Objectives of the Integrated Pest Management Plan: The plan is designed to minimize potential adverse impacts on human health and the environment and to advance ecologically based Integrated Pest Management (IPM). The plan is based on on-site evaluations of local conditions conducted by appropriate technical specialists with experience in participatory IPM."

Rationale for an IPMP

An IPMP addresses the project concerns about pests. It stresses the need to monitor and mitigate negative environmental and social impacts of the project and promote ecosystem management. It also limits hazards associated with the use of pesticides on human health, environment and crops. Pesticides can lead to acute poisoning in human and animal health, contamination of drinking and ground water in the environment and pesticide resistance in the case of crops

Contents of the Integrated Pest Management Plan: The four major issues addressed by the IPM are: i). Pest management approaches; ii) Pesticide use and management; iii) Policy, regulatory Framework and institutional capacity, and iv) Monitoring and evaluation. In addition, this integrated pest management plan specifies procedures for screening pest control products

Policy, regulatory framework and institutional capacity: The **IPMP** must assess the government policies on pest management (crop protection and vector control) and their consistency with IPMP approaches. Evaluate if there are direct or indirect subsidies for pesticides, donated pesticides that distort market prices, or other factors that may increase reliance on (unnecessary) pesticide use.

Recommended Actions in an IPMP FOR NEWMAP

1. Diagnose pest problems affecting crops and livestock production within project states so as to develop a shared vision on priority needs and IPM opportunities.

2. Develop the capacity of PAPs (especially the farmers) to understand and manage pest problems through farmer participatory learning approaches with complementary participatory research on feedback issues emanating from farmers' field experiences.

3. Introduce and promote microbial pesticides and botanicals as alternatives to harmful pesticide regimes and thereby reduce environmental, social and health risks.

4. Establish biodiversity monitoring schemes for early warning on changes in pest and vector status, natural enemy complexes, pollinators, and detect migratory pests and introduction of alien invasive species

5. Develop/update a national IPM policy including national legislations (where not existent) governing the manufacture, registration, importation, distribution and use of pesticides in order to promote NEWMAP compliance with the World Bank's safeguard Policies, OP 4.09 and BP 4.01, and other international conventions and guidelines on pesticide use

BUDGET

Provision of a budget for implementing the IPMP will be required to effectively implement proposed activities for pest management under the NEWMAP over the 8 years period of the project. The budget should cater for capacity building, advisory services, environmental management, social accountability and sensitization, and monitoring and evaluation.

Stakeholders' consultation: This is a very important step in IPMP development and implementation. Stakeholder consultations need to be conducted and opinion from MDAs, CBOs, PAPs and other stakeholders should be documented and addressed.

Conclusion: The chapter on conclusion should provide detailed guidance on implementation.

Integrated Pest Management Plan (IMP).

Critical Aspects to Consider

Record Keeping and Annual Reporting

- It is standard and good practice for the NEWMAP to prepare, maintain and keep pest management and pesticide application records

- Environmental and social compliance is very necessary. Pesticides used must be environmentally safe and as well not disrupt production systems and livelihood.
- Records of the amount of pesticides used, and information such as date and location of use, and the target pests should be provided.
- A periodic pesticide use report should be prepared by the contractor.
- List of personnel trained during the year.
- The report will be reviewed by the FNEWMAP-PMU and the World Bank.

Public Outreach

The NEWMAP will use appropriate opportunities to communicate with the public about IPM strategies and their benefits. Public outreach will include:

• IPM information provided to schools, residents, and businesses via special events, IPM workshops,

• Information on chosen and in-use Pesticide disposal options:

Capacity building issues

The success of IPMP depends largely on developing and sustaining institutional and human capacity to facilitate informed decision by the stakeholder agencies and local farmers in the communities.

Institutional Arrangements

The World Bank will serve as the principal donor for the implementation of the IPMP. The Federal Ministry of Environment, Federal ministry of Agriculture, Federal Ministry of Health, Research Institutions and Universities will collaborate with the project by contributing to the field staff to be trained as IPM Trainers. They will also organize members of their various ministries into farmer groups for training and promotion of IPM practices. Other tasks will include preparation and production of field guides and relevant IPM information materials, provision of policy guidance/oversight for implementation of the IPMP, monitoring, supervision and coordination of IPM activities, and documentation of user compliance on pesticide use.

Consulting

The NEWMAP will procure a Consultant to provide technical and other support for implementation of the IPMP.

Monitoring and Evaluation

Monitoring and evaluation: The IPMP should contain description of activities that require local monitoring during implementation and during supervision missions. Specifically, the IPMP should describe these activities and propose realistic performance indicators that can be used to evaluate progress towards the implementation of sustainable pest management, effectiveness of measures to mitigate pesticide risks, progress in strengthening regulatory framework and institutional capacity, etc. It should also contain a detailed monitoring and supervision plan that would be adopted during project supervisory missions. For example, in the plan include the types of expertise required at different stages of project implementation, actual monitoring activities and detailed budget.

The following monitoring indicators will be incorporated into a participatory monitoring and evaluation plan.

Area	Indicator
Training and Awareness creation	Types and number of participatory learning modules (PLM) delivered; Category and number of extension agents

Area	Indicator
	and farmers trained and reached with each PLM; Category and number of participants reached beyond baseline figures; Practical skills/techniques most frequently demanded by extension agents and farmers; and Crop/livestock management practices preferred by farmers.
Technology acceptance/ field application	Level of pest damage and losses; Rate of adoption of IPM practices; Impact of the adoption of IPM on production performance of farmers
Project direct benefits	Increase in crop/livestock production; Increase in farm revenue; Social benefits: e.g., improvement in the health status of farmers; Level of reduction of pesticide purchase

IPMP Terms of Reference (TOR)

The IPMP shall complement the Environmental and Social Management Framework (ESMF) and other safeguards instruments of the project.

Scope of Work

(A) The consultant is expected to prepare the pest management plan taking into consideration the activities of the NEWMAP and institutional arrangements for implementing the IPMP.

Specifically, the focus will be on:

(a) Project description
(b) Project components and associated activities
(c) Institutional and Implementation Arrangement
(d) Applicable Laws, Regulations and Policies (including list of Ban ingredients, Active ingredients with restriction/tolerable limits, List of pesticides that are acceptable
(e) Existing Pest and Pest management Activities and practices
(f) Potential Impacts of Pest and management Activities
(g) Mitigation Measures
(h) Institutional capacity strengthening needs should be outlined.
(i) Integrated Pest management plan
(j) Monitoring and Evaluation

(B): Review of Local Regulations

The consultant is expected to undertake the review of local regulations:

Specifically, the focus will be on:

- Review of existing laws and regulations that relate to pest management at national levels as well as relates to the World Bank policies
- Review of the risks (heavy pesticide use, number of IPM policy etc)
- Review of local capacity, especially whether enforcement capacity is in place
- Recommendation on mitigation of expected risks
- Government Ownership
- Project design, costing indicators
- Country's pest management policy
- Pest management procedures/plan
- Responsibilities
- Reporting format

(C). PMP Policy and Regulatory Framework

The Consultant will analyze the existing PMP policies, laws, regulations on pest management in the country. In particular, the PMP should assess whether environmental and health risk issues are sufficiently identified and covered by current practices.

- Determine the PMP Issues applicable to the project and identify appropriate strategies to control or avoid environmental harm.
- Design modifications and mitigation measures to be developed consultatively to address identified environmental impacts

- When needed selecting and applying pesticides, in a way that minimizes adverse effects and beneficial organisms, human and environment.
- Promote environmentally sound and sustainable pest management
- Minimize the environmental and health hazards related to pesticide usage
- Ensure that pest management activities follow an integrated pest management approach
- Develop national capacity to implement IPM based on crop protection and pesticide regulation
- Integration of the various regulations pursuance to the project

(D). Baseline Data

Baseline information is very important in documenting the prevailing situation that can serve as a yardstick for measuring project impact as well as the success or failure of the mitigation measures put in place. Therefore the consultant shall collect, collate analyze and report existing data in an objective way. Baseline data shall cover such areas as:

- Current insect pest/diseases problems and management approaches
- Current situation of Agriculture production in project areas
- Current situation of agriculture production in project area
- Current situation of pest management in project area
- Pesticide input in agriculture production in project area
- Health problem caused by chemical pesticide
- Prevalence of chemical pesticides related diseases in the project area
- Prevalence of other pest and diseases in the project area

(E). Development of Management Plan to Mitigate Negative Impacts

The IPMP shall identify and describe the key environmental issues and impacts; and recommend practical and cost-effective actions to prevent or reduce significant impacts to tolerable levels. Estimate the impacts and costs of mitigation measures, as well as the institutional and personnel capacity building needs to implement them. Prepare IPMP including proposed work programs, budget estimates, schedules, staffing and training requirements, and other necessary support services to implement the mitigating measures.

(F). Institutional Capacity and Strengthening

Implementation of the mitigation measures, indeed the entire IPMP depends largely on the ability of the PIU to plan, control and fulfill their commitments in these areas. The Institutional arrangements for participation and project management capacity and strengthening needs should be outlined. In addition, the consultant shall propose means for strengthening of implementing institutions to be able to predict and control the environmental impacts of the project and its sub-components. To this end, the IPMP will address institutional tasks and cover every stage of the project process (from the initiation and reviews to the monitoring of the implementation of environmental mitigation plans). The PMP should also assess the capacity of the implementing agency to handle the preparation, implementation and supervision of comprehensive environmental assessment of the proposed project.

(G).Training Needs

Based on the study's findings, the consultant should describe how to develop an EA training program for the Project staff, and other government and non-government partners and facilitators to ensure adequate monitoring and enforcement of environmental standards. It should also identify the training needs of farmers and the most effective means and methods of training these farmers to effectively implement the IPMP.

(H). Public Consultation

Public consultation with key stakeholders all through the process of developing the IPMP is vital .It is important to understand local concern and acceptance of proposed mitigation measures. The consultant shall discuss and interact with national NGOs, community opinion leaders, scientific experts, relevant government agencies and the private sector.

(I) Monitoring and Evaluations:

The IPMP should outline appropriate monitoring program. To this end, the consultant should describe a monitoring regime that will be established, prioritizing those elements that must be in place prior to allow a baseline to be established against which changes during implementation can be assessed. .Specifically, the IPMP should also describe monitoring programs, which should be designed to:

- Ensure safeguards are being applied effectively
- Identify any unpredicted impacts requiring remedial measures
- Measure and differences between predicted and actual impacts; and provide for periodic review of the management plan itself
- Identification of who is responsible for M & E.

(J) Expected Outcome:

- Baseline information that can be tracked for monitoring the impact of the project
- Institutional Arrangement for participation and project management
- Pest management plan
- PMP Monitoring Framework

(K) Required Profile

Special considerations will be given to individuals that have knowledge, experience and expertise in the execution World Bank projects, and compliance of project activities to environmental and social safeguards of the Bank.

Duration of task

The PMP should be completed in **20** days

ANNEX 009: STAKEHOLDERS CONSULTATION IN THE STATES VISITED

Situation Report Enugu State

View of the erosion sites at the express way by Onyeama mine en-route Ngwo

Representatives of CBOs and NGOs after an interactive session at the office of the Ministry of Environment and Solid Minerals, Enugu State.

on – List of Priority Sites Enugu State

			persons			
s way by na mine	Ngwo, Abor,	TBD	Farming and Trading and Civil Service	General Community populace and private occupational groups (construction companies and poultry farms	Cashew, Palm trees, Mango, Orange	Traditional Ruler, Town Union, Age Grade, Women group, Vigilante, CBOs
	communities	Population	likely project affected person	Groups	Vegetation	Structure
kpologwu gully	Nkpologwu, Aku, Akpugo-Ezedike	TBD	Farming and Trading	General Community populace and private occupational groups (construction companies and poultry farms	Cashew, Mango, Palm trees, Orange	Traditional Ruler, Town Union, Age Grade, Women group, Vigilante, CBOs
lly Erosion	Ebe, Eke, Egede, Ukana	TBD	Farming and Trading	General Community	Cashew, Mango, Palm	Traditional Ruler, Town

Picture of the Ekul
Oruku, Ngine e.t.c a

Questionnaire Analysis

Stakeholders at the State and Organizational Levels- MDAs, CBOs and NGOs

e on the NEWMAP			
	Rating		
	1	2	3
	Very good	Satisfactory	Low
lerstanding and	✓		

	Cumulative Average Rating			
		1	2	3
ority concerns of IAP on ntal and socio-ensitivities		High priority	Moderate priority	Low priority
	Soil quality			
	Water quality			
	Air quality			
	Solid waste disposal			
	Civil and earth works			
	Land use management and land use controls			
	Brush/Forests/Vegetation			
	Visual quality			✓
	Quality and diversity of wildlife			
	Quality and diversity of aquatic life			
	River-based recreation			
	Road drainage patterns	✓		

the table is based on frequency of responses by respondents to the parameters listed above. 3 parameters where indicated under each column moderate priority and low priority) to display cumulative concerns as perceived by respondents.

	Floodplain management			
	Availability of safe drinking water	✓		
	Involuntary resettlement			✓
	Effect on production systems		✓	
	Effect on social wellbeing			
	Cultural heritage		✓	
	Effect on indigenous peoples			
	Renewable energy sources			

Stakeholders at the Community Level- Community Leadership and Community Household Responses

Knowledge on the NEWMAP				
	Rating			
	1	2	3	
	Very good	Satisfactory	low	
Project understanding and perception	✓			

	Cumulative Average Rating			
		1	2	3
Land use/land degradation and soil erosion		High	Moderate	low
	Community co-operation in giving out land for sub-project	✓		
	Awareness level on erosion and watershed issues	✓		
Water Pollution	Occurrence of eutrophication in community utility water bodies			✓
	Decline in number of freshwater fish			✓
Afforestation and Deforestation	Deforestation activities		✓	
	Afforestation activities		✓	
Overexploitation of wetlands	Level of indigenous agricultural activities taking place on wetlands			✓
	Level of waste disposal on wetlands		✓	
	General perception of activities on wetlands contributing to erosion			✓
Anthropogenic activities	General perception that human activities have led to erosion in the area	✓		
	Level of mining, excavation and other earth work activities in the area	✓		
Labour Issues and socio-economics	Perception on the NEWMAP potential to create jobs for indigenous people	✓		
	Possibility of influx of work migrants	✓		
	Level of erosion effects on agricultural practices	✓		
	Perception that the NEWMAP will successfully manage erosion and watershed issues	✓		
	Perception that NEWMAP civil activities may affect communities (infrastructure and businesses) negatively		✓	
	Perception that the NEWMAP may result in involuntary resettlement issues		✓	
	Possibility in gaining co-operation and participation from communities for the implementation of NEWMAP activities	✓		
Public Health/Infectious diseases	Perception that influx of sub-projects workforce may increase spread of STIs			✓

Situation Report- Imo State

View of the erosion sites at the Urualla and Umuchima Ideato South LGA, Imo State

Representatives of erosion affected communities after an interactive session at the office of the Ministry of Petroleum and Environment, Imo State.

Representatives from CBOs and NGOs at the stakeholder interactive consultation session in the conference room of the Ministry of Petroleum and Environment, Imo State.

Information in the table is based on frequency of responses by respondents to the parameters listed above. 3 parameters where indicated under each column (high priority, moderate priority and low priority) to display cumulative concerns as perceived by respondents.

on – List of Priority Sites Imo state

d sites	Likely at risk communities	Estimated Population	Occupation of likely project affected persons	Vulnerable Groups	Nature of Vegetation	Social Structure
ma-obiohia Rd outh	Okoroduruaku village, Obinugwu village Umudurunwaneri villageUmualla village Umuokwaraoke village	TBD	Teaching, petty trading, artisans	Old people, petty traders, churches and mad people	Palm trees, local pear, raffia palm, shrubs.	Eze, Town Union, Youth Organizations, NGO
i Ideato South		TBD	Teaching, petty trading, artisans	Schools, old people	Palm trees, local pear, shrubs	
eji –Umuturu – zu (Urualla)	Eziokwu, Ikpa, Uzuakoli, Umuwnaro, (Ozuomee), Ofeoria, Okorobi, Ikpa, Umuomeji, Umutur, Ezemeazu (Uruala)	3,000 – 5,000	Farming, petty trading, okada riding	Women farmers	Palm trees, local pear, orange, shrubs	Eze Urualla, Eze in Council (Ekwedasike) Palace chievies, Village Heads, Family Heads
umiri uru, Rd, Ihioma, A, Iyiuzo Rd Orlu LGA ream, Onumirir Ekpeowerre Iyingodo stream.	Ihioma	TBD	Teaching, petty trading, artisans	Old people, petty traders, churches and mad people	Palm trees, local pear, shrubs	Chief Executive(Direct or General), Kindred of village unions, Community
nu ibeafor and Mbano	Okwabala, Umuezennachi, Isiokwu	5,000; 4,000; 3,300	Farming, Trading, Artisans	Old people, petty traders, churches and mad people	Raffia palm, Palm tree, Oil bean tree, Bambo	Eze, Town Union, Youth Organizations, NGO (Ihioma Network)

major rivers and water catchment areas	Nature of vegetation
ver	Oil palm, rain forest vegetation
River	Rain forest vegetation
River	Iroko, mahogany, obeche, gmelina, bamboo, rubber and oil palm
River	Iroko, mahogany, obeche, gmelina, bamboo, rubber and oil palm
iver	Iroko, mahogany, obeche, gmelina, bamboo, rubber and oil palm

e on the NEWMAP			
	Rating		
	1	2	3
	Very good	Satisfactory	Low
lerstanding and		✓	

	Cumulative Average Rating			
		1	2	3
ority concerns of IAP on ntal and socio-ensitivities		High priority	Moderate priority	Low priority
	Soil quality			
	Water quality			
	Air quality			
	Solid waste disposal			
	Civil and earth works		✓	
	Land use management and land use controls	✓	✓	
	Brush/Forests/Vegetation			
	Visual quality			
	Quality and diversity of wildlife			✓
	Quality and diversity of aquatic life			
	River-based recreation			
	Road drainage patterns			

the table is based on frequency of responses by respondents to the parameters listed above. 3 parameters where indicated under each column moderate priority and low priority) to display cumulative concerns as perceived by respondents.

Floodplain management			
Availability of safe drinking water	✓		
Involuntary resettlement			
Effect on production systems			✓
Cultural heritage			
Effect on indigenous peoples			
Renewable energy sources			

Stakeholders at the Community Level- Community Leadership and Community Household Responses

	Rating			
	1	2		3
	Very good	Satisfactory		low
Project understanding and perception		✓		
	Cumulative Average Rating			
		1	2	3
Land use/land degradation and soil erosion		High	Moderate	low
	Community co-operation in giving out land for sub-project	✓		
	Awareness level on erosion and watershed issues			✓
Water Pollution	Occurrence of eutrophication in community utility water bodies			✓
	Decline in number of freshwater fish			✓
Afforestation and Deforestation	Deforestation activities			✓
	Afforestation activities		✓	
Overexploitation of wetlands	Level of indigenous agricultural activities taking place on wetlands	✓		
	Level of waste disposal on wetlands			✓
	General perception of activities on wetlands contributing to erosion		✓	
Anthropogenic activities	General perception that human activities have led to erosion in the area	✓		
	Level of mining, excavation and other earth work activities in the area			✓
Labour Issues and socio-economics	Perception on the NEWMAP potential to create jobs for indigenous people	✓		
	Possibility of influx of work migrants		✓	
	Level of erosion effects on agricultural practices	✓		
	Perception that the NEWMAP will successfully manage erosion and watershed issues	✓		
	Perception that NEWMAP civil activities may affect communities (infrastructure and businesses) negatively	✓		
	Perception that the NEWMAP may result in involuntary resettlement issues	✓		
	Possibility in gaining co-operation and participation from communities for the implementation of NEWMAP activities	✓		
Public Health/Infectious diseases	Perception that influx of sub-projects workforce may increase spread of STIs			✓

Situation Report- Abia State

View of the erosion sites at Amafor Umuahia South LGA, Abia State

Representatives of erosion affected communities after an interactive session. Bende LGA, Abia State.

Team with a representativs from the State Government, Abia State.

Information in the table is based on frequency of responses by respondents to the parameters listed above. 3 parameters where indicated under each column (high priority, moderate priority and low priority) to display cumulative concerns as perceived by respondents.

n – List of Priority Sites Abia state

d sites	Likely at risk communities	Estimated Population	Occupation of likely project affected persons	Vulnerable Groups	Nature of Vegetation	Social Structure
	TBD	TBD	TBD	TBD	TBD	TBD
	TBD	TBD	TBD	TBD	TBD	TBD
	TBD	TBD	TBD	TBD	TBD	TBD
	TBD	TBD	TBD	TBD	TBD	TBD
	TBD	TBD	TBD	TBD	TBD	TBD

section of the Aba River- One of the major rivers in Abia State alongside the Imo River.

the State and Organizational Levels- MDAs, CBOs and NGOs Responses

e on the NEWMAP			
	Rating		
	1	2	3
	Very good	Satisfactory	low
lerstanding and		✓	

	Cumulative Average Rating			
		1	2	3
ority concerns of IAP on ntal and socio-ensitivities		High priority	Moderate priority	Low priority
	Soil quality			
	Water quality			
	Air quality			
	Solid waste disposal			
	Civil and earth works		✓	
	Land use management and land use controls	✓		
	Brush/Forests/Vegetation	✓		
	Visual quality			
	Quality and diversity of wildlife			
	Quality and diversity of aquatic life			
	River-based recreation			
	Road drainage patterns			

the table is based on frequency of responses by respondents to the parameters listed above. 3 parameters where indicated under each column moderate priority and low priority) to display cumulative concerns as perceived by respondents.

Floodplain management			
Availability of safe drinking water			
Involuntary resettlement		✓	✓
Effect on production systems			✓
Effect on social wellbeing			
Cultural heritage			
Effect on indigenous peoples	✓		
Renewable energy sources			
Public and Environmental health			
politics			

Stakeholders at the Community Level- Community Leadership and Community Household Responses

Knowledge on the NEWMAP				
	Rating			
	1	2	3	
	Very good	Satisfactory	low	
Project understanding and perception		✓		

	Cumulative Average Rating			
		1	2	3
		High	Moderate	low
Land use/land degradation and soil erosion	Community co-operation in giving out land for sub-project	✓		
	Awareness level on erosion and watershed issues			✓
Water Pollution	Occurrence of eutrophication in community utility water bodies			✓
	Decline in number of freshwater fish			✓
Afforestation and Deforestation	Deforestation activities			✓
	Afforestation activities		✓	
Overexploitation of wetlands	Level of indigenous agricultural activities taking place on wetlands	✓		
	Level of waste disposal on wetlands			✓
	General perception of activities on wetlands contributing to erosion	✓		
Anthropogenic activities	General perception that human activities have led to erosion in the area	✓		
	Level of mining, excavation and other earth work activities in the area			✓
Labour Issues and socio-economics	Perception on the NEWMAP potential to create jobs for indigenous people	✓		
	Possibility of influx of work migrants		✓	
	Level of erosion effects on agricultural practices	✓	✓	
	Perception that the NEWMAP will successfully manage erosion and watershed issues	✓		
	Perception that NEWMAP civil activities may affect communities (infrastructure and businesses) negatively		✓	
	Perception that the NEWMAP may result in involuntary resettlement issues	✓		
	Possibility in gaining co-operation and participation from communities for the implementation of NEWMAP activities	✓		
Public Health/Infectious diseases	Perception that influx of sub-projects workforce may increase spread of STIs			✓

Situation Report- Cross River State

View of the erosion sites at Etim Otop and Ikot Awatim (respectively), Calabar, Cross River State

Nyaghessan gully erosion site.

Stakeholders interactive session at the Ministry of Environment in Calabar.

Information in the table is based on frequency of responses by respondents to the parameters listed above. 3 parameters where indicated under each column (high priority, moderate priority and low priority) to display cumulative concerns as perceived by respondents.

n – List of Priority Sites Cross Rivers state

zed sites	Likely at risk communities	Estimated Population	Occupation of likely project affected persons	Vulnerable Groups	Nature of Vegetation	Social Structure
watim	Ikot Awatim communities	TBD	Civil servants, traders and artisans	Community populace	Palm trees, coconut, black pear, bamboo,	Clan head, Village head, Village council, Family head, Youth
						ncil, uth
						ncil, uth
						ncil, uth
						ncil, uth
						groups, NGOs

major rivers and water catchment areas	Nature of vegetation
River	Rain forest vegetation
ver	Rain forest vegetation

of a section of the Cross River (also called the Oyono River by natives)- One of the major rivers in Cross River.

e on the NEWMAP			
	Rating		
	1	2	3
	Very good	Satisfactory	low
lerstanding and		✓	

	Cumulative Average Rating			
		1	2	3
ority concerns of IAP on ntal and socio-ensitivities		High priority	Moderate priority	Low priority
	Soil quality			
	Water quality			
	Air quality			
	Solid waste disposal			
	Civil and earth works		✓	
	Land use management and land use controls		✓	
	Brush/Forests/Vegetation	✓		
	Visual quality			
	Quality and diversity of wildlife	✓		✓
	Quality and diversity of aquatic life			
	River-based recreation			
	Road drainage patterns			✓

the table is based on frequency of responses by respondents to the parameters listed above. 3 parameters where indicated under each column moderate priority and low priority) to display cumulative concerns as perceived by respondents.

Floodplain management			
Availability of safe drinking water			
Involuntary resettlement			
Effect on production systems			✓
Effect on social wellbeing	✓		
Cultural heritage			
Effect on indigenous peoples			
Renewable energy sources			

Stakeholders at the Community Level- Community Leadership and Community Household Responses

Knowledge on the NEWMAP				
	Rating			
	1	2	3	
	Very good	Satisfactory	low	
Project understanding and perception		✓		

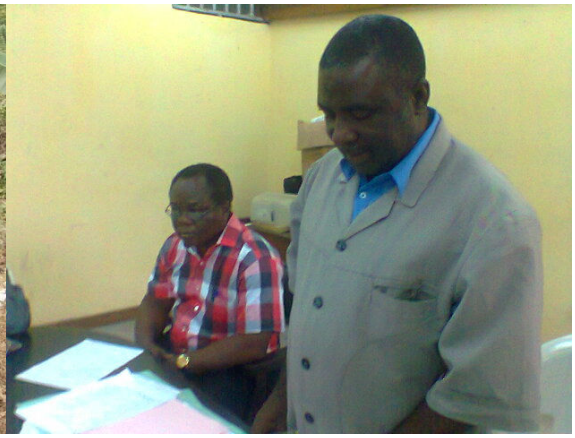
	Cumulative Average Rating			
		1	2	3
Land use/land degradation and soil erosion		High	Moderate	low
	Community co-operation in giving out land for sub-project	✓		
	Awareness level on erosion and watershed issues		✓	
Water Pollution	Occurrence of eutrophication in community utility water bodies			✓
	Decline in number of freshwater fish			✓
Afforestation and Deforestation	Deforestation activities		✓	
	Afforestation activities			
Overexploitation of wetlands	Level of indigenous agricultural activities taking place on wetlands			✓
	Level of waste disposal on wetlands			✓
	General perception of activities on wetlands contributing to erosion		✓	
Anthropogenic activities	General perception that human activities have led to erosion in the area	✓		
	Level of mining, excavation and other earth work activities in the area			✓
Labour Issues and socio-economics	Perception on the NEWMAP potential to create jobs for indigenous people	✓		
	Possibility of influx of work migrants		✓	
	Level of erosion effects on agricultural practices	✓		
	Perception that the NEWMAP will successfully manage erosion and watershed issues		✓	
	Perception that NEWMAP civil activities may affect communities (infrastructure and businesses) negatively	✓		
	Perception that the NEWMAP may result in involuntary resettlement issues	✓		
	Possibility in gaining co-operation and participation from communities for the implementation of NEWMAP activities	✓		
Public Health/Infectious diseases	Perception that influx of sub-projects workforce may increase spread of STIs		✓	

Situation Report- Anambra State

New Heritage 2 Omaga 1&2 Onitsha, Onitsha North LGA, Anambra State

By Central school, Ndikelionwu Orumba North LGA, Anambra State

Neros Plaza 1&2 Ifite Awka, Awka South LGA, Anambra State.



Director Admin and Director Environment and Ecology, Ministry of Environment, Awka Anambra State at a consultative session for the ESMF.

Information in the table is based on frequency of responses by respondents to the parameters listed above. 3 parameters where indicated under each column (high priority, moderate priority and low priority) to display cumulative concerns as perceived by respondents.

on – List of Priority Sites Anambra state

	communities	Population	likely project affected persons	Groups	Vegetation	
donna church ulu Anaocha A	Nanka, Mbakwu, Obeleudu,	80,000	Civil, servant, business and farming	Women, children, migrants	Trees and shrubs	Igwe, Onowu (Prime minister), Igwe's cabinet, Town crier, Family heads, Youth grade
Central school kelionwu umba North	Ufuma, Mgbowo, Enugu-Abo,	60,000	Cicil servants, business	Women, children, migrants	Trees and shrubs	Igwe, Onowu (Prime minister), Igwe's cabinet, Town crier, Family heads, Youth grade
ROS plaza 1&2 e Awka, Awka uth LGA	Awka South communities	64,000	Business, Civil servants	Women, children, migrants	Trees and shrubs	Igwe, Onowu (Prime minister), Igwe's cabinet, Town crier, Family heads, Youth grade
udunu village agana near oum Family se	Orofia, Etiti, Eziachala, Amenye, Ifitedunu, Ukpor, Eziowelle, Abacha, Enugu- Ukwu.	TBD	Business, Agriculture	Women, children, migrants	Trees and shrubs	Igwe, Onowu (Prime minister), Igwe's cabinet, Town crier, Family heads, Youth grade
w Heritage 2 agba 1&2 tsha, Onitsha rth LGA.	Nkpor, Nkwuelezunaka, Onitsha,	30,000	Business, Trade, Civil servants and agricultrure	Women, children, migrants	Trees and shrubs	Igwe, Onowu (Prime minister), Igwe's cabinet, Town crier, Family heads, Youth grade

f major rivers and water catchment areas	Nature of vegetation
River	Kola nut, Oil palm, raffia palm, local pear, bamboo
River	Kola nut, Oil palm, raffia palm, local pear, bamboo
River	Kola nut, Oil palm, raffia palm, local pear, bamboo
i River	Kola nut, Oil palm, raffia palm, local pear, bamboo
i River	Kola nut, Oil palm, raffia palm, local pear, bamboo
li River	Kola nut, Oil palm, raffia palm, local pear, bamboo
River	Kola nut, Oil palm, raffia palm, local pear, bamboo
bra River	Kola nut, Oil palm, raffia palm, local pear, bamboo

he NEWMAP			
	Rating		
	1	2	3
	Very good	Satisfactory	low
nding and		✓	

	Cumulative Average Rating			
		1	2	3
concerns of on		High priority	Moderate priority	Low priority
nd socio-ivities	Soil quality			
	Water quality			
	Air quality			
	Solid waste disposal			
	Civil and earth works		✓	
	Land use management and land use controls	✓		
	Brush/Forests/Vegetation			
	Visual quality			
	Quality and diversity of wildlife			✓
	Quality and diversity of aquatic life			
	River-based recreation			
	Road drainage patterns	✓		

ble is based on frequency of responses by respondents to the parameters listed above. 3 parameters where indicated under each column rate priority and low priority) to display cumulative concerns as perceived by respondents.

Floodplain management			
Availability of safe drinking water			
Involuntary resettlement			
Effect on production systems		✓	
Effect on social wellbeing			
Cultural heritage			✓
Effect on indigenous peoples			
Renewable energy sources			

Stakeholders at the Community Level- Community Leadership and Community Household Responses

Knowledge on the NEWMAP				
	Rating	1	2	3
		Very good	Satisfactory	Low
Project understanding and perception			✓	
	Cumulative Average Rating			
		1	2	3
Land use/land degradation and soil erosion		High	Moderate	low
	Community co-operation in giving out land for sub-project	✓		
	Awareness level on erosion and watershed issues	✓		
Water Pollution	Occurrence of eutrophication in community utility water bodies			✓
	Decline in number of freshwater fish			
Afforestation and Deforestation	Deforestation activities			✓
	Afforestation activities		✓	
Overexploitation of wetlands	Level of indigenous agricultural activities taking place on wetlands			✓
	Level of waste disposal on wetlands			✓
	General perception of activities on wetlands contributing to erosion		✓	
Anthropogenic activities	General perception that human activities have led to erosion in the area	✓		
	Level of mining, excavation and other earth work activities in the area			✓
Labour Issues and socio-economics	Perception on the NEWMAP potential to create jobs for indigenous people	✓		
	Possibility of influx of work migrants		✓	
	Level of erosion effects on agricultural practices	✓		
	Perception that the NEWMAP will successfully manage erosion and watershed issues	✓		
	Perception that NEWMAP civil activities may affect communities (infrastructure and businesses) negatively	✓		
	Perception that the NEWMAP may result in involuntary resettlement issues	✓		
	Possibility in gaining co-operation and participation from communities for the implementation of NEWMAP activities	✓		
Public Health/Infectious diseases	Perception that influx of sub-projects workforce may increase spread of STIs			✓

Situation Report- Edo State

View of the erosion site at Auchi-Abuja express way, Auch, Edo State

View of the erosion site at Queen Ede, Benin City, Edo State.

Representatives of erosion affected communities after an interactive session. Bende LGA, Abia State.

Team with a representativs from the State Government, Abia State.

Information in the table is based on frequency of responses by respondents to the parameters listed above. 3 parameters where indicated under each column (high priority, moderate priority and low priority) to display cumulative concerns as perceived by respondents.

on – List of Priority Sites Edo state

tized sites	Likely at risk communities	Estimated Population	Occupation of likely project affected persons	Vulnerable Groups	Nature of Vegetation	Social Structure
obugie Plain y Erosion	TBD	TBD	TBD	TBD	TBD	TBD
en Ede ndary school Rd	TBD	TBD	TBD	TBD	TBD	TBD
ellu Flood nment East & t	TBD	TBD	TBD	TBD	TBD	TBD

on of the Anegbeche River with Fulani migrants by the river bank. This every enormous river drains into the River Niger..

e on the NEWMAP			
	Rating		
	1	2	3
	Very good	Satisfactory	low
lerstanding and		✓	

	Cumulative Average Rating			
		1	2	3
ority concerns of IAP on ntal and socio-ensitivities		High priority	Moderate priority	Low priority
	Soil quality			
	Water quality			
	Air quality			
	Solid waste disposal			
	Civil and earth works		✓	
	Land use management and land use controls	✓	✓	
	Brush/Forests/Vegetation			
	Visual quality			
	Quality and diversity of wildlife			✓
	Quality and diversity of aquatic life			
	River-based recreation			
	Road drainage patterns	✓		

the table is based on frequency of responses by respondents to the parameters listed above. 3 parameters where indicated under each column moderate priority and low priority) to display cumulative concerns as perceived by respondents.

Floodplain management	✓		
Availability of safe drinking water			
Involuntary resettlement			
Effect on production systems			✓
Effect on social wellbeing			
Cultural heritage			
Effect on indigenous peoples			
Renewable energy sources			
Public and Environmental health			
politics			

Stakeholders at the Community Level- Community Leadership and Community Household Responses

Information in the table is based on frequency of responses by respondents to the parameters listed above. 3 parameters where indicated under each column (high priority, moderate priority and low priority) to display cumulative concerns as perceived by respondents.

Knowledge on the NEWMAP				
	Rating			
	1	2	3	
	Very good	Satisfactory	low	
Project understanding and perception		✓		
	Cumulative Average Rating			
		1	2	3
Land use/land degradation and soil erosion		High	Moderate	low
	Community co-operation in giving out land for sub-project	✓		
	Awareness level on erosion and watershed issues	✓		
Water Pollution	Occurrence of eutrophication in community utility water bodies			✓
	Decline in number of freshwater fish		✓	
Afforestation and Deforestation	Deforestation activities			✓
	Afforestation activities		✓	
Overexploitation of wetlands	Level of indigenous agricultural activities taking place on wetlands			✓
	Level of waste disposal on wetlands			✓
	General perception of activities on wetlands contributing to erosion		✓	
Anthropogenic activities	General perception that human activities have led to erosion in the area	✓		
	Level of mining, excavation and other earth work activities in the area			✓
Labour Issues and socio-economics	Perception on the NEWMAP potential to create jobs for indigenous people	✓		
	Possibility of influx of work migrants		✓	
	Level of erosion effects on agricultural practices	✓		
	Perception that the NEWMAP will successfully manage erosion and watershed issues	✓		
	Perception that NEWMAP civil activities may affect communities (infrastructure and businesses) negatively	✓		
	Perception that the NEWMAP may result in involuntary resettlement issues	✓		
	Possibility in gaining co-	✓		

ANNEX 010 STAKEHOLDERS ATTENDANCE SHEET

NEWMAP's Stakeholders Interactive Session (Attendance List for Enugu State)

S/N	NAME	ESTABLISHMENT	POSITION	PHONE NO.	E-MAIL
1	Ozoani Victor	World Bank Consultant.	Asst.Prog.	08066907070	victecin@yahoo.com
2	Udenwani G.I	Ministry of Finance	Director	08037112633	geofryudenwani@yahoo.com
3	Ezeh Tessy	Ministry of Environment	PRO	0803708944	
4	Engr. Evans Ugwu	MOEMR	Head(Ecology& MR)	08033403216	Evansugwu2000@yahoo.co.uk
5	Patrick W.I Okenwa	MOEMR	Director	08033509431	p.okenwa@yahoo.com.uk
6	Barr.A.O Onaga	MRD	P.S	08035517649	
7	Nwangwu A.U	MOEMR	Head (Environmental Conservation	07035019177	
8	Okolo Johnpaul	CIDJAP	Project Officer (Environment)	08038844985	okolochuoli@yahoo.com
9	Udejiofor Emmanuel	Ministry of Water Resources	Geologist	080-38662918	emmalexassociate@yahoo.com
10	Nwodoani Ejike	Ministry of Water Resources	Geologist	08037350196	ejikechibuzor@gmail.com
11	Crodu J.U	Forestry(MOEMR) Enugu	Director of Forestry	08034718819	Jupo4director@yahoo.com

S/N	NAME	ESTABLISHMENT	POSITION	PHONE NO.	E-MAIL
12	Chinonye Okegbe	MOEMR	Director (F&A)	08033419543	Daconsinokegbe @yahoo.com
13	Onwuegbuna Guy. C	MOEMR	Director Pollution Control	08037789391	guyonwuuegbuna@ yahoo.com
14	E.C. Asadu	MOEMR	Director of Planning	08067968555	
15	Godwin C. Ogenyi	MHD&PR	Hon. Commissioner	08062666448	gcogenyi@yahoo.com
16	Chioma Obasi				
17	Eugene Hua	World Bank Consultant			
18	Ogbonna Chime	Min. Of Lands	Deputy Director	08033196104	
19	Okonkwo B.C	Min. Of Environment	HOD Env/Health	08052420293	
20	Engr.J.N. Okafor	Min. Of Works	Deputy Director	08052540748	
21	Okenwa B.I	Min. Of Agric	Chief Admin Officer	08037444906	
22	Paul .N.P	SSA to Gov.	SSA	08033114595	
23	Madu P.C	MHD PR	Chief Statistician	07065664138	
24	Okafor Simon I (JP)	MHDPR	Director of Coops	08068577171	
25	Igwe Chibuike	ASBESOC/ASERSO	CEO/President	08037143455	infoasbesoc@gmail.co
26	Nwangene Christian	Voci/Asernso	V.President	08063457452	christianwangene@ yahoo.com
27	Alintah Festus	KEMCA	ED	08035511807	
28	Engr. F.C. Okonkwo	Min. Of Rural Dev.	Director	07031116138	Fred.okonkwo@yahoo.com

NEWMAP'S STAKEHOLDERS INTERACTIVE SEASSION (ATTENDANCE LIST FOR EDO STATE)

QUEEN EDE/ OGBESON COMMUNITY

S/N	NAME	POSITION	PHONE No.
1	Pa Daniel Ediagbonya	Odionwere	07025655938
2	Ichiore Alexandre	Landlords Association Secretary	08135450605
3	Mrs. P. Ediagbonya	Odiowere's wife	08033443409
4	Mrs. S Amadi	Landlady	08023528607
5	Mrs. P. Obasogie	Landlady	08023594468
6	Mrs. Friday Ikponmwosa	Jesus Daily Ministry	08055407356
7	Sir. Charles A. Anoje	St. Thomas Aquinas Catholic Church.	08037771925
8	Comrade F.O. Idahosa	Jesus Daily Ministry	08055964003
9	Mrs. A. Igbinosun	Leader, Association of Women Forum	08050676204
10	Mrs. M.A. Ihiehie	Leader, Women Forum, Ogbeson	08051079922
11	Mrs. S.O.Ogie	Landlady's Secretary	08134999595
12	Mrs. Ajayi Tina	Landlady's Secretary	08026239337
13	Chief Foster Aghahowa Odigie	Asst. Sec. Gen	07055722888
14	P.E		
15	Evbuotubu Community	Asst. Sec. Gen.	07060470000
16	Christopher.O. Igbineweka	Engr.	08037190092

NGO

S/N	Name of officer	Name of NGO	Phone No.
1	Johnson E. Dudu	CPED, Benin city, (Centre for Population and Environmental Development)	08052837422

AUCHI COMMUNITY

S/N	Name	Position	Phone No
1	HRH. Alhaji H.A. Momoh	Otaru of Auchi	
2	Chief Alhaji J.M. Garuba	Daudu of Usogu	08059866315
3	Mallam Dirisu Yayah	PA (Otaru of Auchi)	08050516381

PMU-NEWMAP/FME/CONSULTANTS/WORLD BANK

S/N	Name of Officer	Name of Institution	Phone No
1	A.H. Ikhelona	PS, MEPU	08034036512
2	Tom Obaseki	Min. Of Environment, Edo State, PMU-NEWMAP(Proc. Specials)	08023071085
3	Tawa Woghireh	PMU-NEWMAP-Fin. Expert	08037267317
4	Edwin .A. Ero	Min. Of Env. Edo State, PMU-NEWMAP (E&S)	08036179689
5	Oyebankole Agbelusi	Hospitalia Consultaire	08023468195
6	Dr. Victor C. Nwachukwu	Hospitalia Consultaire	07032921700
7	Ozoani Victor	Multi Dev. Consultant(World Bank)	08066907676
8	Obasi Chioma	Multi Dev. Consultant(World Bank)	08062392974
9	Eugene Itua	World Bank Consultant	08030610235
10	Engr. R.E. Aghayesho	Consultant (CEXEM),MEPU	08056724203
11	Engr.(Dcn) G.M. Ejemai	Director,Env. M.E.P.U	08058767896
12	P.E. Otoighile (Mrs)	Director, Admin and Supply, Min. Of Env. & Public Utility.	08023389323
13	A.I. Omoruyi	Director (Forestry), Min. Of Environment.	08023343648

ANNEX 011 RESETTLEMENT POLICY FRAMEWORKS

RESETTLEMENT POLICY FRAMEWORK TEMPLATE: NIGERIA

PART I: BASIC INFORMATION

1. **Country and Project Name:**

2. **Project Development Objectives:**

3. **Project Outcomes:**

4. **Expected Project Benefits:**

5. **Identified Project Social Risks:**

Recipient:

Responsible Government/Country Agency for RPF Implementation:

Total Project Cost (USD million):
IDA/IBRD (USD million):
Government (USD million):
Other-Co-financing (USD million):

Total Cost of RPF (USD million):
Project preparation (USD million):
Government (USD million):

Name/Contacts of Consultant/Consulting Firm who prepared RPF:

Date RPF Prepared:	**Date RPF Disclosed**:
Country:	**Social Safeguards Specialist**:
Country Manager: **Country Director**: **Project ID**:	**Task Team Leader**: **SDN Sector Leader**: **Environment Category**:

Date ISDS prepared:	**Date ISDS disclosed**:
Year of project appraisal:	**Year of project closing:**

Is this a transferred project?	[ ] Yes	[ ] No
Is RPF applied to financial intermediary or intermediaries financing sub-projects?	[ ] Yes	[ ] No
Is RPF applied because zone of impact of sub-projects cannot be determined at this stage?	[ ] Yes	[ ] No
Is the RPF applied because the zone of impact is known but the site (location) alignments are not yet well established?	[ ] Yes	[ ] No
Is this community driven development (CDD) project?	[ ] Yes	[ ] No
Is this a sector-wide project with national coverage?	[ ] Yes	[ ] No
Is this a regional operation, with national/sub-national coverage?	[ ] Yes	[ ] No

Safeguard policies triggered?	**Applicable**	
Environmental Assessment (OP/BP 4.01)	[ ] Yes	[ ] No
Natural Habitats (OP/GP 4.04)	[ ] Yes	[ ] No
Forestry (OP 4.36)	[ ] Yes	[ ] No
Pest Management (OP 4.09)	[ ] Yes	[ ] No
Cultural Property (OP 4.11)	[ ] Yes	[ ] No
Indigenous Peoples (OP 4.10)	[ ] Yes	[ ] No
Involuntary Resettlement (OP 4.12)	[**X**] Yes	[ ] No
Safety of Dams (OP/BP 4.37)	[ ] Yes	[ ] No
Projects in Disputed Areas (OP/BP 7.60)	[ ] Yes	[ ] No
Projects on International Waterways (OP/BP 7.50)	[ ] Yes	[ ] No

PART II: OBJECTIVES

The objectives of the Resettlement Policy Framework (RPF) are to:

- Establish the ***[Project Name]*** resettlement and compensation principles and implementation arrangements;
- Describe the legal and institutional framework underlying *Nigerian* approaches for resettlement, compensation and rehabilitation;
- Define the eligibility criteria for identification of project affected persons (PAPs) and entitlements;
- Describe the consultation procedures and participatory approaches involving PAPs and other key stakeholders; and
- Provide procedures for filing grievances and resolving disputes.

The RPF will apply to ***[all sub-projects/activities to be identified/areas to be demarcated].*** The procedures will be carried out throughout preparation and implementation, and impacts of any potential resettlement will be included in monitoring and evaluation (M&E). When a Resettlement Action Plan (RAP) is required, it will be prepared in accordance with guidance provided in this RPF, including Detailed Measurement Surveys, Identification (Census) of PAPs/displaced persons, and Public Consultation and Disclosure Procedures (PCDP). The RPF follows the guidance provided in the World Bank Operational Policy on Involuntary Resettlement (OP4.12), as described in Annex 1.

The RPF ensures that any possible adverse impacts of proposed project activities are addressed through appropriate mitigation measures, in particular, against potential impoverishment risks. These risks can be minimized by:

- Avoiding displacement of people without a well designed compensation and relocation process;
- Minimizing the number of PAPs, to the extent possible;
- Compensating for losses incurred and displaced incomes and livelihoods; and
- Ensuring resettlement assistance or rehabilitation, as needed, to address impacts on PAPs livelihoods and their well being.

PART III: PROJECT DESCRIPTION AND RATIONALE FOR RPF

Description of project activities where the RPF will be applied:

Land acquisition and resettlement impacts [Describe the activities that may require land take or acquiring land and other assets; relocation or displacement of persons occupying or using these lands and other assets]:

PART IV: LEGAL AND INSTITUTIONAL FRAMEWORK

This RPF will apply the laws, legislation, regulations, and local rules governing the use of land and other assets in Nigeria. This legal and institutional framework is presented in five sections: (i) Political economy and governance in Nigeria; (ii) Property and land rights, as defined by Nigerian law and customary practice; (iii) Acquisition of land and other assets,

including regulations over the buying and selling of these assets; (iv) Human rights and compensation, in particular, the accepted norms influencing peoples' basic rights to livelihood and social services; (v) Dispute resolution and grievance mechanisms, specifically the legal and institutional arrangements for filing grievances or complaints and how those grievances are addressed through formal and informal systems of dispute resolution; and (vi) Comparison with World Bank OP4.12, using equivalence and acceptability standards.

i) POLITICAL ECONOMY AND GOVERNANCE IN NIGERIA

The political and legal context for the application of Resettlement Policy Frameworks (RPFs) is mainly governed by *The Land Use Act of 1978 as modified in 1990* and *The Constitution of Nigeria, 1999.* It is important to note that there is no private ownership of land, as all land is vested in the authority of the government.

ii) PROPERTY AND LAND RIGHTS IN NIGERIA

The *Constitution of Nigeria,* 1999 provides that every citizen has the right to acquire and own immovable property in Nigeria. However, there is no private land in Nigeria, as all land is under the authority of government

In Nigeria, as in much of Africa, there are overlapping systems of land rights. Nigeria has both customary land rights and statutory land rights, the latter of which is based in English common law. Customary land rights generally apply to ethnic communities, where individuals and families received land rights by virtue of land being assigned to them (or their ancestors) by the community leader, usually the Chief. Statutory land rights are generally found in urban areas, where institutions and business have established rights to land through common law channels.

The *Land Use Act of 1978* vests all land in the authority of the Governor of that state. This land is "to be held in trust and administered for the use and common benefit of all Nigerians." (Land Use Act, Section 1). The *Land Use Act* distinguishes between **urban** land, which is under direct control of the Governor and **non-urban** land which is under the control of the local government in that area (Land Use Act, Section 2).

The Governor has the power to grant occupancy rights to any person for any purpose on both urban and non-urban land (Land Use Act, Section 5). The Local Government can grant occupancy rights to any person or urbanization on non-urban land in its jurisdiction, where that land will be used for "agricultural, residential or other purposes." The Local Government can also grant these rights for grazing purposes "as may be customary in the Local Government Area concerned" (Land Use Act, Section 6).

Additionally, the *Constitution* states that "control of all minerals, mineral oils and natural gas in, under or upon any land in Nigeria or in, under or upon the territorial waters and the Exclusive Economic Zone of Nigeria" is under control of the federal government of Nigeria.

iii) ACQUISITION AND VALUATION OF LAND AND OTHER ASSETS

Land Acquisition

The *Land Use Act* entitles the Government of Nigeria to revoke the occupancy right to a piece of land "for overriding public interest. (Land Use Act, Section 2)" Additionally, the local government has the right to enter onto, use, and occupy any land in its jurisdiction, and also to revoke occupancy right to the land if necessary for the purpose above (Land Use Act,

Section 6). The Act defines overriding public interest as when the land is required by either the federal, state, or local government for public purposes or if the land is required for mining or oil pipelines (Land Use Act, Section 2). However, the *Constitution of Nigeria* requires that adequate compensation be paid if either movable or immovable property is compulsorily acquired by the government (Section V). The *Land Use Act* specifies details on how compensation is to be paid.

If the government determines that it needs to compulsorily acquire land, and thus revoke a person's occupancy right, the Governor on behalf to the "Head of the Federal Military Government" shall issues a notice to such effect. The notice shall take effect as soon as the occupier receives the notice, or at a later date if so specified on the notice (Land Use Act, Section 28).

Right of Way

The 1996 Electricity Supply Regulations of 1966 give clear Right of Way (RoW) allowances for high voltage power lines. Specifically it requires a clearance off 6 meters for 330 kV lines, 4 meters for 132kV lines, 3 meters for 33 kV lines, and 2.4 meters for lines that carry 11kV or less.

The Highway Act defines the right of way for highways as 50 meters to either side of the median line. In other words, the total right way is 100 meters. This land is federally owned and managed, and the government holds the right to dispose of or use this land.

Valuation

The *Land Use Act* states that compensation will be for the value of their "unexhausted improvements" as at the date that the revocation takes place (Land Use Act, Section 6 and Section 29). Specifically, it states that compensation shall cover the amount equal to the rent paid in the year the land was acquired (assuming that any rent is paid). Compensation must also cover the cost of replacing any buildings, installations, or improvements minus any depreciation. Additionally, the Act specifies that interest must be paid 'at the bank rate' for any delay in payment of compensation. Finally, crops must be compensated at the value of the crops 'as determined by the appropriate officer' (Land Use Act, Section 29).

iv) HUMAN RIGHTS AND COMPENSATION

The *Constitution of Nigeria* requires that, if a person's property is compulsorily acquired, that person must be adequately compensated (Section V). According to the *Land Use Act,* if the occupier of the land is a community, the compensation can be paid directly to the community, to the chief to distribute to the community according to customary law, or place in a fund to use to benefit the community (Land Use Act, Section 29). Under the *Land Use Act,* if compulsorily acquired land was used for agriculture, the person shall be given an alternative piece of land to use for the same purpose (Land Use Act, Section 6). If the land houses a residential building, the government may choose to resettle the persons affected in another "reasonable alternative accommodation." However, if the value of the alternate accommodation is higher than the compensation owed to the displaced persons, the difference will be treated as a loan that the recipients must replay to the government (Land use Act, Section 33).

v) DISPUTE RESOLUTION AND GRIEVANCE MECHANISMS

The *Land Use Act* provides that if a person is dissatisfied with the amount of compensation offered to him, the case must be taken to the appropriate *Land Use and Allocation Committee* (Land Use Act, Section 2). The *High Court* is the only body that can make the

determination on who should receive compensation if there is any question on that matter (Land Use Act, Section 39). However, the *Land Use Act* also states that "no court shall have jurisdiction to inquire into any question concerning or pertaining to the amount or adequacy of any compensation paid or to be paid" (Land Use Act, Section 47).

vi) COMPARISON TO WORLD BANK OP 4.12

There are a number of serious discrepancies between Nigerian laws and regulations and the requirements for resettlement as laid out in OP 4.12. Although the Nigerian Constitution requires that adequate compensation be paid to those displaced by projects, this is not on par with OP 4.12, which requires that compensation be paid prior to the start of the project. Additionally, it is not clear how the determination of compensation for crops as well as buildings and other structures will be made under Nigerian law. The World Bank's policies require that people be reimbursed at full replacement value. Nigerian law does not make any specific accommodation for squatters or illegal settlers, and reimbursement is based on legal occupancy. OP 4.12 requires that affected communities are consulted, and should be given the opportunity to participate, implement, and monitor resettlement. However, Nigerian law does not require any public consultations, and land can be seized for public purpose as soon as the occupier receives the notice of intent to do so.

Additionally, there are no specific accommodations for potentially vulnerable groups such as women, children, the elderly, ethnic minorities, indigenous people, the landless, and those living under the poverty line. These groups are at highest risk to be negatively affected by resettlement, and should thus be given special consideration during the preparation of a resettlement policy framework to assure that they can maintain at least the same living standard after displacement takes place.

Finally, there is also no provision in the law that the state should attempt to minimize involuntary resettlement.

Table I: Comparison of Nigerian and World Bank Policies on Resettlement and Compensation			
Types of Affected Persons/ Lost Assets	**Nigerian Law**	**World Bank OP4.12**	**Comparison/Gaps**
Section I: Property and land rights			
Land Owners	The *Land Use Act of 1978* vests all land in the authority of the Governor of that state. This land is "to be held in trust and administered for the use and common benefit of all Nigerians." (Land Use Act, Section 1).	Through census and socio-economic surveys of the affected population, identify, assess, and address the potential economic and social impacts of the project that are caused by involuntary taking of land (e.g., relocation or loss of shelter, loss of assets or access to assets, loss of income sources or means of livelihood, whether or not the affected person must move to another location) or involuntary restriction of access to legally designated parks and protected areas Land-for-land exchange is the preferred option; compensation is to be based on replacement cost.	The legal right to resettlement is applicable only to those with proprietary interest in the affected land
Land Tenants/Squatters	The *Land Use Act* entitles the Government of Nigeria to	For those without formal legal rights to lands or claims to	Nigerian law does not make any specific accommodation

Table I: Comparison of Nigerian and World Bank Policies on Resettlement and Compensation			
Types of Affected Persons/ Lost Assets	**Nigerian Law**	**World Bank OP4.12**	**Comparison/Gaps**
	revoke the occupancy right to a piece of land "for overriding public interest. (Land Use Act, Section 2)" Additionally, the local government has the right to enter onto, use, and occupy any land in its jurisdiction, and also to revoke occupancy right to the land if necessary for the purpose above (Land Use Act, Section 6). The Act defines overriding public interest as when the land is required by either the federal, state, or local government for public purposes or if the land is required for mining or oil pipelines (Land Use Act, Section 2)	such land that could be recognized under the laws of the country, the government should provide resettlement assistance in lieu of compensation for land, to help improve or at least restore those affected persons' livelihoods	for squatters or illegal settlers, and reimbursement is based on legal occupancy. There is no equivalence on the specific requirement of non-discrimination or the requirement that particular attention be paid to the needs of vulnerable groups among the displaced.
Land Users	Under the *Land Use Act,* if compulsorily acquired land was used for agriculture, the person shall be given an alternative piece of land to use for the same purpose (Land Use Act, Section 6). If the land houses a residential	Identify and address impacts also if they result from other activities that are: (a) directly and significantly related to the proposed project, (b) necessary to achieve its objectives, and (c) carried out or planned to be carried out	No equivalence between Bank and Nigerian systems for identifying and addressing impacts resulting from project related activities.

Table I: Comparison of Nigerian and World Bank Policies on Resettlement and Compensation			
Types of Affected Persons/ Lost Assets	**Nigerian Law**	**World Bank OP4.12**	**Comparison/Gaps**
	building, the government may choose to resettle the persons affected in another "reasonable alternative accommodation." However, if the value of the alternate accommodation is higher than the compensation owed to the displaced persons, the difference will be treated as a loan that the recipients must replay to the government (Land use Act, Section 33).	contemporaneously with the project.	
Owners of non-permanent buildings	The *Land Use Act* states that compensation will be for the value of their "unexhausted improvements" as at the date that the revocation takes place (Land Use Act, Section 6 and Section 29). Specifically, it states that compensation shall cover the amount equal to the rent paid in the year the land	For those without formal legal rights to lands or claims to such land or assets that could be recognized under the laws of the country, Bank policy provides for resettlement assistance in lieu of compensation for land, to help improve or at least restore their livelihoods.	Those without formal legal rights or claims to such lands and/or semi-permanent structures are not entitled to resettlement assistance or compensation. This is inconsistent with Bank policy

Table I: Comparison of Nigerian and World Bank Policies on Resettlement and Compensation			
Types of Affected Persons/ Lost Assets	**Nigerian Law**	**World Bank OP4.12**	**Comparison/Gaps**
Owners of permanent buildings	rent paid in the year the land was acquired (assuming that any rent is paid). Compensation must also cover the cost of replacing any buildings, installations, or improvements minus any depreciation. (Land Use Act, Section 29).	Entitled to in-kind compensation or cash compensation at full replacement cost including labor and relocation expenses, prior to displacement	Nigerian law requires the affected persons receive compensation on the basis of replacement value when permanent structures are affected. Although the law can be interpreted to include labor and relocation expenses, these are not explicitly enumerated under Nigerian law.
Section II: Resettlement and Compensation Process			
Timing of compensation payments	The Land Use Act (Section 29) specifies that interest must be paid 'at the bank rate' for any delay in payment of compensation. Finally, crops must be compensated at the value of the crops 'as determined by the appropriate officer'	Implement all relevant resettlement plans before project completion and provide resettlement entitlements before displacement or restriction of access. For projects involving restrictions of access, impose the restrictions in accordance with the timetable in the plan of actions.	There is no equivalence on implementing all relevant resettlement plans before project completion or on providing resettlement entitlements before displacement or restriction of access.
Calculation of compensation and valuation	Under the *Land Use Act,* if compulsorily acquired land was used for agriculture, the person shall be given an	Bank policy requires: (a) prompt compensation at full replacement cost for loss of assets attributable to the	Although the Nigerian Constitution requires that adequate compensation be paid to those displaced by

Table I: Comparison of Nigerian and World Bank Policies on Resettlement and Compensation			
Types of Affected Persons/ Lost Assets	**Nigerian Law**	**World Bank OP4.12**	**Comparison/Gaps**
	alternative piece of land to use for the same purpose (Land Use Act, Section 6). If the land houses a residential building, the government may choose to resettle the persons affected in another "reasonable alternative accommodation." However, if the value of the alternate accommodation is higher than the compensation owed to the displaced persons, the difference will be treated as a loan that the recipients must replay to the government (Land use Act, Section 33).	project; (b) if there is relocation, assistance during relocation, and residential housing, or housing sites, or agricultural sites of equivalent productive potential, as required; (c) transitional support and development assistance, such as land preparation, credit facilities, training or job opportunities as required, in addition to compensation measures; (d) cash compensation for land when the impact of land acquisition on livelihoods is minor; and (e) provision of civic infrastructure and community services as required.	projects, this is not on par with OP 4.12, which requires that compensation be paid prior to the start of the project. Additionally, it is not clear how the determination of compensation for crops as well as buildings and other structures will be made under Nigerian law. The World Bank's policies require that people be reimbursed at full replacement value.
Relocation and resettlement	The Governor has the power to grant occupancy rights to any person for any purpose on both urban and non-urban land (Land Use Act, Section 5). The Local Government can grant occupancy rights to any person or urbanization on	To avoid or minimize involuntary resettlement and, where this is not feasible, to assist displaced persons in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-	There is no equivalence on implementing all relevant resettlement plans before project completion or on providing resettlement entitlements before displacement or restriction of access.

Table I: Comparison of Nigerian and World Bank Policies on Resettlement and Compensation			
Types of Affected Persons/ Lost Assets	**Nigerian Law**	**World Bank OP4.12**	**Comparison/Gaps**
	non-urban land in its jurisdiction, where that land will be used for "agricultural, residential or other purposes." The Local Government can also grant these rights for grazing purposes "as may be customary in the Local Government Area concerned" (Land Use Act, Section 6).	displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher	
Completion of resettlement and compensation	The *Land Use Act* states that compensation will be for the value of their "unexhausted improvements" as at the date that the revocation takes place (Land Use Act, Section 6 and Section 29). Specifically, it states that compensation shall cover the amount equal to the rent paid in the year the land was acquired (assuming that any rent is paid). Compensation must also cover the cost of replacing any buildings, installations, or improvements minus any depreciation. Additionally,	Implement all relevant resettlement plans before project completion and provide resettlement entitlements before displacement or restriction of access. For projects involving restrictions of access, impose the restrictions in accordance with the timetable in the plan of actions.	There is no equivalence between Nigerian law and World Bank policies on implementing relevant resettlement plans before project completion or on providing resettlement entitlements before displacement or restriction of access.

Table I: Comparison of Nigerian and World Bank Policies on Resettlement and Compensation			
Types of Affected Persons/ Lost Assets	**Nigerian Law**	**World Bank OP4.12**	**Comparison/Gaps**
	the Act specifies that interest must be paid 'at the bank rate' for any delay in payment of compensation. Finally, crops must be compensated at the value of the crops 'as determined by the appropriate officer' (Land Use Act, Section 29).		
Livelihood restoration and assistance	Under the *Land Use Act,* if compulsorily acquired land was used for agriculture, the person shall be given an alternative piece of land to use for the same purpose (Land Use Act, Section 6). If the land houses a residential building, the government may choose to resettle the persons affected in another "reasonable alternative accommodation." However, if the value of the alternate accommodation is higher than the compensation owed to the displaced persons, the	Livelihoods and living standards are to be restored in real terms to pre-displacement levels or better	Nigerian policy and legislation would need to be aligned with Bank policy to effectively guarantee rights of all affected persons of involuntary resettlement.

Table I: Comparison of Nigerian and World Bank Policies on Resettlement and Compensation			
Types of Affected Persons/ Lost Assets	**Nigerian Law**	**World Bank OP4.12**	**Comparison/Gaps**
	difference will be treated as a loan that the recipients must replay to the government (Land use Act, Section 33).		
Consultation and disclosure		Consult project-affected persons, host communities and local NGOs, as appropriate. Provide them opportunities to participate in the planning, implementation, and monitoring of the resettlement program, especially in the process of developing and implementing the procedures for determining eligibility for compensation benefits and development assistance (as documented in a resettlement plan), and for establishing appropriate and accessible grievance mechanisms.	OP 4.12 requires that affected communities are consulted, and should be given the opportunity to participate, implement, and monitor resettlement. However, Nigerian law does not require any public consultations, and land can be seized for public purpose as soon as the occupier receives the notice of intent to do so.
Section III: Dispute Resolution			
Grievance mechanism and dispute resolution	The *Land Use Act* provides that if a person is dissatisfied with the amount of compensation offered to him,	Establish appropriate and accessible grievance mechanisms	

Table I: Comparison of Nigerian and World Bank Policies on Resettlement and Compensation			
Types of Affected Persons/ Lost Assets	**Nigerian Law**	**World Bank OP4.12**	**Comparison/Gaps**
	the case must be taken to the appropriate *Land Use and Allocation Committee* (Land Use Act, Section 2).		

PART V: COMPENSATION FOR LAND AND OTHER ASSETS

The RPF guidelines apply to all components under the ***[Project]***, whether or not they are directly funded in whole or in part by the ***[Project]***. The RPF applies to activities in sub-projects (or components) affecting those who would be physically displaced or who would lose some or all access to resources, and regardless of the total number affected, the severity of impact, and their legal status (e.g. the RPF guidelines apply also to those with ill-defined or no title to the land).

The RPF provides special attention to the needs of vulnerable groups among the PAPs, especially households with incomes below the national poverty line, including the landless, elderly and disabled, women and children, indigenous groups and ethnic minorities, and other historically disadvantaged.

The activities in the ***[Project]*** that are expected to have some land acquisition or restriction of access include the following:

Describe the Project components that may involve, for example: land acquisition for construction of structures; road building or access ways; workers camps; etc.

Although the exact nature and locations of sub-projects are unknown, the following categories of PAPs will be used in identifying groups of PAPs for the purpose of determining impacts.

Project affected persons (PAPs) are individuals whose assets may be lost, including land, property, other assets, and/or access to natural and/or economic resources as a result of activities related to sub-project(s).

Project affected households are groups of PAPs in one household and where one or more of its members are directly affected by the ***[Project]***. These include members like the head of household, male, and female members, dependent relatives, tenants, etc.

Vulnerable groups of people. From these households the ***[Project]*** will separately identify the vulnerable members, such as those who are too old or too ill; children; those stricken with HIV/AIDS; women; unemployed youth; etc. Households headed by women that depend on sons, brothers, and others for support are especially vulnerable. Similarly, households with elderly or seriously ill persons are eligible for additional support.

During implementation of this ***[Project]***, a social assessment will be carried out to identify the areas or sites expected resettlement impacts due to land acquisition or restriction of access to resources. At that stage, OP 4.12 calls for the preparation of separate stand-alone Resettlement Action Plans (RAPs) consistent with the guidelines provided in this RPF. The following procedural guidelines will apply when it is determined that a RAP would be developed.

(i) All potential PAPs should be identified (through a scoping exercise) and informed about their options and rights pertaining to compensation for land and assets to be acquired by the sub-project(s);
(ii) PAPs must be consulted about land acquisition and compensation and offered technical and financial options, including the most economically feasible alternatives; and
(iii) PAPs should receive reasonable compensation at full replacement cost for losses of assets and access attributable to the sub-project.

Screening. This process would lead to the creation of a list of the number and types of infrastructure (including buildings or other structures) that sub-projects will construct that may potentially involve resettlement issues. This list will be presented to affected communities using a sensitization and consultation process. These consultations will be documented for each site (sub-project).

RAP Preparation. As soon as the list (sub-projects) is approved by the responsible agency implementing the ***[Project]***, a consultative and participatory process for preparing a RAP will be started, as follows:

(i) A socio-economic survey will be completed to determine scope and nature of resettlement impacts.
(ii) The socio-economic study will be carried out to collect data in the selected sub-project sites.
(iii) The socio-economic assessment will focus on the potential affected communities, including some demographic data, description of the area, livelihoods, the local participation process, and establishing baseline information on livelihoods and income, landholding, etc.

Annex 2 describes the requirements for the RAP in detail. In general, the RAP contains the following information:

(i) Baseline Census;
(ii) Socio-Economic Survey;
(iii) Specific Compensation Rates and Standards;
(iv) Entitlements related to any additional impacts;
(v) Site Description;
(vi) Programs to Improve or Restore Livelihoods and Standards of Living;
(vii) Detailed cost estimates and Implementation Schedule.

The RAP will be prepared by the ***[Name of Agency]***.
The following guidelines are used when a RAP is developed.

(i) Consultation and participatory approaches**.** A participatory approach is adopted to initiate the compensation process. The consultations must start during the planning stages when the technical designs are being developed, and at the land selection/screening stage. The process therefore seeks the involvement of PAPs throughout the census for identifying eligible PAPs and throughout the RAP preparation process.

(ii) Disclosure and notification. All eligible PAPs are informed about the ***[Project]*** and the RAP process. A cut-off date is established as part of determining PAPs eligibility. In special cases where there are no clearly identifiable owners or users of the land or asset, the RAP team must notify the respective local authorities and leaders. A "triangulation" of information – affected persons; community leaders and representatives; and an independent agent (e.g. local organization or NGO; other government agency; land valuer) – may help to identify eligible PAPs. The RAP must notify PAPs about the established cut-off date and its significance. PAPs must be notified both in writing and by verbal notification delivered in the presence of all the relevant stakeholders.

(iii) Documentation and verification of land and other assets. The government authorities at both national and local levels; community elders and leaders; representatives from the ***[Project Agency]*** will arrange meetings with PAPs to discuss the compensation and valuation process. For each individual or household affected by the sub-project, the RAP preparation team will complete a Compensation Report containing necessary personal information on the PAPs and their household members; their total land holdings; inventory of assets affected; and demographic and socio-economic information for monitoring of impacts. This information will be documented in a Report, and ideally should be "witnessed" by an independent or locally acceptable body (e.g. Resettlement Committee). The Reports will be regularly updated and monitored.

(iv) Compensation and valuation. All types of compensation will be clearly explained to the individual and households involved. These refer especially to the basis for valuing the land and other assets. Once such valuation is established, the ***[Project Agency]*** will produce a Contract or Agreement that lists all property and assets being acquired by the sub-project and the types of compensation selected. Table II below provides a sample of entitlements that are eligible for compensation. These options include in-kind (e.g. replacement housing) and cash compensation. All compensation should occur in the presence of the affected persons and the community local leaders.

Table II: Entitlement Matrix			
Land and Assets	**Types of Impact**	**Person(s) Affected**	**Compensation/Entitlement/Benefits**
Agricultural land	Cash compensation for affected land equivalent to market value Less than 20% of land holding affected Land remains economically viable.	Farmer/ title holder	Cash compensation for affected land equivalent to replacement value
		Tenant/ lease holder	Cash compensation for the harvest or product from the affected land or asset, equivalent to average market value of last 3 years, or market value of the crop for the remaining period of tenancy/ lease agreement, whichever is greater.
	Greater than 20% of land holding lost Land does not become economically viable.	Farmer/ Title holder	Land for land replacement where feasible, or compensation in cash for the entire landholding according to PAP's choice. Land for land replacement will be in terms of a new parcel of land of equivalent size and productivity with a secure tenure status at an available location which is acceptable to PAPs. Transfer of the land to PAPs shall be free of taxes, registration, and other costs. Relocation assistance (costs of shifting + assistance in re-establishing economic trees + allowance up to a maximum of 12 months while short- term crops mature) Relocation assistance (costs of shifting + assistance

Table II: Entitlement Matrix			
Land and Assets	**Types of Impact**	**Person(s) Affected**	**Compensation/Entitlement/Benefits**
			in re-establishing economic trees + allowance up to a maximum of 12 months while short- term crops mature)
		Tenant/Lease holder	Cash compensation equivalent to average of last 3 years' market value for the mature and harvested crop, or market value of the crop for the remaining period of tenancy/ lease agreement, whichever is greater. Relocation assistance (costs of shifting + assistance in re-establishing economic trees + allowance up to a maximum of 12 months while short- term crops mature Relocation assistance (costs of shifting + assistance in re-establishing economic trees + allowance up to a maximum of 12 months while short- term crops mature) Relocation assistance (costs of shifting + allowance).
Commercial Land	Land used for business partially affected Limited loss	Title holder/ business owner	Cash compensation for affected land Opportunity cost compensation equivalent to 5% of net annual income based on tax records for previous year (or tax records from comparable business, or estimates where such records do not exist).

Table II: Entitlement Matrix			
Land and Assets	**Types of Impact**	**Person(s) Affected**	**Compensation/Entitlement/Benefits**
		Business owner is lease holder	Opportunity cost compensation equivalent to 10% of net annual income based on tax records for previous year (or tax records from comparable business, or estimates where such records do not exist)
	Assets used for business severely affected If partially affected, the remaining assets become insufficient for business purposes	Title holder/business owner	Land for land replacement or compensation in cash according to PAP's choice. Land for land replacement will be provided in terms of a new parcel of land of equivalent size and market potential with a secured tenure status at an available location which is acceptable to the PAP. Transfer of the land to the PAP shall be free of taxes, registration, and other costs. Relocation assistance (costs of shifting + allowance) Opportunity cost compensation equivalent to 2 months net income based on tax records for previous year (or tax records from comparable business, or estimates)
		Business person is lease holder	Opportunity cost compensation equivalent to 2 months net income based on tax records for previous year (or tax records from comparable business, or estimates), or the relocation allowance, whichever is higher. Relocation assistance (costs of shifting) Assistance in rental/ lease of alternative land/

Table II: Entitlement Matrix			
Land and Assets	**Types of Impact**	**Person(s) Affected**	**Compensation/Entitlement/Benefits**
			property (for a maximum of 6 months) to reestablish the business.
Residential Land	Land used for residence partially affected, limited loss Remaining land viable for present use.	Title holder	Cash compensation for affected land
		Rental/lease holder	Cash compensation equivalent to 10% of lease/ rental fee for the remaining period of rental/ lease agreement (written or verbal)
		Title holder	Land for land replacement or compensation in cash according to PAP's choice. Land for land replacement shall be of minimum plot of acceptable size under the zoning law/ s or a plot of equivalent size, whichever is larger, in either the community or a nearby resettlement area with adequate physical and social infrastructure systems as well as secured tenure status. When the affected holding is larger than the relocation plot, cash compensation to cover the difference in value. Transfer of the land to the PAP shall be free of taxes, registration, and other costs. Relocation assistance (costs of shifting + allowance)

Table II: Entitlement Matrix			
Land and Assets	**Types of Impact**	**Person(s) Affected**	**Compensation/Entitlement/Benefits**
	Land and assets used for residence severely affected Remaining area insufficient for continued use or becomes smaller than minimally accepted under zoning laws	Rental/lease holder	Refund of any lease/ rental fees paid for time/ use after date of removal Cash compensation equivalent to 3 months of lease/ rental fee Assistance in rental/ lease of alternative land/ property Relocation assistance (costs of shifting + allowance)
Buildings and structures	Structures are partially affected Remaining structures viable for continued use	Owner	Cash compensation for affected building and other fixed assets Cash assistance to cover costs of restoration of the remaining structure
		Rental/lease holder	Cash compensation for affected assets (verifiable improvements to the property by the tenant). Disturbance compensation equivalent to two months rental costs
	Entire structures are affected or partially affected Remaining structures not suitable for continued use	Owner	Cash compensation for entire structure and other fixed assets without depreciation, or alternative structure of equal or better size and quality in an available location which is acceptable to the PAP. Right to salvage materials without deduction from compensation Relocation assistance (costs of shifting + allowance)

Table II: Entitlement Matrix			
Land and Assets	**Types of Impact**	**Person(s) Affected**	**Compensation/Entitlement/Benefits**
			Rehabilitation assistance if required (assistance with job placement, skills training)
		Rental/lease holder	Cash compensation for affected assets (verifiable improvements to the property by the tenant) Relocation assistance (costs of shifting + allowance equivalent to four months rental costs) Assistance to help find alternative rental arrangements Rehabilitation assistance if required (assistance with job placement, skills training)
		Squatter/informal dweller	Cash compensation for affected structure without depreciation Right to salvage materials without deduction from compensation Relocation assistance (costs of shifting + assistance to find alternative secure accommodation preferably in the community of residence through involvement of the project Alternatively, assistance to find accommodation in rental housing or in a squatter settlement scheme, if available) Rehabilitation assistance if required assistance with

Table II: Entitlement Matrix			
Land and Assets	**Types of Impact**	**Person(s) Affected**	**Compensation/Entitlement/Benefits**
			job placement, skills training)
		Street vendor (informal without title or lease to the stall or shop)	Opportunity cost compensation equivalent to 2 months net income based on tax records for previous year (or tax records from comparable business, or estimates), or the relocation allowance, whichever is higher. Relocation assistance (costs of shifting) Assistance to obtain alternative site to re- establish the business.
Standing crops	Crops affected by land acquisition or temporary acquisition or easement	PAP (whether owner, tenant, or squatter)	Cash compensation equivalent to average of last 3 years market value for the mature and harvested crop.
Trees	Trees lost	Title holder	Cash compensation based on type, age and productive value of affected trees plus 10% premium
Temporary Acquisition	Temporary acquisition	PAP (whether owner, tenant, or squatter)	Cash compensation for any assets affected (e. g. boundary wall demolished, trees removed)

(v) Community payments. Although most sub-projects do not normally take land and other assets belonging to a community, such as a community center, school, or sacred site, if this occurs in a sub-project, the community (as a whole) will be compensated. This compensation will be in the form of reconstruction of the facility (in case of damages) or replacement at least the same standard or equivalent or better standard required by local planning regulation. Examples of community compensation expansion of grazing grounds; rehabilitation of school buildings, public toilets, health facilities; installation of wells or pumps; creation of market places; and reconstruction of community roads.

(vi) Grievance mechanism. The sub-project RAP team will establish an independent grievance mechanism. This may be set up through Local Authorities, including a Resettlement or Land Committee and through community leaders. All PAPs will be informed about how to register grievances or complaints, including specific concerns about compensation and relocation. The PAPs should also be informed about the dispute resolution process, specifically about how the disputes will be resolved in an impartial and timely manner. The RAP Team will produce a Report containing a summary of all grievances. If needed, the dispute resolution process should include Nigerian Courts of Law, but traditional institutions can be an effective first step in both receiving and resolving grievances.

PART VI: IMPLEMENTATION SCHEDULE AND COSTS

Since the specific sites and sub-projects are not yet determined, this RPF refers only to an estimated number of PAPs. Because costs of resettlement and compensation are based on technical designs and results of scoping, it is not possible to produce a detailed budget for RAP implementation. Once a budget is finalized, it will be subject to approval by the World Bank.

An indicative RAP budget outline can be found in Table III below.

Table III: Indicative Outline of a RAP Budget

Asset acquisition	Amount or number	Total estimated cost	Agency responsible
Land			
Structure			
Crops and economic tress			
Community infrastructure			
Land Acquisition and Preparation			
Land			
Structures			
Crops areas and others			
Community infrastructure			
Relocations			
Transfer of possessions			
Installation costs			
Economic Rehabilitation			
Training			
Capital Investments			
Technical Assistance			
Monitoring			
Contingency			

#	Item	Costs	Assumptions
1	Compensation for loss of Land	/hectare	For land acquisition purposes, based on Nigerian average market cost, or from similar projects
2	Compensation for loss of Crops	/hectare of farm lost	Includes costs of labor invested and average of highest price of staple food

			crops and Nigerian market prices
3	Compensation for loss of access to pastoralists	If applicable	Those affected would be provided with shared access, or alternate routes (decision agreed through consultation and participation of all)
4	Compensation for loss of access to fishing resources.	If applicable	Data provided from the revised socio-economic study will determine market values of catch, fish products etc.
5	Compensation for Buildings and Structures	If applicable	This compensation may be in-kind or cash. Costs for basic housing needs should include ventilated pit latrines, outside kitchen, and storage.
6	Compensation for Trees	/year/tree	Includes costs of labor invested and average of highest price of trees (and tree products) and Nigerian market prices
7	Cost of Relocation Assistance/Expenses	/household	This cost reflects the moving and transportation allowance
8	Cost of Restoration of Individual Income		Assumed to be higher than the GDP/capita in Nigeria
9	Cost of Restoration of Household Income		These costs reflect the livelihood restoration program of the RAP
10	Cost of Training Farmers, pastoralists and other PAPs		This is a mitigation measure involving capacity building and involves PAPs and affected communities

The PIU will determine an appropriate Resettlement Budget. It is usually financed in-country through the administrative and financial management rules and manuals issued by the Government of Nigeria.

PART VII: PUBLIC CONSULTATION AND DISCLOSURE PLAN

Public consultations in relation to the RAP occur at all stages, starting with inception and planning when the potential lands and alternative sites are being considered. A participatory approach is adopted as an on-going strategy throughout the entire project cycle.
Public participation and consultations take place through individual, group, or community meetings. Additionally, radio programs and other media forms may be used to further disseminate information. PAPs are consulted in the survey process; public notices where explanations of the sub-project are made; RAP implementation of activities; and during the monitoring and evaluation process. Selection of ways to consult, and expand participation by PAPs and other stakeholders, will take into consideration literacy levels prevalent in affected communities; ethnicity and cultural aspects; and practical conditions (like distance).
The role of traditional political and cultural leaders, including the community elders, in the participation strategy will be important. The RAP team should ensure that these leaders and local representatives of PAPs are fully involved in designing the public consultation procedures.
Data collecting phase. Consultations during preparation, in particular, the collection of background information, and the social survey or social assessment, are critical for successful data collection. The levels of consultation will vary from households to community groups, based on the particular context of the sub-project(s). The RAP team will design the questionnaires but it will be the households, organizations, and institutions that will validate their effectiveness through feedback. Focus group meetings with women, farmers' associations, individuals who own farms, fishing boats, etc, as well as primary and/or secondary schools, health centers, and agricultural cooperative unions are usually good sources for establishing the community baseline situation.
Implementation phase. During implementation, PAPs will be informed about their rights and options. The grievance mechanism will continue to operate and all grievances will be recorded. The participation of local leaders and PAPs in disseminating information and resolving disputes will be important once RAP implementation starts. A dynamic participatory approach involves PAPs in decision making about livelihood and community development programs.
Monitoring and evaluation phase. PAPs representatives will participate in the sub-project workshops at mid-term and at the end of RAP implementation. To the extent possible, the RAP should include social accountability tools like citizen report cards to assess the quality of RAP implementation, and in some cases, assist the RAP team in tracking expenditures. The latter would be significant in helping PAPs with money management and restoring their livelihoods. PAPs will be able to suggest corrective measures, as needed, to improve RAP implementation in the sub-project(s). Prior to closing the RAP, PAPs will participate in a feedback survey as part of the RAP's independent impact evaluation exercise.

PART VIII: MONITORING AND EVALUATION OF IMPACTS

The RAP team will be expected to develop and implement a Monitoring and Evaluation Plan (MEP). The main indicators that the MEP will measure include: (i) impacts on affected individuals, households, and communities to be maintained at their pre-project standard of living, and better; (ii) improvement of communities affected by the project; and (iii) management of disputes or conflicts. In order to measure these impacts, the RAP identifies the specific indicators to be monitored; define how they will be measured on a regular basis; and identify key monitoring milestones (e.g. at mid-point of the RAP implementation process).

The PIU will establish a reporting system for the sub-project RAP that will:

(i) Provide timely information to the project about all resettlement and compensation issues arising as a result of RAP related activities;
(ii) Identify any grievances, especially those that have not yet been resolved at the local level and which may require resolution at the higher levels (e.g. by the PIU);
(iii) Document completion of project resettlement and compensation that are still pending, including for all permanent and temporary losses;
(iv) Evaluate whether all PAPs have been compensated in accordance with the requirements of this RPF and that PAPs have better living conditions and livelihoods; and
(v) Identify mitigation measures, as necessity, when there are significant changes in the indicators that may require strategic interventions (e.g. vulnerable groups are not receiving sufficient support from the sub-project).

The independent impact evaluation will determine:

(i) If compensation payments have been completed in a satisfactory manner; and
(ii) If there are improvements in livelihoods and well-being of PAPs.

Several indicators are used to measure these impacts. These include, among others, a comparison of income levels before-and-after; access to livelihoods and employment; changes in standards of housing and living conditions; and improvements in level of participation in sub-project activities. There are measures to verify these basic indicators, such as number of children in-school (compared to pre-RAP levels); changes in health standards; and changes in access to markets or roads – all of which may reflect overall improvements in standards of living.

The following methods will be used for measuring impacts:

(i) Questionnaires with data stored in a database for comparative analysis (before-after and with-without);
(ii) Documentation and recording of PAPs situation, including subsequent uses of assets/improvements;
(iii) Relocation/resettlement and Compensation Reports, including status of land impacts; percentage of individuals selecting cash or a combination of cash and in-kind compensation; proposed use of payments;
(iv) Number of grievances and time and quality of resolution; and
(v) Ability of individuals and families to re-establish their pre-resettlement activities, in terms of improvements in land and crop production, and/or presence of other alternative incomes.

The RAP team will maintain, together with local officials, basic information on all physical or economic displacement arising from the sub-project. This includes an update, for example on a quarterly basis, of the following:

(i) Number of sub-projects requiring preparation of a RAP;

(ii) Number of households and individuals physically or economically displaced by each sub-project;
(iii) Length of time from sub-project identification to payment of compensation to PAPs;
(iv) Timing of compensation in relation to commencement of physical works;
(v) Amount of compensation paid to each PAP household (if in cash), or the nature of compensation (if in kind);
(vi) Number of people raising grievances in relation to each sub-project;
(vii) Number of unresolved grievances.

The PIU will review these statistics to determine whether the RAP implementation arrangements, as defined in this RPF, are effective in addressing RAP related issues. Financial records will be maintained by the sub-projects and the PIU, to determine the final cost of RAP implementation. The following indicators (in Table IV) can be used to monitor implementation of the RAP.

Table IV: Indicators of RAP Impacts

Monitoring (of Issues)	Evaluation (of Impacts)
Number of compensation (and valuation) not completed	Changes (+/-) in PAPs conditions during transition process
Number of sub-projects unable to settle compensation after two years	Changes (+/-) in PAPs income and livelihood conditions
Number of grievances filed	Quality of grievances or disputes resolved (qualitative)
Number of livelihood restoration programs completed	Changes (+/-) in affected households income levels
Pre project production versus present production levels (crops for crops, land for land)	Equal or improved production per affected household/homestead

Annual audit. The annual audit of RPF implementation, and as applicable RAP implementation in sub-project(s), includes: (i) a summary of RAP performance of each sub-project; (ii) a compliance review of RAP implementation process; and (iii) a progress report on the quality of RAP implementation in terms of application of guidelines provided in this RPF.

The audit will verify results of monitoring of RAP implementation indicators, and assess whether the project achieved the resettlement objectives. A specific measure of whether livelihood and living standards have been restored or enhanced will be completed. The audit will also assess the efficiency, effectiveness, impact, and sustainability of RAP sub-project activities. The aim is to learn lessons for application to future sub-projects or other projects in the sector and in the country. Finally, the audit will ascertain whether the resettlement entitlements were appropriate, as defined in the RPF guidelines.

Socio-Economic assessment. The purpose of socio-economic assessment, which is part of the evaluation process, is to ensure that PAPs livelihood and well being have improved, and have not worsened as a result of the sub-project. An assessment will be undertaken on payment of compensation, restoration of income and livelihoods, and provision of sufficient community development activities. Monitoring of living standards will continue after resettlement. Additionally a reasonable period (usually two years) must be established for monitoring post-resettlement impacts. A number of indicators will be used for measuring status of affected people.

Most socio-economic assessments use surveys, focus group meetings, and participatory appraisal tools for measuring impacts. A separate assessment must be made for each sub-project. Additionally, since a baseline household survey was completed during RAP preparation, the end-RAP assessment can measure changes from this baseline.

List of Annexes

ANNEX 1: World Bank Resettlement Policy Framework (RPF)

[Excerpt from the World Bank OP4.12 Involuntary Resettlement, Revised April 2004]
These policies were prepared for use by World Bank staff and are not necessarily a complete treatment of the subject. OP 4.12 (Revised April 2004) applies only to projects that are governed by OP / BP 6.00, ***Bank Financing -*** *that is, those in countries with approved country financing parameters. Other operational policy statements governing Bank financing that have been amended to reflect OP/BP 6.00 also apply to these projects.*
Projects in countries without approved country financing parameters continue to be subject to other operational policy statements governing Bank financing.

Resettlement Policy Framework

For sector investment operations that may involve involuntary resettlement, the Bank requires that the project implementing agency screen subprojects to be financed by the Bank to ensure their consistency with this OP. For these operations, the borrower submits, prior to appraisal, a resettlement policy framework that conforms to this policy (see Annex A, paragraphs 23-25). The framework also estimates, to the extent feasible, the total population to be displaced, and the overall resettlement costs.

For financial intermediary operations that may involve involuntary resettlement, the Bank requires that the financial intermediary (FI) screen subprojects to be financed by the Bank to ensure their consistency with this OP. For these operations, the Bank requires that before appraisal the borrower or the FI submit to the Bank a resettlement policy framework conforming to this policy (see Annex A, paragraphs 23-25). In addition, the framework includes an assessment of the institutional capacity and procedures of each of the FIs that will be responsible for subproject financing. When, in the assessment of the Bank, no resettlement is envisaged in the subprojects to be financed by the FI, a resettlement policy framework is not required. Instead, the legal agreements specify the obligation of the FIs to obtain from the potential sub-borrowers a resettlement plan consistent with this policy if a subproject gives rise to resettlement. For all subprojects involving resettlement, the resettlement plan is provided to the Bank for approval before the subproject is accepted for Bank financing.

For other Bank-assisted project with multiple subprojects26 that may involve involuntary resettlement, the Bank requires that a draft resettlement plan conforming to this policy be submitted to the Bank before appraisal of the project unless, because of the nature and design of the project or of a specific subproject or subprojects (a) the zone of impact of subprojects cannot be determined, or (b) the zone of impact is known but precise sitting alignments cannot be determined. In such cases, the borrower submits a resettlement policy framework consistent with this policy prior to appraisal (see Annex A, paragraphs 23-25). For other subprojects that do not fall within the above criteria, a resettlement plan conforming to this policy is required prior to appraisal.

For each subproject included in a project described in paragraphs 26, 27, or 28 that may involve resettlement, the Bank requires that a satisfactory resettlement plan or an abbreviated resettlement plan that is consistent with the provisions of the policy framework be submitted to the Bank for approval before the subproject is accepted for Bank financing.

For projects described in paragraphs 26-28 above, the Bank may agree, in writing, that sub-project resettlement plans may be approved by the project implementing agency or a responsible government agency or financial intermediary without prior Bank review, if that

agency has demonstrated adequate institutional capacity to review resettlement plans and ensure their consistency with this policy. Any such delegation, and appropriate remedies for the entity's approval of resettlement plans found not to comply with Bank policy, is provided for in the legal agreements for the project. In all such cases, implementation of the resettlement plans is subject to ex post review by the Bank.

ANNEX 2: Annotated Outline for Preparing a Resettlement Action Plan (RAP)

This template is extracted from OP 4.12 Annex A. Its full description can be found in the World Bank external website [INSERT LINK].

The scope and level of detail of the RAP will vary depending on the magnitude and complexity of resettlement or displacement. The RAP is prepared based on the most recent and accurate information on the: (i) proposed resettlement and its impacts on displaced persons and other adversely affected groups; and (ii) legal issues affecting resettlement. The RAP covers elements that are specific to the project context.

A broad outline of the RAP, as applied to sub-projects covered under a RPF includes, but is not limited to, the following:

Description of the sub-project: General description of the sub-project and identification of sub-project area or areas.

Potential Impacts: Identification of the: (i) the sub-project components or activities that require resettlement or restriction of access; (ii) zone of impact of components or activities; (iii) alternatives considered to avoid or minimize resettlement or restricted access; and (iv) mechanisms established to minimize resettlement, displacement, and restricted access, to the extent possible, during project implementation.

Objectives: The main objectives of the resettlement program as these apply to the sub-projects.

Socio-economic studies: The findings of socio-economic studies to be conducted in the early stages of project preparation, and with the involvement of potentially affected people will be needed. These generally include the results of a census of the affected populations covering:

(i) Current occupants of the affected area as a basis for design of the RAP and to clearly set a cut-off date, the purpose of which is to exclude subsequent inflows of people from eligibility for compensation and resettlement assistance;
(ii) Standard characteristics of displaced households, including a description of production systems, labor, and household organization; and baseline information on livelihoods (including, as relevant, production levels and income derived from both formal and informal economic activities) and standards of living (including health status) of the displaced population;
(iii) Magnitude of the expected loss, total or partial, of assets, and the extent of displacement, physical or economic;
(iv) Information on vulnerable groups or persons, for whom special provisions may have to be made; and
(v) Provisions to update information on the displaced people's livelihoods and standards of living at regular intervals so that the latest information is available at the time of their displacement, and to measure impacts (or changes) in their livelihood and living conditions.

There may be other studies that the RAP can draw upon, such as those describing the following:

(i) Land tenure, property, and transfer systems, including an inventory of common property natural resources from which people derive their livelihoods and sustenance, non-title-based usufruct systems (including fishing, grazing, or use of forest areas) governed by local recognized land allocation mechanisms, and any issues raised by different tenure systems in the sub project area;
(ii) Patterns of social interaction in the affected communities, including social support systems, and how they will be affected by the sub-project;
(iii) Public infrastructure and social services that will be affected; and
(iv) Social and cultural characteristics of displaced communities, and their host communities, including a description of formal and informal institutions. These may cover, for example, community organizations; cultural, social or ritual groups; and non-governmental organizations (NGOs) that may be relevant to the consultation strategy and to designing and implementing the resettlement activities.

Legal Framework: The analysis of the legal and institutional framework should cover the following:

(i) Scope of existing land and property laws governing resources, including state-owned lands under eminent domain and the nature of compensation associated with valuation methodologies; land market; mode and timing of payments, etc;
(ii) Applicable legal and administrative procedures, including a description of the grievance procedures and remedies available to PAPs in the judicial process and the execution of these procedures, including any available alternative dispute resolution mechanisms that may be relevant to implementation of the RAP for the sub-project;
(iii) Relevant laws (including customary and traditional law) governing land tenure, valuation of assets and losses, compensation, and natural resource usage rights, customary personal law; communal laws, etc related to displacement and resettlement, and environmental laws and social welfare legislation;
(iv) Laws and regulations relating to the agencies responsible for implementing resettlement activities in the sub-projects;
(v) Gaps, if any, between local laws covering resettlement and the Bank's resettlement policy, and the mechanisms for addressing such gaps; and
(vi) Legal steps necessary to ensure the effective implementation of RAP activities in the sub-projects, including, as appropriate, a process for recognizing claims to legal rights to land, including claims that derive from customary and traditional usage, etc and which are specific to the sub-projects.

The institutional framework governing RAP implementation generally covers:

(i) Agencies and offices responsible for resettlement activities and civil society groups like NGOs that may have a role in RAP implementation;
(ii) Institutional capacities of these agencies, offices, and civil society groups in carrying out RAP implementation, monitoring, and evaluation; and
(iii) Activities for enhancing the institutional capacities of agencies, offices, and civil society groups, especially in the consultation and monitoring processes.

Eligibility: Definition of displaced persons or PAPS and criteria for determining their eligibility for compensation and other resettlement assistance, including relevant cut-off dates.

Valuation of and compensation for losses: The methodology to be used for valuing losses, or damages, for the purpose of determining their replacement costs; and a description of the proposed types and levels of compensation consistent with national and local laws and measures, as necessary, to ensure that these are based on acceptable values (e.g. market rates).

Resettlement Measures: A description of the compensation and other resettlement measures that will assist each category of eligible PAPs to achieve the objectives of OP 4.12. Aside from compensation, these measures should include programs for livelihood restoration, grievance mechanisms, consultations, and disclosure of information.

Site selection, site preparation, and relocation: Alternative relocation sites should be described and cover the following:

(i) Institutional and technical arrangements for identifying and preparing relocation sites, whether rural or urban, for which a combination of productive potential, location advantages, and other factors is at least comparable to the advantages of the old sites, with an estimate of the time needed to acquire and transfer land and ancillary resources;
(ii) Any measures necessary to prevent land speculation or influx of eligible persons at the selected sites;
(iii) Procedures for physical relocation under the project, including timetables for site preparation and transfer; and
(iv) Legal arrangements for recognizing (or regularizing) tenure and transferring titles to those being resettled.

Housing, infrastructure, and social services: Plans to provide (or to finance provision of) housing, infrastructure (e.g. water supply, feeder roads), and social services to host populations; and any other necessary site development, engineering, and architectural designs for these facilities should be described.

Environmental protection and management. A description of the boundaries of the relocation area is needed. This description includes an assessment of the environmental impacts of the proposed resettlement and measures to mitigate and manage these impacts (coordinated as appropriate with the environmental assessment of the main investment requiring the resettlement).

Community Participation: Consistent with the World Bank's policy on consultation and disclosure, a strategy for consultation with, and participation of, PAPs and host communities, should include:

(i) Description of the strategy for consultation with and participation of PAPs and hosts in the design and implementation of resettlement activities;
(ii) Summary of the consultations and how PAPs' views were taken into account in preparing the resettlement plan; and
(iii) Review of resettlement alternatives presented and the choices made by PAPs regarding options available to them, including choices related to forms of compensation and

resettlement assistance, to relocating as individual families or as parts of pre-existing communities or kinship groups, to sustaining existing patterns of group organization, and to retaining access to cultural property (e.g. places of worship, pilgrimage centers, cemeteries); and

(iv) Arrangements on how PAPs can communicate their concerns to project authorities throughout planning and implementation, and measures to ensure that vulnerable groups (including indigenous peoples, ethnic minorities, landless, children and youth, and women) are adequately represented.

The consultations should cover measures to mitigate the impact of resettlement on any host communities, including:

(i) Consultations with host communities and local governments;
(ii) Arrangements for prompt tendering of any payment due the hosts for land or other assets provided to PAPs;
(iii) Conflict resolution involving PAPs and host communities; and
(iv) Additional services (e.g. education, water, health, and production services) in host communities to make them at least comparable to services available to PAPs.

Grievance procedures: The RAP should provide mechanisms for ensuring that an affordable and accessible procedure is in place for third-party settlement of disputes arising from resettlement. These mechanisms should take into account the availability of judicial and legal services, as well as community and traditional dispute settlement mechanisms.

RAP implementation responsibilities: The RAP should be clear about the implementation responsibilities of various agencies, offices, and local representatives. These responsibilities should cover (i) delivery of RAP compensation and rehabilitation measures and provision of services; (ii) appropriate coordination between agencies and jurisdictions involved in RAP implementation; and (iii) measures (including technical assistance) needed to strengthen the implementing agencies' capacities of responsibility for managing facilities and services provided under the project and for transferring to PAPs some responsibilities related to RAP components (e.g. community-based livelihood restoration; participatory monitoring; etc).

Implementation Schedule: An implementation schedule covering all RAP activities from preparation, implementation, and monitoring and evaluation should be included. These should identify the target dates for delivery of benefits to the resettled population and the hosts, as well as clearly defining a closing date. The schedule should indicate how the RAP activities are linked to the implementation of the overall project.

Costs and budget: The RAP for the specific sub-projects should provide detailed (itemized) cost estimates for all RAP activities, including allowances for inflation, population growth, and other contingencies; timetable for expenditures; sources of funds; and arrangements for timely flow of funds. These should include other fiduciary arrangements consistent with the rest of the project governing financial management and procurement.

Monitoring and evaluation: Arrangements for monitoring of RAP activities by the implementing agency, and the independent monitoring of these activities, should be included in the RAP section on monitoring and evaluation. The final evaluation should be done by an independent monitor or agency to measure RAP outcomes and impacts on PAPs' livelihood and living conditions. The World Bank has examples of performance monitoring indicators to

measure inputs, outputs, and outcomes for RAP activities; involvement of PAPS in the monitoring process; evaluation of the impact of RAP activities over a reasonable period after resettlement and compensation, and using the results of RAP impact monitoring to guide subsequent implementation.

ANNEX 3: Sample Grievance and Resolution Form

Name (Filer of Complaint): _____
ID Number: _____ (PAPs ID number)
Contact Information : _____ (Village ; mobile phone)
Nature of Grievance or Complaint:
_____
_____
_____

Date	Individuals Contacted	Summary of Discussion
_____	_____	_____

Signature_____ Date: _____

Signed (Filer of Complaint): _____
Name of Person Filing Complaint :_____(if different from Filer)
Position or Relationship to Filer: _____

Review/Resolution
Date of Conciliation Session: _____
Was Filer Present? : Yes No
Was field verification of complaint conducted? Yes No
Findings of field investigation:
_____
_____
_____
Summary of Conciliation Session Discussion:
_____
_____
_____
Issues _____-
_____

Was agreement reached on the issues? Yes No
If agreement was reached, detail the agreement below:
If agreement was not reached, specify the points of disagreement below:

_____
_____

Signed (Conciliator): _____ Signed (Filer): _____

Signed: _____
Independent Observer

Date: _____

ANNEX 4: Sample Table of Contents for Consultation Reports

1.0 Introduction.
1.1 Project Description
1.2 Applicable Laws, Regulations, and Policies to Public Engagement
1.3 Project Lenders

2.0 Stakeholder Analysis
2.1 Areas of Influence/Stakeholders
2.2 Description of Stakeholders

3.0 Stakeholder Engagement
3.1 Previous Consultation Activities
3.2 Implemented Community Engagement Activities
3.3 Project Sponsor's Community Engagement Plan
3.3.1 Phase 1 – Initial Stakeholder Consultation
3.3.2 Phase 2 – Release of the SEA Terms of Reference and Draft PCDP
3.3.3 Phase 3 – Release of SEA Consultation Summary Report

4.0 Summary of Key Issues

5.0 Future Consultation Events
5.1 Phase 4 – Release of the SEA Report and Action Plans
5.2 Phase 5 – RCDAP Planning Consultation
5.3 Phase 6 - Ongoing Project Communication

6.0 Disclosure Plan

Tables
Table 2.1: Consultation Activity Summary
Table 3.1: Initial Government Agency Consultations
Table 3.2: Summary of NGO Meetings
Table 3.3: Sub-County Committee Composition
Table 3.4: Summary of Community Discussions
Table 3.5: Local Community Comments
Table 4.1: Summary of Key Issues and Responses
Table 5.1: Summary of Future Consultation Activities per Stakeholder Group

TEMPLATE Table on Consultation Activity Summary

Location and Communities Represented	Meeting Dates	Attendees	Discussion Summary
Example:			

ANNEX 5: Glossary of Terms

Census	A field survey carried out to identify and determine the number of Project Affected Persons (PAPs) or Displaced Persons (DPs) as a result of land acquisition and related impacts. The census provides the basic information necessary for determining eligibility for compensation, resettlement, and other measures emanating from consultations with affected communities and the local government institutions.
Compensation	The payment in kind, cash or other assets given in exchange for the acquisition of land including fixed assets, is called compensation. These include other impacts resulting from activities to rehabilitate or cushion the impacts from displacement.
Cutoff Date	The cut-off date is the date of commencement of the census of PAPs or DPs within the EASP program area boundaries. This is the date on and beyond which any person whose land is occupied for EASP program, will not be eligible for compensation.
Grievance Mechanism	The RPF contains a grievance mechanism based on policies and procedures that are designed to ensure that the complaints or disputes about any aspect of the land acquisition, compensation, resettlement, and rehabilitation process, etc. are being addressed. This mechanism includes a procedure for filing of complaints and a process for dispute resolution within an acceptable time period.
Implementation Schedule	The RPF contains an implementation schedule that outlines the time frame for planning, implementation, and monitoring and evaluation of the RAPs for sub-projects, if applicable.
Land	Land refers to all types of agricultural and/or non-agricultural land and any structures thereon whether temporary or permanent and which may be acquired by the project.
Land Acquisition	Land acquisition means the possession of or alienation of land, buildings, or other assets thereon for purposes of the project.
Project Affected Persons (PAPs) or Displaced Persons (DPs)	Project affected persons (PAPs) or Displaced Persons (DPs) are persons affected by land and other assets loss as a result of EASP activities. These person(s) are affected because they may lose, be denied, or be restricted access to economic assets; lose shelter, income sources, or means of livelihood. These persons are affected whether or not they will move to another location. Most often, the term DPs applies to those who are physically relocated. These people may have their: standard of living adversely affected, whether or not the Displaced Person will move to another location ; lose right, title, interest in any houses, land (including premises, agricultural and grazing land) or any other fixed or movable assets acquired or possessed, lose access to productive assets or any means of livelihood.

Project Impacts	Impacts on the people living and working in the affected areas of the project, including the surrounding and host communities are assessed as part of the overall evaluation of the project.
Project Implementing Unit (PIU)	Some projects make use of project implementing units (PIUs), which are generally separate units within the project recipient's agency. The PIU is often composed of full time staff devoted to implementing the project, and have been encouraged to have separate teams with environment and social specialists who can carry out the activities, for example, as outlined in the RPF or RAP.
Rehabilitation Assistance	Rehabilitation assistance is the provision of development assistance in addition to compensation such as livelihood support, credit facilities, training, or job opportunities, needed to assist PAPs or DPs restore their livelihoods.
Replacement Cost	Replacement cost refers to the amount sufficient to cover full recovery of lost assets and related transaction costs.
Resettlement Action Plan (RAP)	The RAP is a resettlement instrument (document) to be prepared when sub-project locations are identified. In such cases, land acquisition leads to 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. RAPs are prepared by the implementing agency and contain specific and legal binding requirements to resettle and compensate the affected people before project implementation.
Resettlement Assistance	Resettlement assistance refers to activities that are usually provided during, and immediately after, relocation, such as moving allowances, residential housing, or rentals or other assistance to make the transition smoother for affected households.
Resettlement Policy Framework (RPF)	The RPF is an instrument to be used throughout the project's implementation. The RPF sets out the objectives and principles, organizational arrangements, and funding mechanisms for any resettlement, that may be necessary during implementation. The RPF guides the preparation of Resettlement Action Plans (RAPs), as needed, for sub-projects.
Rights and Entitlements	Rights and entitlements are defined for PAPs and DPs (with the cut-off date) and cover those losing businesses, jobs, and income. These include options for land-for-land or cash compensation. Options regarding community and individual resettlement, and provisions and entitlements to be provided for each affected community or household will be determined and explained, usually in an entitlement matrix.
Witness NGO or Independent Monitor	Some RPFs refer to a witness NGO or an independent monitor that can be contracted to observe the compensation process and provide an independent assessment of the quality of the process. These are usually NGOs or other agencies that are not directly involved in the project and have a reputation for independence and integrity.

ANNEX 6: Relevant Laws

Property Rights and Land Rights	**Law / Regulation**
Subject to the provisions of this Act, all land comprised in the territory of each State in the Federation are hereby vested in the Governor of each state and such land shall be held in trust and administered for the use and common benefit of all Nigerians in accordance with the provisions of this Act.	Land Use Act 1978, Section 1
All land in urban areas shall be under the control and management of the Governor of each State; and all other land shall be under the control and management of local government within the area of jurisdiction in which the land is situated.	Land Use Act 1978, Section 2(a)
It shall be lawful for the Governor in respect of land, whether or not in an urban area to grant statutory rights off occupancy to any person for all purposes.	Land Use Act 1978, Section 5(1)
It shall be lawful for a Local Government in respect of land not in an urban area , to grant customary rights of occupancy to any person or organization for the use of land in the Local Government Area for agricultural, residential and other purposes; to grant customary rights of occupancy to any person or organization for use of land for grazing purposes as may be customary in the Local Government Area concerned.	Land Use Act 1978, Section 6(1)
For agricultural purposes, no single customary right of occupancy shall exceed 500 hectares.	Land Use Act 1978
Land can be classified according to the following broad categories: **Community land,** or land commonly referred to as ancestral land, is owned by all the people. **Communal land** consists mostly of under-developed forests and is owned by nobody. Those who clear it first claim ownership. **Clan or family land** is owned by clans and families, as the name suggests. **Institutional land:** land allocated to traditional institutions such as traditional authorities and chiefs. **Individual land:** land acquired by an individual, which may be inherited by the immediate family, depending on customary practices	None Cited[1]
Simultaneously operating are two levels of land law, a customary system that varies by ethnic group and family type around the country, and a "statutory" system based in English common law established during the colonial period which operates in many urban areas and selected other areas around the country, usually where institutions of the modern society and economy have established rights under this	None Cited

[1] Located source of quote: Ali-Akpajiak, Sofo C.A. and Toni Pyke, *Measuring Poverty in Nigeria*, Oxford: Oxfam GB, 2003. This source attributes it to the Land Use Act of 1978, but I cannot locate this information in the Act.

latter system. Individuals and families hold heritable rights in land assigned to them or their ancestors under customary systems – and grazing rights, rights to economic trees, and cropping rights may overlap physically on a given piece of land. Individuals and corporate entities hold lease rights acquired within the statutory system or adjudicated by registration from customary tenure into the statutory system.	

ANNEX 012: Environmental and Social Guidelines for Contractors

The following guidelines should be included in the contractor's agreements:

- Installation of the work site on areas far enough from water points, houses and sensitive areas.
- Sanitary equipments and installations
- Site regulation (what is allowed and not allowed on work sites)
- Compliance with laws, rules and other permits in vigor.
- Hygiene and security on work sites
- Protect neighboring properties
- Ensure the permanence of the traffic and access of neighboring populations during the works to avoid hindrance to traffic
- Protect staff working on work sites
- Soil, surface and groundwater protection: avoid any wastewater discharge, oil spill and discharge of any type of pollutants on soils, in surface or groundwaters, in sewers, drainage ditches or into the sea.
- Protect the environment against exhaust fuels and oils
- Protect the environment against dust and other solid residues
- Waste management: install containers to collect the wastes generated next to the areas of activity.
- Degradation/demolition of private properties: inform and raise the awareness of the populations before any activity of degradation of gods. Compensate beneficiaries before any demolition.
- Use a quarry of materials according to the mining code requirements
- Compensation planting in case of deforestation or tree felling
- No waste slash and burn on site
- Speed limitation of work site engines and cars
- Allow the access of Public and emergency services
- Organize the storage of materials on the public highway
- Parking and displacements of machines
- Footbridges and access of neighbors
- Signaling of works
- Respect of cultural sites
- Dispose safely of asbestos

- Consider impacts such as noise, dust, and safety concerns on the surrounding population and schedule construction activities accordingly;
- Protect soil surfaces during construction and re-vegetate or physically stabilize erodible surfaces;
- Ensure proper drainage;
- Prevent standing water in open construction pits, quarries or fill areas to avoid potential contamination of the water table and the development of a habitat for disease-carrying insects;
- Select construction materials sustainably, particularly wood;
- Control and clean the construction site daily;
- During construction, control dust by using water or through other means;
- Provide adequate waste disposal and sanitation services at the construction site;
- Dispose of oil and solid waste materials appropriately.
- Preserve natural habitats along streams, steep slopes, and ecologically sensitive areas;
- Develop maintenance and reclamation plans and restore vegetation and habitat.
- Sound use of chemicals for termite control during the construction phase.

Annex 013 Gully Erosion Control & Slope Stabilization in Southeast Nigeria Good Practice Guidance Note (GPGN)

Overview

This GPGN is written for consulting engineers preparing erosion control designs for NEWMAP and the State Ministry of Environment engineers responsible for reviewing their work. The causes of gullies and ravines in Southeast Nigeria are generally understood and the major role of road development and inadequate urban stormwater drainage in gully formation is recognized. However, gully reclamation efforts have not been successful due to financial constraints, lack of adequate professional experience of effective practices for gully prevention and reclamation and, institutional deficiencies in quality assurance of reclamation works. This Note is intended to serve as: (i) an awareness creation and sensitization document; and (ii) a convenient primer of required good practices and a source of access to the useful detailed technical information required for design and construction remedial works. The presentation approach provides a systematic review works design practices *with internet links* to recognized manuals and guidelines of such practices that may be downloaded for detailed study to broaden professional horizons and knowledge for preparation of designs. This Note is not a list of "recipes" as each gully situation is unique to a local situation and remedies depend on detailed surveys, available budget and, most of all, the experience and ingenuity of the selected designer to cope with the field conditions. Finally, even if the design is good, competent supervision of the contractor will determine its effectiveness while post-construction field monitoring and maintenance will ensure its sustainability.
Section A reviews "Gully Formation Causes and Propagation Processes in Southeastern Nigeria" because engineers should understand the area's erosion-prone environment's gully formation processes and mechanisms when analyzing a location's gully problems. This is based on a summary of key Nigerian studies. The conclusions of past reviews of the causes

of gullying caused by roads and inadequate urban stormwater infrastructure are described for "sensitization".
Section B describes "Gully Control Principles and Practices". It covers practices related to: (a) phases of gully control; (ii) factors to be considered in selecting treatment options; (iii) gully stabilization considerations; and (iv) gully control structure design for head-cutting control and gully bed and bank stabilization. The emphasis is on porous check dams made of natural materials from wood, rock and rock-filled gabions. Deep gullies and ravines incised below a groundwater table are weakened by seepage: thus reclamation efforts for gullies deeper than 15-20 m are bound to fail. *Thus gullies caused by poor road and stormwater drainage should be effectively treated as a budget priority after they develop to prevent future major damages and an almost irreversible situation*.

Section C describes "Slope Stabilization and Ravine Control covering: (i) well known engineering structures and materials for slope stabilization and an example of expensive urban ravine control using these methods; and (ii) erosion control and slope stabilization using accepted soil bioengineering practices. The multipurpose Vetiver Grass system--now used in over 120 countries--is described along with an example of its use in controlling an urban gully.
Section D describes "Road and Stormwater Drainage Erosion Control Practices". While the design principles are known, the Note emphasizes some key erosion control principles and refers to manuals for detailed practices.

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A. Gully Formation Causes and Propagation Processes in Southeastern Nigeria

1. The Southeast Nigeria Problem Scope.

1. Gullying is a serious form of soil degradation involving loss of land. While being subordinate to sheet and rill erosion in terms of topsoil removal in a given locality, it poses a critical threat by lowering the base level in a natural catchment's drainage system. This exposes the area to potential removal of all material within the basin above this level. Thus a long narrow gully may represent the removal of only a few thousand hectare-meters of soil, but potentially it sets the stage for removal of hundreds of thousands with major adverse impacts on both the socio-economic and natural environment.

2. A Remote Sensing (RS) and Geographic Information System (GIS) mapping study of gully erosion in 5 Southeastern Nigeria States (Abia, Anambra, Ebonyi, Enugu and Imo) was undertaken by Igbokwe et al was published 2008[2]. The study mentions that, in about 2004, there were over 2,350 sizeable gullies in these States discernable by various RS methods: this number has no doubt increased by 2011. While Ebonyi has mostly minor gullies, Anambra & Imo had both active and inactive gullies and that no control measures had hitherto proven successful in these two States. Of these five states, Anambra has the highest concentration of active gully sites. Using map overlays--but ignoring very small gullies--each State's areas with larger gullies were classified into mildly, moderately and severely gullied areas. The classification of the state territories in terms of mildly gullied areas, moderately gullied areas and severely gullied areas as shown in Table 1 below.

Table 1: Severity of gully affected areas in five Southeast Nigeria States (circa 2004/5)

State	Mildly Gullied		Moderately Gullied		Severely Gullied	
	Area (km^2)	(% of State)	Area (km^2)	(% of State	Area (km^2)	(% of State)
Abia	3322.61	79.4	864.45	20.6	0	0
Anambra	1661.38	35.1	1316.58	27.8	1758.0	37.1
Ebonyi	2447.0	47.4	2712.06	52.6	0	0
Enugu	6252.08	80.8	1481.41	19.2	0	0
Imo	4694.67	88.1	634.50	11.9	0	0
Total Area	18,377.74		7,009.00		1,758.0	

Source: Igbokwe J.I. et al, 2008

2. Southeast Nigeria Gully Formation Processes and Mechanisms

3. Gullying. Once rills are large enough to restrict vehicular access they are referred to as gullies or gully erosion. Major concentrations of high-velocity run-off water in these larger rills remove vast amounts of soil. This results in deeply incised gullies occurring along depressions and drainage lines. Removal of topsoil and subsoil by fast-flowing surface water creates abrupt deep and wide gullies, of two different kinds: scour gullies and headward erosion. In scour gullies, run-off water concentrated in rills or depressions removes soil particles through sluicing - the washing effect of running water on loose grains. Material commonly moved is the size of fine to medium sand or may be derived from slaking, when large aggregates disintegrate upon wetting. Scour gullies are often associated with gently undulating landscapes. In headward erosion, the gully extends upstream as a result of waterfall undercutting and gravitational slumping of the gully head. It is often associated

[2] Igbokwe J.I., J.O. Akinyede, B. Dang, T. Alaga, M.N. Ono, V.C. Nnodu & L.O. Anike (2008): "Mapping and monitoring of the impact of gully erosion in southeastern Nigeria with satellite remote sensing and geographic information system"; The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences. Vol. XXXVII. Part B8. Beijing 2008. Download at http://www.isprs.org/proceedings/XXXVII/congress/8_pdf/9_WG-VIII-9/03.pdf

with (although not confined to) steeper landscapes. In both cases gullies may widen through lateral erosion, where water undercutting causes subsequent slumping of the gully sides.

4. Once a gully has formed, the processes whereby it lengthens and widens are much better understood. The upper end of a gully is marked by a headwall, a vertical scarp, separating the un-gullied portion of the valley floor from the gully below. Water flows over the headwall during runoff and falls into a plunge pool at the base of the headwall. The water then erodes the base and sides of the pool, undercutting the headwall. When undercutting reaches an advanced stage, the headwall fails and topples into the gully, thereby lengthening the trench. This process is repeated many times as a gully advances up the drainage way. When first formed, most gullies are quite narrow and have vertical sidewalls. If enough water is flowing through the gully to carry away the slumped material, additional slumping can occur through undercutting of the gully sidewall toes. This causes the gully to widen. Widening also occurs when upper portions of gully walls separate and topple into the gully. If water intermittently flowing through the gully continues to clean out debris derived from the headwall and sidewalls, the gully continues to grow. When more debris accumulates than is transported away, the gully stabilizes and begins to fill.

5. A useful description (with photos) of gully erosion and its causes is given in an Australian erosion control organization's Fact Sheet[3]. The Fact sheet describes the various causes and the related gullying mechanisms (land clearing, urbanization, exposure of weak subsoil, lateral bank erosion, culvert construction and construction of unstable drainage channels*). One of the most notable aspects is that a newly formed gully bed (thalweg) has a slope significantly flatter than the original gradient of the overland flow. Thus, the further the gully migrates up the valley, the higher and less stable the gully banks become.* This can result in various forms of bank erosion including undercutting, slumping, lateral bank erosion and dry-cracking. Gully erosion can be a stormwater problem, a vegetation problem or any combination of these. *Soil properties may vary significantly in the soil profile-and can be a major factor in the choice of treatment option and how the option is designed.*

6. Gully Formation in the Anambra-Imo Basin. Gully processes are localized in the fine- to medium- grained Coastal Plain Sands (Pliocene to Recent) and Nanka Sands (Eocene) and the medium- to coarse-grained Nsukka Sandstone and Ajali Sandstone (Cretaceous) of the Anambra-Imo basin region. The most active and dangerous spots occur at Agulu, Nanka, Alor, Oraukwu, Oko and parts of Udi, Enugu and Ukehe in Anambra and Enugu States. Other catastrophic gullies occur at Amucha, Isuikwuato, Ohafia, Abriba and Arochukwu in Imo and Abia States, and in parts of Uyo and Calabar in Cross River State. In all these places, with similar stratigraphic sequences of thick cohesionless sand strata overlain by a red clayey sand stratum and surface earth of either sandy loam or silty loam, intense gullying involving sudden and often catastrophic movements of large earth masses, has sent villages packing, wrecked homes, swept crops and washed roads away. The major gully formation processes derive mainly from anthropogenic (Man-induced) causes exacerbated by local geomorphology, the high annual rainfall (maximum of about 1950 mm/year), very high rainfall intensity and fragile soils. This is particularly true in Anambra State which has the highest average population density in Africa and the most fragile lithology conducive to gully major formation. As population grew from the 1850s, the tuber-maize shifting cultivation fallow period reduced from 11-12 years to about 3 years as land trees were felled and bush cleared for agriculture. This caused increased runoff, rill erosion and gully formation in the fine- to coarse-grained sands and sandstones of the Anambra-Imo basin region. The gullies became wide ravines several km long and over 75 m deep.

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[3] Catchments & Creeks Pty Ltd: "Gully Erosion – Part 1, Gully erosion and its causes"; April 2010. See http://www.catchmentsandcreeks.com.au/docs/Gully1-1.pdf

7. The Agulu-Nanka region of Anambra State[4] is the worst affected and most problematic area and has been extensively studied. The landscape is a cuesta within the Awka-Orlu uplands formed by the Nanka formation and the Imo Shale formation. Both the geological, hydrogeological, geotechnical and hydrogeochemical characteristics of the area and human activity have contributed to gully development and growth. Major aquifers and aquitards form multi-aquifer systems and heavy rainfall causes a rise in the water table. The increase in hydraulic head produces rapid flow rates that enhance the gullying process. The depth to the water table varies spatially. In areas that remain unaffected by gullying, the water table may be as deep as 60 m. In areas where the overlying lateritized soils have been eroded exposing cohesionless sands, the water table is shallower and may outcrop as effluent seepages, springs, ponds or streams. A considerable rise in the water table occurs during the rainy season, despite the thick unsaturated zone. This is due to the high vertical hydraulic conductivity of the freely draining medium- to coarse-grained soil overlying the multi-aquifer system. The depth to water table in aquifer in the escarpment area varies between 10 to170m during the rainy season and 80 to 260m in the dry season in a transect from Igboukwu to Awka[5].

8. Deep natural gullies (>15m deep) which are generally located on either the scarp face or dip slopes of the highlands result from the continuous incision of the highlands by the headwaters of the main river systems (Imo, Orashi, Njaba, etc) and their tributaries. This is a natural geologic process which is accelerated and/or exacerbated by human activities and the properties of the underlying rocks. Generally, most gullies begin as a rill and the erosion progress downwards by cutting near vertical walls in the partially cemented lateritic soils and/or formations. One rainy season is sufficient to initiate a severe gully and once initiated, the gullies are difficult to control or stop. When the gully reaches the unconsolidated, loose, sand formation (Coastal Plain Sands or Benin Formation), the erosion process accelerates by lateral undercutting resulting in massive slumping (mainly rotational & block slumping). The localized removal of soils, sediments and poorly consolidated sedimentary rocks by running water is augmented by processes of mass movement to form steep-sided ravines. The gully-forming processes ultimately yield a degraded "badlands" terrain, comprising knife-edge ridges, separated by deep ravines, and no longer amenable to agricultural use.

9. The expansion of the gully complexes results from the high pore water pressures in the aquifer complex, particularly during the peak recharge times of the rainy season. These high pore water pressures reduce the effective strength of the unconsolidated coarse sands along the seepage faces on the gully walls. The sands are gradually loosened and eroded. The less permeable clay layers are lubricated and saturated with water. The clays subsequently expand and lose their shear strength. Caving-in, piping, slumping and landslides are common. These erosion-causing activities occur in a cyclic manner and result in step-like features that are displayed all over the affected areas The high hydrostatic pressure in the aquifers produces a reduction in the effective strength of the unconsolidated coarse sands in the walls of the gullies leading to intense erosion. The erosion is followed by mass movements and sediment removal by flood flows within the gully. This is most pronounced during the rainy season.

10. Expansion and contraction of the clays and shales in the rainy and dry seasons respectively lead to slumping and landslides. The behavior of the inter-bedded shales, which

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[4] Egboka B.C.E. & E.I Okpoko (1984): "Gully erosion in the Agulu-Nanka region of Anambra State, Nigeria": *Challenges in African Hydrology and Water Resources* (Proceedings of the Harare Symposium, July 1984), IAHS Publ. No. 144. Download from http://iahs.info/redbooks/a144/iahs_144_0335.pdf .

[5] Okoro E.I, Egboka B.C.E, Anike O.L, Enekwechi E.K (2010): "Evaluation of Groundwater Potentials in parts of the escarpment areas of southeastern Nigeria"; International Journal of Geomatics and Geosciences, Vol. 1, No. 3, 2010 (see Fig 4). Download at http://ipublishing.co.in/jggsvol1no12010/EIJGGS2021.pdf

undergo large changes in volume as a result of alternate wetting and drying, enhance the gullying. The shales increase in volume when wet and become sticky and plastic during the rains. They form a caked dry mass during the dry season. Drying causes contraction of the clay and shale, resulting in the formation of extensive tension cracks or pressure release fractures. The cracks are also transferred to the sandstone units. They are observed horizontally at the ground surface and vertically and transversely on gully walls, extending for a distance or height of many meters. The tension cracks at the ground surface occur about 1.5 m from the edge of the gully, and they maintain this almost uniformly for a distance of about 50-100 m, until they terminate at angles of about 45° to the edge of the gully. The cracks widen with time. During the rains, they serve as channels for vertical flow of water to the underlying sand/shale boundaries.

11. As a result of the shales being thoroughly saturated after many days of rainfall, the clay minerals swell and develop a tendency to slide. Large masses of sand underlain by the plastic shale slide down dip into the gully, with the shale acting as a lubricant. Trees and homes are carried by the sliding mass into the gully. Quicksand also occurs in some places since the gully serves as a regional interceptor drain drawing groundwater drainage towards the gully wall toe and gully bed. After heavy rains, the water table rises and the pore water pressure increases. This creates conditions that are unable to withstand any imposed stress.

12. *The hydro-geochemical characteristics of the area are important factors in the generation and growth of the gullies through chemical reactions*. The surface water and groundwater are slightly acidic, thereby facilitating the decomposition of the cements binding particles together and loosening them for erosion. The deposits of amorphous sulphur indicate highly reducing conditions and consequently an anaerobic environment. Oxidation-reduction (redox) reactions are possibly occurring along the water flow system. All these processes contribute to soil disaggregation and erosion.

13. <u>Types of Gully Formation & Propagation by Natural Processes in Southeast Nigeria</u>. *The concept of gullying is generally linked to runoff processes and control of runoff is advocated as the most effective means of controlling gullying. However, the processes described above, particularly in the Nanka and Imo Shale formations are very complex and not wholly related surface runoff making a generalized approach to gully control and reclamation very difficult*. Ezechi and Okagbue[6] (1989) undertook a field study of gully genesis and processes in the Agulu-Nanka- Oraukwu gully complex flowing east from the escarpment towards the Imo-Shale formation drained by the Mamu River and the Alor-Nnobi gullies draining into the Idemili River, a Niger River tributary. Aside of gullies formed by concentrated runoff due to road construction, storm water drainage and other human interference in the environment, three generic types of gullies arise from *natural phenomena*. These are: Base level, Scarp and Fracture gullies.

a) <u>Base Level Gullies</u>. These gullies originate at the base level streams/rivers and are brought about by the combined effect of seepage forces, flowing soil and bank erosion with groundwater as the main causative factor. These gullies emanate at locations along a stream bank where groundwater outflow causes `quick' conditions and bank slumping and sliding. This causes upslope movement and gully formation propagated by progressive liquefaction of fallen debris, subterranean erosion and tension fracturing of the bank. This process continues to higher elevations with large increase in depth and rate of advancement and many gully prongs develop in response to local

[6] Ezechi J.I. and C.O. Okagbue (1989): " A genetic classification of gullies in Eastern Nigeria and its implications on control measures"; Journal of African Earth Sciences, Vol. 9, No.3/4, pp 711-718, 1989. *No free article download available.*

runoff channels or depressions. Some sections of the Agulu-Nanka gullies belong to this category.

b) Scarp Gullies. These gullies are initiated and propagated by runoff at boundaries of vulnerable slope sections where exposed cohesionless sands are overlain by resistant strata. At the peak of the rainy season when soils are saturated and runoff rate and volume is maximal. The runoff opens an erosion channel and, as it flows from the resistant top stratum, it floods the underlying loose sands reducing their cohesion and transporting them further downslope. Scour pools form as the loose sands are removed giving rise to local scarps. Further flooding and erosion of the sand bed leads to undermining of the upper resistant layer which then fails by tension and a gully starts propagating. An example is a scarp gully near a road to Oraukwu.

c) Fracture Gullies. These gullies form at locations that show excessive desiccation fracturing where there is sparse vegetation and thin cohesive top soils. The deep fractures extend into the underlying weak sands and runoff infiltration of the fracture zone cracks make deep incisions into the subsurface. Erosion of the sands below gradually undermines the top cohesive strata and causes its collapse. Further internal erosion leads to further collapsing as the channel deepens and widens. Increase in rainfall intensity after an August dry spell favors formation of fracture gullies.

14. Gully propagation of the above three gully types occurs by sliding and slumping, block failure and sometimes through toppling as follows:

i. Sliding. At most sites, slope failure by sliding and slumping takes place after the slope has been undermined leading to tension fracturing behind the crest of the gully slope. The downslope movement of the earth mass mostly moves along a curvilinear failure surface and may reach the gully bottom undisturbed. In some cases, the materials are pulverised before reaching the gully floor as screes. Where large quantities of material are already accumulated at the gully slope toe, the movement of the intact earth may stop halfway as foundation support is derived from the soil debris below giving rise to terrace features on the gully face.

ii. Block Failures. These occur where parallel tension fractures are found in the advance direction of the gully front. Cross fractures or joints often form roughly orthogonal to the tension fractures so that small bodies of earth get detached and slide down as intact blocks into the gully bed. Block failures were observed to be restricted to the cohesive top-stratum and to be common in areas where this stratum is relatively thin with little or no vegetative cover.

iii. Toppling Failure. *This is not a common feature* and was only observed in a few locations (e.g. at the Oraukwu/Alor gully site) where the geological cross-section is made up of discontinuous lenses of sandstone beds or laterized shaly beds of cohesive soil underlain by cohesionless white sands. Initially, the slope toe is undermined by overland flow and infiltrating rainwater and sliding of the sands progresses upslope until a competent top layer of rocky sandstone or laterized shaly bed is left projecting into the gully. The overhang is gradually weakened by alternate wetting and drying until tension fracture develops and the overhang breaks and topples into the gully in a cascade of earth rubble. Unless carried away by the runoff into and in the gully, the rubble remains and helps stabilize the slopes.

Base-level and scarp gullies commonly advance by slope undermining, sliding and slumping except that scarp gullies are also affected by toppling. Fracture gullies advance by collapsing and also block failure. *Gullies formed by runoff concentration by runoff concentration (e.g. from road and drainage culverts) and exposure of erodible soils generally propagate by sliding and slumping*.

15. Characteristics of Soils Vulnerable to Gully Erosion. In the late 1990s, geotechnical studies were carried out in nine different gully-prone formations[7]. Gradation analyses, Atterberg limits, dry buld density and moisture contents were determined from soil samples of gully systems and, also along the gully walls to ascertain changes in soil properties with depth. Gradation analysis revealed that the coastal sands are very uniform and the combined percentage sieve passing or size distribution curves were very similar. The Coefficient of Uniformity (CU)--defined as d_{60}/d_{10}--indicates a minor variation in the size distribution and CU among the soils of the geological formations (coastal, Nanka, Ajali and Nsukka) and are indicative of a uniform fine to medium-grained sand. It was found that since the origin of the lateritic sand is relatively pure quartz sand, variations in bulk density are likely due to differences in packing and, more significantly, the degree and amount of oxide cementation.

16. The nature and type of soil cement correlates significantly with soil dispersion time (a measure of time taken for a cohesive sample to dissociate into sand grains in water by deflocculation) and gully advance. CaO, MgO, MnO, Na_2O, and K_2O have the most significant negative correlations; i.e. indicating that the less of these oxides present, the greater the gully increase. The oxides are cements normally contributed by pore water: therefore, the degree of cementation by these oxide cements governs the cohesion and resistance to erosion. Generally, dispersion occurs when fresh water enters earth pores and monovalent Na ions have replaced divalent cations such as Ca and Mg on the exchange complex of clays. Deposits that exhibit rapid dispersion are susceptible to erosion and gullying under hydraulic action. The iron cement of the laterite in the sands sampled, although not significantly correlated, showed a reverse trend, i.e. the more iron cement, the greater the rate of gully advance.

17. Soil dispersivity does have a significant effect on erosion potential and thus on gully development. As indicated above, in the poorly consolidated fine- to medium-grained sands and sandstones containing subordinate shales of the Nanka sands, leaching of sporadically distributed cement in the sandstones and dispersion of clays in the interbedded, argillaceous layers were seen as the main factors giving rise to gully formation. Similarly, the expanding clays of the underlying Imo Shale were assumed to likely exhibit strong dispersion affects: this would speed the propagation of gullies initiated at the higher levels in the ridge-forming Nanka Sand, especially in the Awka-Orlu uplands. The Nsukka Sandstone comprises medium- to coarse-grained sandstones with subordinate carbonaceous shales, sandy shales and coal seams. The underlying Ajali Sandstone is extensively cross-bedded and consists of medium- to cosrse-grained sandstones, poorly consolidated often with subordinate shales. These to units exhibited the shortest dispersion times of the four investigated: therefore dispersion is a significant factor in gully development in these units and render deposits disaggregated and erosion susceptible. *The study found that, as the proportion of the finer sizes (,0.15 mm and <0.075 mm) increases, so does the dispersion time in a range of about 50-130 seconds: i.e. the `cleaner' (less fines) and more uniform the sand is, the more prone it is to erosion* (see Figure 11 of the paper in footnote 6).

18. It was also found--in the 1994 study--that the proportion of particles smaller than 1 mm (range 86-97 %) is related to gully advance in all three directions: length, breadth and depth. The more coarse sand present, the greater the gully advance rate. Three regression equations were derived for annual length, width and depth increase for the sample gullies as a function of the cumulative percentage if grains passing the 1 mm sieve. *These equations are indicative of gullying rates. However, it is necessary to study the rate of advance and the*

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[7] Hudec P.P., Simpson F., Akpokje E., Umenweke M. and Onrasik M.: "Gully erosion of coastal plan sediments of Nigeria"; 8th International IAEG Congress, 1988 Balkema, Rotterdam. Download from http://web2.uwindsor.ca/courses/earth_science/hudec/publications/gullyerosion.pdf

grain size distribution of each gully system in order to establish predictive equations for each. In addition to grain size analysis, a dispersion or slaking test of gully head and wall samples is also desirable in planning interventions to prevent and/or control gullying.

19. A 2005 study by FUT, Owerri investigated the pedology of soils near gully sites in Imo and Abia States on Coastal Plain sands (Benin formation), shale (Bende-Ameki formation), upper coal measures (Nsukka formation) and false-beddded sandstones at six sites (Mbaise, Umuahia, Bende, Okigwe, Orlu and Owerri[8]. It was found that soils were sandy with a low Silt-Clay Ratio but were eroding. Exchangeable Sodium Perecentage (ESP), carbon content, silt, clay and Calcium-Magnesium Ratio (CMR) tended to influence soil erodability and correlated significantly with Dispersion Ratio ($p < 0.05$). ESP was higher in pedons near gully sites (ESP = 1.4 – 5.1) compared with non-gully sites (ESP 0.1 – 0.3). CMR was narrow (0.3-3.0), organic matter was < 11% and, Cation Exchange Capacity (CEC) was lower at sites affected by gullying (3.5- 7.0). A low base saturation (<40%) shows very strong leaching of basic cations in the study area. The importance of rainfall to the initiation and rapid growth of gullies is demonstrated by the fact that major landslides and slumping which are responsible for the rapid growth of gullies generally occur after heavy rains. The high intensity tropical rainfall in the area produces high volume of overland flow and run-off that possess high erosive energy. This combines with the high erodability (dispersion) properties of the sandy soil to produce the numerous severe complex gullies. *The study concluded that the soils are sandy and would seem to resist erosion but have a chemical nature predisposing them to erosion (as found by Hudec et al) and that non-soil factors like climate promote the inability of these soils to resist erosion.*

3. Road & Drainage Infrastructure Causes of Gully Erosion.

20. Road Design & Construction. Previous studies on gully in southern Nigeria showed that a gully is often initiated by rainfall events on surfaces whose vegetation cover has been removed for agricultural purposes and sites of uneven compaction of surface soils by human and animal feet, wheeled traffic, in off-road locations. It also takes place, where soils and sediments surround artificial materials, such as poorly designed road culverts and roadside gutters (Hudec et al., 2006). Gullies not associated with paved roads may begin as rills over bare soil which may rise from local unpaved access roads and other civil engineering constructions. The response of the lithologies to the post construction events determine the magnitude of the ensuring gullies. In road construction, the routes cut across both sandstones and shales consequent engineering and geological problems. The clearing process concentrates the runoff along the lowlands. The concentrated runoff with its sediment traction loads gather momentum down slope. The acquired energy is dissipated in the scouring and erosion of the cohensionless sands. With appreciable topographic slope, the devastation of the sandy layer occurs. Often the roads are destroyed before their completion. Ancient gullies are reactivated when runoff is directed into their thalwegs. Roadcuts, seasonal scraping to grade and poorly completed drainage channels cause roadside and urban gully erosion especially where the cohesionless sands are exposed. When effluent seepage occurs at the foot of cut-slopes, erosional processes choke the roads with sediments. The minor Awka-Orlu uplands, in Anambra State are replete with such gullies which are traceable to roadworks. Estate developers are also in the habit of channeling household runoff into public roads, thus contributing to roadside erosion processes. *The majority of the structures associated with accelerated infrastructural development of the rural areas are often not properly planned and undertaken without adequate erosion control/prevention provisions.*

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[8] Onweremadu E.U: "Pedology of near-gully sites and its implications on the erodability of soils in central southeastern Nigeria"; Research Journal of Environmental Sciences 1 (2), pp 71-76, 2007. Download at http://docsdrive.com/pdfs/academicjournals/rjes/2007/71-76.pdf

21. The connection between gully erosion and the increased runoff, associated with the clearing of woodland and road-building in 1951. Nearly forty years later, a FAO Nigeria Land Resources Management Study (1990) concluded that most of the gully erosion in southeastern Nigeria is caused by badly designed roads and the clearance of vegetation from building sites. A major 1992-2000 IDRC/CRDI Erosion Project study by a Canadian & two Nigerian universities conducted Abia, Anambra, Enugu and Imo States concluded that the performance of road culverts and roadside gutters revealed major flaws in the design of highway drainage throughout the four states[9]. Gullies tend to form, where the concrete-lined drains and culverts are too small to accommodate peak surface runoff, are not terminated at base of-slope locations and, are allowed to decay and become clogged with debris. The overflowing water erodes beneath the roadside gutter or culvert, which eventually falls away to provide a site of localized erosion. The Study concluded that "Highway development and construction projects account for the erosion of up to 90 percent of the gully systems in southeastern Nigeria".

22. A review of past Nigerian studies of gully erosion their causes and mitigation measures--mainly for roads--was published in March 2010[10] and included descriptions of a 2009 revisit some of the road gully sites examined in 1994 by the IDRC/CRDI Erosion Project. The paper describes (with photos from 1995 and 2009) one road in Imo State and 3 roads in Abia State. The study confirmed that the initiation and development of road erosion gullies is facilitated by natural processes (rainfall, topography engineering-geological properties of soils, especially texture, etc) and the activities of poor road design, construction and remedial works. Large gullies had formed along major federal highways as well as State and LGA roads. The major roads were generally constructed with box-shaped concrete-line drains and gullies often developed where the concrete drains were:

- allowed to clog with debris, or are too small to accommodate peak overland flow and surface run-off, thereby causing the water to over-top them and undermine/undercut drains;
- broken and left to unrepaired which exposes the highly erodible soil to high run-off; and
- terminated at the middle of a slope or are not taken to a safe outlet at the valley bottom.

Gullies are also initiated by poor or improperly constructed and/or maintained road culverts especially where: (i) culverts are too small to accommodate peak run-off and where their outlets are not taken to a safe point at the bottom of the valley; and (ii) the culvert components were joined with weak mortar that allows inflow of water into the soil thereby undermining the culvert and ultimately resulting in its collapse. *In summary, most of the road gully erosion causes and remediation works reviewed were either partially successful or unsuccessful because of the following major reasons: a) poor design and quality assurance of construction; (b) inadequate roadside drains and lack of proper/safe termination of drain and culvert at the valley bottom; c) inadequate or lack of effective measures to protect slope surfaces; and d) lack of adequate road maintenance.*

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[9] Hudec P.P., Simpson F., Akopodje E.G. and Umenweke M.O (2006): "Termination of Gully Processes, Southeastern Nigeria"; Proceedings of the Eighth Federal Interagency Sedimentation Conference (8thFISC), April2-6, 2006, Reno, Nevada.

[10] Enuvie G., Akpokodje et al: "Gully erosion geohazards in southeastern Nigeria and management implications". See http://scientia-africana.uniportjournal.info/v9n1/pdfvol9no1/3%20PROF%20AKPOKOJE-erosion%20paper1-format2.pdf .

23. Unplanned Urbanization and Inadequate Stormwater Drainage. Hudec et al's 90% figure for infrastructure-related gully causes probably did not include large urban gullies and ravines caused by flawed municipal stormwater and road drainage of inadequate capacity together with uncontrolled housing development in Calabar and Onitsha, as well as Auchi, Benin City and small towns in south-central Nigeria's Edo State. A study of 14 gully erosion sites by Obafemi Awolowo University, Ile-Ife was undertaken in four settlements (Ode – Irele, Akotogbo, Ajagba and Lipanu) in Irele LGA of Edo State[11]. It was found that the inappropriate construction of drains along urban streets and concrete channels enhanced the formation of gullies. The termination half way (before getting to the natural drainage channel) of the construction work of the erosion channels constructed previously by the local government constituted the main factors that triggered the gully formation erosion observed. *This could suggest a severe flooding and gully erosion impact of growing, unplanned and uncontrolled urbanization in most administrative headquarters and cities in southcentral & southeastern Nigeria if improved stormwater drainage systems are not carried out*.

24. Within the Niger Delta region, erosion gullies are formed primarily by surface run-off from high intensity rainfall events on the fine-to coarse grained sand of the Benin formation. The gully forming process yield a degraded terrain in which deep and wide gullies are formed within some states such as Edo, Delta and Cross River states. The Niger Delta Development Commission (NDDC) recently commissioned research consultants to carry out research profile on flood and erosion in the region[12]. Measurements carried out by the authors for monitoring and control of flooding and erosion in some Niger delta states with a focus on Edo State and Benin City in particular (with its thus far intractable Queen Ede School and University gully sites) are discussed in this paper. This included using satellite imageries along with GPS and total station instruments for watershed, flood basins and erosion gullies sites to determine their spatial extent, acquisition of baseline data for monitoring of bank slumping and sliding in erosion gullies and hill slopes. The results of the measurements in combination with meteorological data, hydrology, hydrogeology, geology, geomorphology, soils, etc were used for erosion and flood risk sensitivity and vulnerability analysis. They also form a data base for severity ratings of the flood and erosion sites for mitigation and management purposes.

25. Inadequate Watershed/Basin Focus in Infrastructure Planning. *Corrective measures for gully erosion caused by poor infrastructure planning, design in Southeast Nigeria require a coordinated strategic management approach based on watershed or drainage basin scale taking cognizance of the causative factors and the engineering geological properties of the soils and geomorphology of the region*. The need for a watershed approach to road development is well illustrated by the construction of the Opi-Ugwogo-Abakpa Nike Road in Anambra State during the 1980s. In 1975 a cut and fill road link between Opi and Abakpa Nike through Ugwogo was planned. This road was to cut across the 250km long north-south trending Arochukwu-Ohafia-Awgu-Udi-Nsukka cuesta, near Opi based on fillings of depressions and cuts of elevated areas. The alignment of the road near Opi was very close to

[11] Ibitoye, M. O., Ekanade, O.1, Jeje, L. K. , O. O. Awotoye and Eludoyin, A. O: "Characterisation of gully formed in built up area in southwestern Nigeria": Journal of Geography and Regional Planning Vol. 1(9), pp. 164-171, December, 2008. Download at: http://www.academicjournals.org/JGRP/PDF/Pdf2008/Dec/Ibitoye%20et%20al.pdf"

[12] Ehiorobo J.O. and Osadolor C. Izinyon: "Measurements and Documentation for Flood and Erosion Monitoring and Control in the Niger Delta States of Nigeria"; FIG Working Week 2011, Bridging the Gap between Cultures, Marrakech, Morocco, 18-22 May 2011 Download at http://77.243.131.160/pub/fig2011/papers/ts07e/ts07e_ehiorobo_izinyon_5126.pdf

the Ora River and followed the river's flow direction and a section of the road that became badly gullied lies almost within the floodplain[13].

26. Given the rugged topography, several small ephemeral and perennial tributaries naturally flow into the river. The road design and construction interfered with some and completely blocked others. Consequently, during heavy rainstorms, the runoff that would hitherto have been channeled to the Ora River, carved alternative drainage paths since no artificial drainage was provided and initiated severe erosion. The erosion was most severe near the toes of the cut slopes which are underlain by the friable and easily gullied Ajali Sandstone Formation which also forms the grade on which the road was constructed. The erosion led to not only led to cut slope undermining but also to the undermining of the road pavement. Such undermining led to slumping/sliding along the cut slopes as well as the collapse of the undermined sections of the pavement. In these sections, the entire pavement was completely washed away and the road became a drainage way during storms.

27. The fill sections of the road were similarly attacked as the embankment toes become undermined by runoff. In these road sections, gullies as deep as the height of the cut slopes were generated. Investigation revealed that the grading or leveling of the ground created landslide susceptible conditions. In the fill sections, failure planes developed on the former ground surface where vegetation was not properly cleared prior to regarding. In the rainy season, increased soil saturation resulted where surface and subsurface drainage was destroyed by re-grading. The fills, though compacted, lost strength during rainy periods and became subject to mass movement.

28. To remedy the problem, the paper considers alternatives of: (i) wide reinforced concrete drainage channel on both sides of the road from Opi town down to the banks of the Ora River; and (ii) considerable flattening the of the cuts and embankments. This option was very expensive as *the present gullies have to be first filled before any construction could be undertaken be undertaken*. To minimize cost and regeneration of gullies, a complete a complete realignment and relocation section of the road, slightly to the south, away from the Ora River floodplains was proposed as a better alternative solution. *This, however, would still require the provision of drainages not close to the Ora River as the cuesta would have to be bisected by the diversion.*

B. Gully Control Principles & Practices

1. Principles and Practices of Gully Erosion Control

29. Identifying sound general gully control principles and good practices in textbooks and professional literature for large gullies/ravines like those found in the Anambra –Imo basin is difficult because the focus is generally on shallow gully control in agricultural areas by agronomic land management and agricultural engineering practices developed by the USDA's Soil Conservation Service for large farms in the semi-arid, temperate and sub-tropical USA and Australia through the Catchments & Creeks organization. At the other extreme, control of rocky debris transported by mountain torrents by means of concrete check dams is well covered in European and Japanese technical literature but not relevant to SE Nigeria conditions. Good practices for control of gullies caused by poor road and municipal stormwater drainage under the lithology conditions of SE Nigeria is not found as a subject in drainage design manuals as it is assumed that if the correct drainage design practices are followed, gullying should not occur. Nevertheless, this Note will attempt to list some relevant good practice principles from materials available in professional engineering literature. Applications to sub-tropical and tropical climates in Africa, Asia and South

[13] Okagbue C.O. & Agbo J.U.: "Gully erosion resulting from anthropogenic-hydrological modifications: case of the Opi-Ugwogo-Abakpa Nike Road, Anambra State, Nigeria"; Hydrology in Mountainous Regions. II - Artificial Reservoirs; Water and Slopes (Proceedings of two Lausanne Symposia, August 1990). IAHS Publication No. 194, 1990. Download at http://iahs.info/redbooks/a194/iahs_194_0407.pdf

America agriculture were developed by FAO and published in a series of field guides and bulletins[14],[15],[16],[17]. Australian principles & treatment practices are summarized in a useful Catchment & Creeks Fact Sheet[18] replete with diagrams and illustrative photos.

1.1 Factors Determining Treatment Options

30. Runoff Control Needs. Generally, gullies are formed and enlarged by an increase in surface run-off. *Therefore, minimizing surface run-off into the gully is essential in gully control.* Watersheds deteriorate because of: (a) misuse of agricultural land, urbanization built-up areas reducing rainfall infiltration and infrastructure drainage concentrating runoff from large catchment areas; (b) accelerated runoff on steep slopes increasingly affected by the aforementioned land-use factors, especially of easily eroded soils; and (c) short intensive rainstorms and/or prolonged rains of moderate intensity. There is a relationship between rainfall intensity, rate of run-off, density of vegetative cover, and the size of a catchment area. In tropical countries, after the soil is completely saturated, almost all of the rainfall turns into run-off during the wettest months. It rains intensively for two or three days without stopping and the increased run-off causes increased gullying.

31. A gully develops in three distinct stages; *waterfall erosion; channel erosion along the gully bed; and landslide erosion on gully banks*. Appropriate gully control measures must be determined according to these development stages. A gully head often develops where flowing water plunges from the upstream segment to the bottom of the gully. A gully head often develops where flowing water plunges from the upstream segment to the bottom of the gully and the gully head starts carving a hollow at the bottom of the gully by direct action. When the excavation has become too deep, the steep gully-head wall collapses and the process is repeated again and again, so that the gully head progresses backwards to the upper end of the watershed. The process is called gully-head advancement or *head-cutting* (see Fig. 2 below). As the gully head advances backwards and crosses lateral drainage ways caused by waterfall erosion, new gully branches develop. Branching of the gully may continue until a gully network or multiple-gully systems cover the entire watershed.

32. Channel erosion along a gully bed is a scouring away of the soil from the bottom and sides of the gully by flowing water. The length of the gully channel increases as waterfall erosion causes the gully head to advance backwards. At the same time, the gully becomes deeper and wider because of channel erosion. In some cases, a main gully channel may become as long as one kilometer or longer depending of the rates and runoff volume into the gully. Channel erosion along gully beds is the main cause of land slides on gully banks. During the rainy season, when the soil becomes saturated, and the gully banks are undermined and scoured by channel erosion, big soil blocks start sliding down the banks and are washed away through the gully channel.

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[14] FAO: "Guidelines for Watershed Management"; FAO Conservation Guide No.1, Rome 1977. Chapter 12 deals with gully erosion control practices in USA hilly & mountainous areas. Download from http://www.fao.org/DOCREP/006/AD071E/AD071e00.htm

[15] Geyik M.B.: FAO Watershed Management Field Manual – *Gully Control*"; FAO Conservation Guide 13/2, Rome 1986. Download at http://www.fao.org/docrep/006/ad082e/AD082e00.htm#cont

[16] Roose E.: "Land Husbandry- Components & Strategy"; FAO Soils Bulletin 70, Rome 1996. chapter 6 deals with gully erosion. Download at http://www.fao.org/docrep/T1765E/t1765e00.htm

[17] Chapman J.: "Methods and Materials in Soil Conservation – A Manual"; FAO, Rome 2005. *Covers gullies and other forms of erosion, methods and materials for their control, including use of geotextiles (Chapter 5) and vegetation (Chapter 6).* Download at ftp://ftp.fao.org/agl/agll/docs/mmsoilc.pdf

[18] Catchments & Creeks Pty Ltd: "Gully Erosion – Part 2, Assessment of Treatment Option"; Brisbane, April 2010. Download at http://www.catchmentsandcreeks.com.au/docs/Gully2-1.pdf

33. Gully Classification for Selecting Treatment Options. *Gullies are generally classified by depth and catchment size* as follows: (i) *small gullies* - 1 m depth and < 2 ha of drainage area (A) contributing runoff; (ii) medium gullies – 1-5 m depth and drainage are of 2 to 20 ha; and (iii) *large gully* – depth > 5 m and drainage area > 20 ha. For gully control engineering designs for small watersheds (up to 500-1000 ha), peak runoff rates are generally computed by the well-known semi-empirical "*Rational Formula*". For gully control engineering designs for small watersheds (up to 500-1000 ha), peak runoff rates are generally computed by the well-known semi-empirical "*Rational Formula*". The method uses a design rainfall intensity (mm/hour) equal to the catchment Time of Concentration (Tc) or time taken for runoff to reach the inflow point from the most distant watershed boundary (a function, inter alia of slope and catchment shape). If the gully has lateral inflow from smaller gullies, or a convex topography carrying runoff towards the gully walls (e.g. as in Irele LGA in Edo State[19]), discharge within the gully increases in a downstream direction. Thus determination of the gully catchment area and computation of the Design Discharge by the Rational Formula for gully reclamation check dams along the gully needs to take this into account.

34. Gully treatment options are influenced by the shape of gully cross-sections (Fig. 3 below):

(a) *U-Shaped gullies* are formed where both the topsoil and subsoil have the same resistance against erosion. Because the subsoil is eroded as easily as the topsoil nearly vertical walls are developed on each side of the gully. One or two storms per year are enough to carry away all particles accumulated in the gully bottom during the year, and for the solid load in the runoff to abrade the valley bottom. During intermediate seasons, the fine matter accumulated on the slopes as the rock weathers slides down to the bottom of the gully, partly as a result of the impact of raindrops, partly through formation of small secondary rills, but most often through the mass sloughing of water-saturated particles. Since slope equilibrium has been far exceeded, no vegetation can take root. *Erosion control must therefore concentrate on preventing further excavation of the bottom of the gully and re-establishing equilibrium.*

(b) *V-Shaped gullies* develop where the subsoil has more resistance than topsoil against erosion. This is the most common gully form. The base may be made up of very resistant material, in which case the channel will broaden as the sides cave in during exceptional flows. If, on the other hand, the resistant layer is found on the surface, runoff will cut deep into the sub-soil material until it reaches a temporary or permanent water table, which will exercise lateral pressure on the base of the slope until it caves in and undermines the gully banks. *Here again, the gully bottom must be stabilized and the sediment retained until the slopes attain equilibrium.*

(c) *Trapezoidal gullies* can be formed where the gully bottom is made of more resistant material than the topsoil. *Large gullies of this type are conducive to reclamation using gabion and masonry check dams because the resistant material (firm soil or weathered rock) forms a good foundation for such dams.*

[19] Adediji A., Ibitoye M.O. and Ekanade O.; "Generation of digital elevation models (DEMS) for gullies in Irele local government area of Ondo State, Nigeria"; African Journal of Environmental Science and Technology Vol. 3 (3), pp. 067-077, March, 2009. Download at http://www.academicjournals.org/AJEST/PDF/pdf%202009/Mar/Adediji%20et%20al.pdf

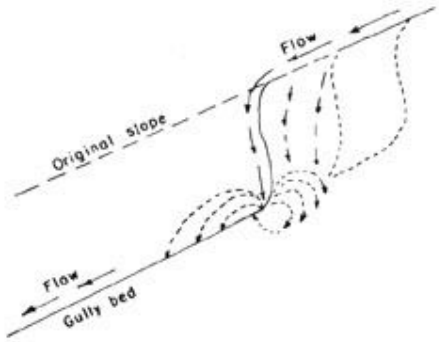


Fig. 2 Waterfall erosion at gully head and advancement of the gully to the upper edge of the watershed. (Source: Weidelt, 1976)

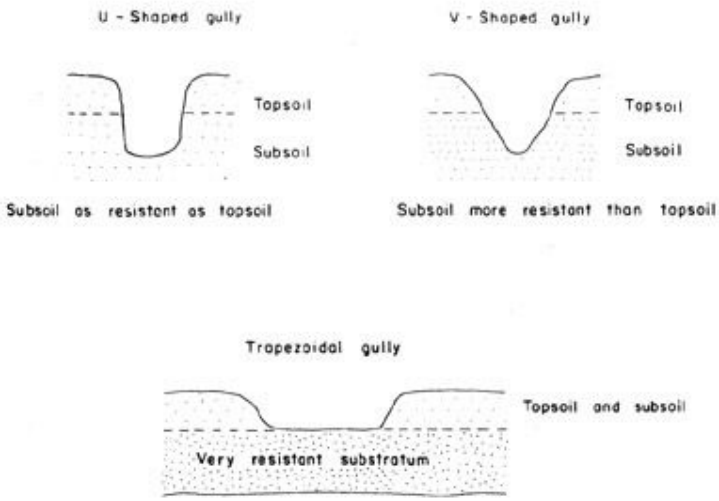


Fig. 3 Gully classes based on shape of gully cross-section. (Source: Weidelt, 1976)

(d) Gullies whose head-cutting is caused by *"tunneling"* are difficult to treat. Tunneling can develop on gentle slopes, in material with surface cracks, on soil rich in swelling clay (vertisols, tropical brown soils, etc.) or on marl rich in gypsum or other soluble minerals causing soil dispersion. During end-of-dry-season rainstorms, the water penetrates these cracked soils down to the weathered rock, percolating through the cracks to the bottom of the slope. As runoff pours into cracks in the soil, internal erosion takes place and the cracks will gradually erode to become tunnels. In due course, the tunnel cracks cave in, forming headward-cutting gullies that can advance by several dozen meters during major rainstorms. *Dry tillage (sub-soil ripping) is one way of blocking these cracks and forcing the water to wet the whole soil mass instead of soaking primarily into the megapores created by the cracks.*

35. Gully Control Phases. The following three methods must be applied in the following order:

(1) *Improvement of gully catchments to reduce and regulate the run-off rates (peak flows).* This is usually done with agronomic measures to reduce sheet erosion and maintain soil fertility. The agronomic measures depend on the prevailing farming system (e.g. cereal-livestock). To reduce runoff on sloping lands, graded terraces drained by grassed waterways (on large farms) or dug contour bunds on small farms in Africa and Asia. Measures suited to SE Nigeria will be discussed later in this Note.

(2) *Diversion of surface runoff above the gully head area*. The basic aim of diversions is to reduce the surface water entering into the gully through gully heads and along gully edges, and to protect critical planted areas from being washed away. The normal practice is to construct grassed diversion ditches on slopes < 0.5%. However, if there is a permanent plant cover in the channel, the gradient may be as high as two to three percent. The protective vegetation must be maintained during the entire rainy season, or these steeper gradients will cause channel erosion. Diversion ditches should be large enough to carry all the water that is discharged from the gully catchment area during periods of maximum run-off. These are high maintenance structures and usually applied successfully on large farms under good management. On steeper slopes, such drains have to be lined to prevent erosion damage. Road drainage and large urban drains carrying concentrated runoff, such drains are constructed concrete or masonry-lined.

(3) *Stabilization by structural measures and accompanying revegetation*. When the first and/or second methods are applied in some regions with temperate climates, small or incipient gullies may be stabilized without having to use the third measure. On the other hand, in tropical and subtropical countries which have heavy rains (monsoons), all three methods must be carried out for successful gully control. This Note focuses mainly on the structural practices since there are three critical components, namely: *(i) bed stabilization; (ii) gully head-cutting control and stabilization; and (iii) gully bank/wall stabilization*. Revegetation should follow gully bed stabilization and plays an important role in completing gully bank stabilization. Check dams are constructed across the gully bed to stop channel and lateral erosion. By reducing the original gradient of the gully channel, check dams diminish the velocity and the erosive power of non-diverted run-off entering the gully head. Thus gully heads have also to be protected against the erosive power of runoff.

36. Criteria for Selecting Gully Network Control Priorities. Treatment and treatment priorities also depends on whether there is a single discontinuous gully or continuous gullies forming a gully network. Continuous gullies consist of many branch gullies. A continuous gully has a main gully channel and many mature or immature branch gullies. A gully network (gully system) is made up of many continuous gullies. A multiple-gully system may be composed of several gully networks. Discontinuous or independent gullies may develop on hillsides after landslides or below a road culvert discharging at erosive velocities. At the beginning of its development, a discontinuous gully does not have a distinct junction with the main gully or stream channel. After some time, it may reach a main gully channel or stream. Independent gullies may be scattered between the branches of a continuous gully, or they may occupy a whole area without there being any continuous gullies.

37. In deteriorated watersheds, each continuous gully in a gully network usually has a distinct catchment and a main gully channel, but it may or may not have a fan at is outlet (see Fig. 4 below). The main gully channel of each continuous gully is about one kilometer long and its catchment area is not usually more than 20 hectares. *In general, there is no vegetative cover in a gully system*. A torrent catchment usually comprises several gully systems; forest and rangelands destroyed or in good condition; hillside farming areas; low croplands; and urban areas (villages, towns). Therefore, the catchment area of a torrent may spread over more than 1,000 ha and be 2 km long or larger. In order to control a gully torrent, all the

gullies throughout the entire catchment area must be stabilized. *Each continuous gully in a gully system should be regarded as a basic treatment unit, and all the control measures in that unit should be finished before the rainy season. In addition, vegetative measures such as the planting of tree seedlings, and shrub and grass cuttings cannot begin until structural work is complete.*

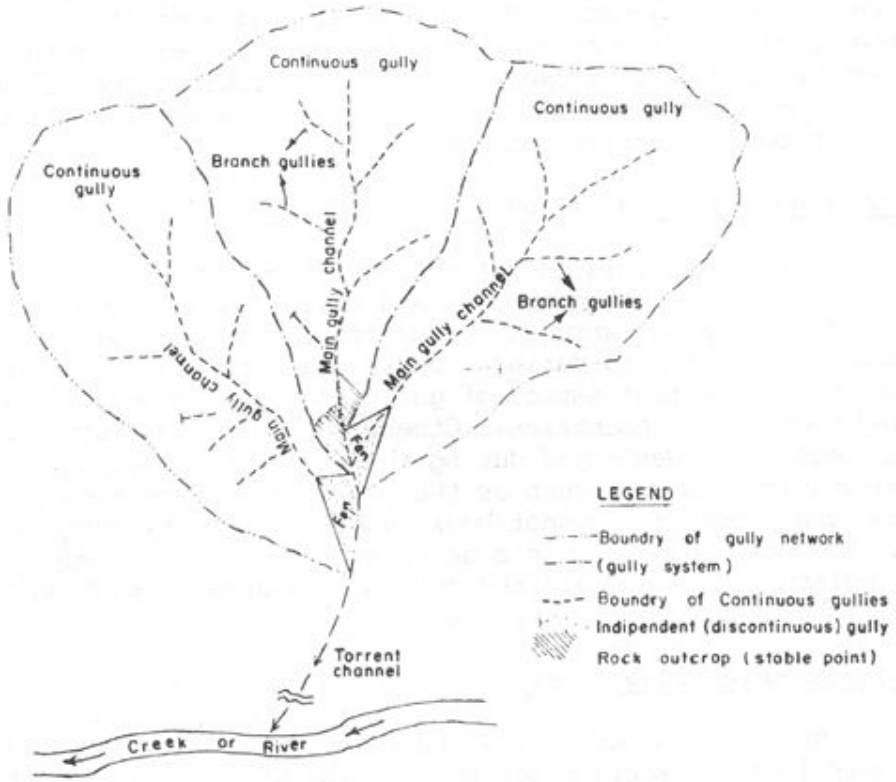


Fig. 4 A gully network (gully system).

38. Analysis of gully networks and subsequent ranking of the network gullies for treatment priority leads to highest benefits for least cost as found by B.H. Heede of the Rocky Mountain Forest & Range Experiment Station, Arizona[20]. Ranking of gullies is suggested as a stepwise process consisting of determining stream order, number of tributaries, and stages of gully development. Networks can be differentiated by the type of their gullies: continuous, discontinuous, or mixtures of both. This network classification points to the main critical erosion locations within the individual gullies that must be recognized for control. For treatment selection, gully networks must be further described by stream order, number of tributaries, and stage of gully development (young, mature, etc.). Establishment of treatment priorities can be summarized in general terms as follows:

First priority: discontinuous gullies;

[20] Heede B.H. (1981): "Analysis and Guidelines for Watershed Rehabilitation". Download at http://www.waterboards.ca.gov/water_issues/programs/tmdl/records/region_1/2003/ref1134.pdf (see pp 108-116 of the paper). A detailed published version entitled "Gully Control: Determining Treatment Priorities for Gullies in a Network" was published in "Environmental Management", Vol. 6, No. 5, pp 441-451, 1982.

main-stem gully;
tributary gullies with largest number of tributaries of their own.
Second priority: tributary gullies controlling smaller numbers of tributaries.
Third priority: tributary gullies with excessive erosion rates.

1.2 Gully Stabilization Considerations

39. Gully Bed Stabilization. Backfilling of gullies can only be economically justified for shallow gullies < 2 m deep if there is a cheap source of good or similar soil whose excavation will not cause gully problems elsewhere. Stabilization normally begins with gully bed stabilization. When the bed is stable, the leading head-cut is addressed followed finally by the gully banks. Stabilizing the gully head before the gully bed is stabilized increases the risk that future lowering of the bed will undermine the gully head stabilization measures and cause their failure (*see Footnote 17- Gully Erosion Part 2 Fact Sheet Sections 3.3 & 3.4 diagrams*). Technically, it may be possible to stabilize a gully head before the gully bed has achieved stability, but only if it is possible to predict the ultimate stable profile (i.e. elevations of the gully bed). In such cases, the stabilization works need to be designed in a manner compatible with existing and future bed levels. The first step in determining the gradient and elevation of a stable gully bed is to observe any existing `stable' gully beds in the local area or, possibly, a section of stable gully bed located towards the lower end of the gully. A failed gully head control structure (rock chute in Australian practice) can be expensive to repair, and if not repaired promptly can lead to continued head-cutting and upstream migration of the gully head. *If the gully head is to be stopped before gully bed is stable (or even immediately), the gully head protection design must allow for potential lowering of the gully head at its toe. This usually means recessing the toe of the inlet structure (e.g. chute) well below the existing bed level and creating a temporary plunge pool* (see Fig. 9 of Fact Sheet Part 2).

40. To obtain satisfactory results from structural measures, a series of check dams should be constructed for each portion of the gully bed. Because they are less likely to fail, low check dams are more desirable than high ones. After the low dams silt up, vegetation can control the low overfalls much more easily than on high dams. Check dams are not necessary on those gully portions which are protected from channel and lateral erosion by continuous rock outcrops along their gully beds. Over time, sediment should collect behind the porous check dams helping to raise and stabilize the gully bed. Additional check dams or grade stabilization structures can be constructed at the midpoint between successive weirs taking care that its foundation is on stable soil. As soon as adequate sediment has been accumulated, planting of hardy grasses with a ground fall at each grass barrier limited to a maximum height of 1 m otherwise additional mid-barriers will be needed. Depending on the depth of the gully and the sediment quantity passing through the system, check dam weirs can be added till the gully backfills to the desired elevation.

41. Current practice recommended by FAO in Conservation Guide 13/2 (footnote 14) is that the number of check dams (N) for each portion of the main gully channel can be calculated by using the equation: $N = (a - b)/H$ where:

`a' = The total vertical distance is calculated according to the average gully channel gradient and the horizontal distance between the first and last check dam in that portion of the gully bed;
`b' = The total vertical distance is calculated according to the compensation gradient and horizontal distance between the first and last check dam in that portion of the gully bed; and

`H' = The average effective height of the check dams, excluding foundation, to be constructed in that portion of the gully bed.

42. The spaces between check dams can be determined according to the "compensation gradient" and the effective height selected for the check dams. The Compensation Gradient is the gradient between the top of the lower check dam and the bottom of the upper one (i.e. the future or final gradient of the gully channel). It is formed when material carried by flowing water fills the check dams to spillway level. *Field experience has demonstrated that the compensation gradient of gullies is not more than 3 percent. The first check dam weir should be designed with a spillway crest at an elevation about equal to that of the toe of the gully head stabilization works. the compensation gradient selected (i.e. 2-3%), the crest-toe elevation rule should be followed for all intermediate check dams*. This will tend to ensure that water and material stored behind the lower structure is level with the toe of the upper structure: thus, water will spill over the crest of the upper structure into the pool behind the lower structure.

43. If a greater separation is employed sediment will not accumulate to the necessary extent and erosion will work back to undermine the next dam upstream. Eventually successive dams will be undermined until the gully head protective works are destroyed. It should be remembered that as check dams effectively decrease the velocity over the length through which they have been constructed, the velocity will increase further downstream and may cause extra erosion in that area. Ideally, the natural gully gradient below the lowest check dam should be equal to or less than the gradient between the top of the lowest check dam and the base of the next check dam up gully. If this is not the case, erosion will occur immediately below the lowest check dam and eventually undermine it.

44. possible, the first check dam should be constructed on a stable point in the gully (such as a rock outcrop, the junction point of the gully to a road, the main stream or river). If there is no such stable point, a counter-dam must be constructed. The distance between the first dam and the counter-dam must be at least two times the effective height of the first check dam. The points where the ensuing check dams are to be built are determined according to the compensation gradient and the effective height of the check dams. Spacing of check dams, should give preference to the narrowest parts of the gully in order to reduce construction costs. In this case, to establish the compensation gradient between the proposed check dams, proportionately increase the foundation depth of the upper check dam when the space between the lower and upper check dam is extended. When the space is shortened, decrease the foundation depth. As the foundation depth is increased, the total height of the check dam (effective height plus foundation depth) should not exceed the permissible, maximum total height.

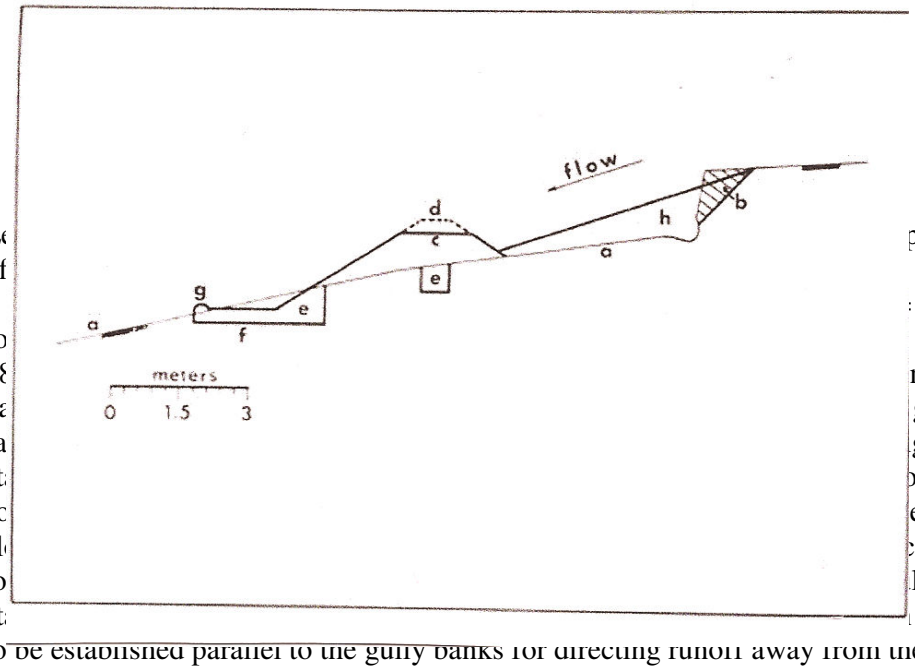
45. <u>Gully Head and Intermediate Head-Cut Stabilization</u>. Gully head stabilization measures include hard engineering practices (e.g. drop boxes, concrete chutes, grouted boulder chutes, culvert outlet concrete energy dissipaters) and semi-hard structures (e.g. rock chutes, soil cement grade control structure with energy dissipation pool). Rock chutes seem to be the preferred practice for medium gullies in Australia for cases where natural materials can be used: a detailed Fact Sheet about design, material specifications and construction method is available from Catchments & Creeks Pty Ltd[21]. Rock chute failure is commonly a result either poor construction practices, water passing around or under the rocks and, use of inadequately sized rock. Thus, the for a computed inflow discharge, the Fact Sheet focuses on design of: (i) control of flow entry into the chute crest and its alignment; (ii) determination

[21] Catchments & Creeks Pty Ltd.: "Gully Erosion – Part 3, Design of Rock Chutes for Gully Stabilization"; Brisbane, April 2010. Download at http://www.catchmentsandcreeks.com.au/docs/Gully3-1.pdf

of appropriate rock size; (iii) the chute backing material or geotextile filter layer; and (iv) energy dissipation measures at the chute base to prevent its undermining and damage to the gully banks. *If a chute is to be placed on dispersive soils, a layer non-dispersive soil must be laid prior to placing the filter cloth or aggregate filter layer upon which rocks are placed.* The thickness of the cover layer should be a minimum of 100mm on a gentle slope, 200 mm & 300 mm for steep (2:1) and steep high risk slopes (1.5:1) respectively[22].

46. The head gully stabilization measures can also be used to control well-defined head cuts that form at intermediate locations along the gully. If the head of the gully contains at least two distinctive gully heads, then one head is isolated by surrounding it with a temporary control flow bund while the rock chute is being built. Once this chute is vegetated and reaches its full strength, it is brought back on line while the second head is isolated and its chute is built.

47. Heede proposes a basic head- cut stabilization structure design for porous dams check dams based on elimination of the pressure of heavy foundation pressures of masonry or concrete structures (see Footnote 22). The structure is based on an inverted filter backfill with the coarser fill behind the dam so that the porous dam is not clogged. The inverted filter is obtained by sloughing the head wall cut to an angle whereby material can be placed in layers from of increasing particle size from coarse to fine sand onto fine and coarse gravel. Geotextile sheets are also recommended to minimize fines transport into the check dam. A diagram of the structure complete with spillway apron is shown below.



L pillway; d = crest
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fa grate around the
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lo lly. When
st bunds may need
to be established paralel to the gully banks for directing runoff away from the unstable banks to the stable chute drop structures. This will control erosion while bank vegetation is being established. If the gully is not too deep and the gully bank toes are stable (i.e. only subject to erosion by gully bed runoff and not also instability from groundwater seepage), the banks can be stabilized with gabion retaining walls or synthetic, jute or coir erosion control mats. These ideal practices are expensive and practically suited to shallow or medium depth gullies.

1.3 Gully Control Structures

[22] Figures 16 to 19 on page 22 of the Gully Erosion Fact Sheet – Part 2 (Footnote 17) gives diagrams for turfing, rock, gabion or concrete cover of the non-dispersive soil cover.

49. Gully Stabilization Structure Selection Criteria. General standards for selecting control measures for each portion of a continuous gully are given in Table 2 below.

Table 2

Criteria for selection of control measures for a continuous gully

Length of main gully channel portions m	Gradient of main gully channel portions %	Catchment area of gully portions ha	Required structural measures for each portion of main gully channel
-	-	2 or less	Above gully heads: Diversion ditches or channels
100 or less (from gully head)	various	2 or less	Maximum 100m from gully head: Brush fills; earth plugs; woven-wire, brushwood, log and loose stone check dams. These measures can also be constructed in branch gullies.
900	70 or less	2 - 20	Between 100th-1000th metre: Boulder check dams; retaining walls between check dams, if necessary; one gabion or cement-masonry check dam is usually constructed as a first check dam, instead of a boulder one.

Note: All strutural measures must be accompanied with vegetative measures (planting of tree seedlings, shrub and grass cuttings, and sowing of tree, shrub and grass seeds).

The required structural measures for each portion of a main gully channel are shown in the last column of the table. The criteria used for selecting gully control measures in Table 2 are to be used for continuous gullies, gully networks, or multiple-gully systems located in deteriorated watersheds.

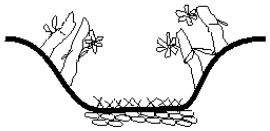
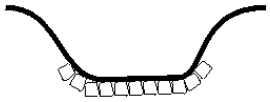
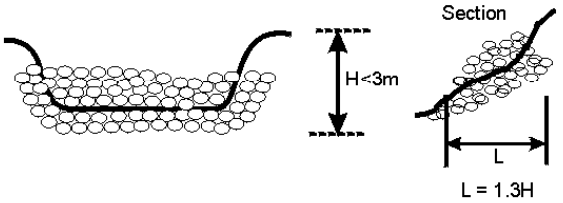
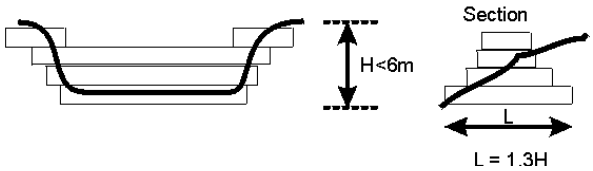
50. For a continuous gully, the main criteria for selecting structural control measures are based on the size of the gully catchment area, the depth, gradient and length of the gully channel. Overall, “leaky weirs” or porous check dams (grade control structures) are preferred to masonry or concrete structures, especially for stabilizing head-cuts as they are flexible and subject to less hydrostatic pressure: “hard” head-cut and check dam structures are easily undercut and tend to fail especially where a consolidated foundation soil is not available. The various portions of the main gully channel and branch gullies are stabilized by brush fills; earth plugs; brushwood, log, loose-stone and gabion check dams. The lower parts are treated with loose stone, boulder or gabion check dams (see Figure on the next page). Smaller and shallow tributary gullies draining 2 ha can also be stabilized stiff-grass barriers such as Vetiver Grass planted across the gully cross-section: this utilizes the dense quick-growing Vetiver hedge to trap sediment by forming a natural bund serving as a check dam.

51. Check Dam Design. The first guideline on gully erosion control structures was a paper on gully control structures and systems by B.H. Heede[23]. This paper focused on empirical design and construction of cost-effective check dams used for shallow to medium gullies in Colorado. The dams were constructed from: (a) loose rocks or wire-bound loose rocks; (b) a wire mesh fence fastened to steel posts with a loose rock fill piled upstream to the fence; or (c) gabion structures. The importance of this paper is that, although based on local Colorado experience, it developed analytical relationships for: (i) dam spacing as a function of the sediment gradients accumulating behind the dams and dam effective height (measured from gully bottom to spillway crest); (ii) structural stability by "keying" the structure into the gully walls and gully bed; (iii) dam height and rock volume in relation to volume of sediment accumulation; (iv) spillway crest length and shape in relation of overflow volume, energy dissipation needs, apron length and prevention of gully bank toe undercutting; and (v) sediment-dam cost ratios for each check dam type as a function of gully slope. The maximum height of check dams used in Colorado was about 1.8 m.-2 m. *As a general recommendation, where gully walls are of soft soil, the check dams should be `keyed' into the wall at a depth of 1.2 – 1.8 m, while the bed key should be at least 0.6 m deep.*

52. Designs for porous check dams are shown in Chapter 4 ("Specific Treatment Measures") of FAO Conservation Guide No. 13/2 (Footnote 14). In humid regions, brushwood or loose stone check dams, are preferred to brush fills or brush plugs for very small gullies on slopes < 10%. *Woven-wire check dams* are used in gullies with moderate slopes (not more than 10 percent) and small drainage areas that do not have flood flows which carry rocks and boulders. *Log check dams* are used to stabilize incipient, small and branch gullies generally not longer than 100 m. and with catchment areas of less than two hectares.

53. *Loose stone check dams* are used to stabilize the incipient and small gullies and the branch gullies of a continuous gully or gully network. The length of the gully channel should be not more than 100 m and the gully catchment area is two ha or less. The maximum effective height of the dam is 1.0 m and its foundation depth is at least 0.5 m. The thickness of the dam at spillway level is 0.5 to 0.7 m and the inclination of its downstream face is 20 percent (1•1/5 ratio); the thickness of the base is computed accordingly. The upstream face of the dam is generally vertical. The foundation of the dam is dug so that the length of the foundation will be more than the length of the spillway. *The foundation of the wings should be dug in such a manner that the wings will enter at least 50 cm into each side of the gully*. The wings of the dam should be protected against flash water by wing walls. The angle between the wing wall and the wing is 30 to 45 degrees. The wing wall's height must be equal to the depth of the spillway.

[23] Heede B.H.: "Gully Control Structures and Systems"; chapter XII in", FAO Conservation Guide No. 1 (see Footnote 13). Download at http://www.fao.org/DOCREP/006/AD071E/AD071E00.HTM

FLOW		TYPES OF TRANSVERSE WEIR	DESIGN CRITERIA
Low		Bamboo planting in gully with fascines, branch layering or palisade.	
Low		Rubble masonry	H >0.5m or to maximum flow depth. Minimum thickness of masonry layer =0.5m
Low to moderate		Dry stone pitching	H > 0.5m or to maximum flow depth. Minimum stone size: 40×20cm. Long axis of stones vertical.
Moderate		Gabion mattress	H > 0.5m or to maximum flow depth. Minimum mattress thickness=0.5m
High			Stonewell checkdam
High			Gabion checkdam

Typical Check Dam Types and Section Criteria (see Fig 26 in the FAO Manual – Footnote 16)

54. *Boulder check dams* placed across the gully are used mainly to control channel erosion and to stabilize gully heads. In a gully system or multiple-gully system, all the main gully channels of continuous gullies (each continuous gully has a catchment area of 20 ha or less and its length is about 900 m) can be stabilized by boulder check dams. The maximum total height of the dam is 2 m. Foundation depth must be at least half of effective height. The thickness of the dam at spillway level is 0.7 to 1.0 m (average 0.85 m), and the inclination of its downstream face is 30 percent (1:0.3 ratio); the thickness of the base is calculated accordingly. The upstream face of the dam is usually vertical. If the above-mentioned dimensions are used it is not necessary to test the stability of the dam against

overturning, collapsing and sliding. However,, the dimensions of the spillway should be computed according to the maximum discharge of the gully catchment area and the form of the spillway is generally trapezoidal (see Figs. 17A to 17 C in Conservation Guide 13/2).

55. Gabion Check Dams. Gabion check dams may be constructed from wire box gabions of dimensions 1 x 1 x 2 m, or 0.85 x 0.85 x 2 m, or 0.75 x 1.5 x 3 m. If the catchment area of a gully is 20 ha or less and the length of the gully is about 1,000 m, channel erosion will be controlled by boulder check dams, but the first check dam and its counter-dam should be constructed as gabions. If the gully crosses a road, gabion check dams may be built above and below the road at the junction points. In addition, gabion check dams combined with gabion retaining walls can be used to stabilize landslides in the upper portions of the gully. *Generally, it is neither necessary, nor economical to build a series of gabion check dams to control channel erosion along the gully beds.*

56. The Gabion check dam design proposed by the FAO (shown in Figs. 18A -18C of Conservation Guide 13/2) is built from 0.85 m x 2.0 m gabions and is composed of a main structure followed by a counter-dam downstream which serves as a sill for a rock apron. *If the total height (H) (i.e. effective height plus foundation depth) of the gabion check dam described is 3 m or less it is not necessary to compute the dimensions of the dam (thickness of. crest and base) according to hydrostatic principles or empirical formulas.* This is because the box gabions design stabilizes the dams against overturning, collapsing, sliding and breaking. If the total height (H) the gabion check dams is 3-5 m, stability against overturning, collapsing and sliding is enabled by the following dimensions: (i) the thickness of the dam's crest at spillway level should be 0.4H; and (ii) the thickness of the dam's base should 0.6H. The depth of the foundation should be equal to one-half of the effective height of the dam, which means that the foundation depth is one-third of the dam's total height and the foundation is longer than the spillway. The apron length from main dam toe to the end of the downstream counter-dam is given a 2H. Depending on the soil type, wings should enter at least 50- 120 cm into each side of the gully and they should be protected against flash water by wing walls. The angle between the wing and wing wall is 0 to 45 degrees. The height of a wing wall is equal to the depth of the spillway. Conservation Guide 13/2 provides an example computing the volume of excavation and volume of rock-filled gabions.

57. *The FAO Guide 13/2, does not mention placing the gabions on geotextile sheet to prevent gabion clogging. Where bed soils are loose sand, the use of rocks for the stilling basin apron may not be sustainable because of scouring: this Note's Author would recommend a Reno Mattress gabion apron.* The designs shown in FAO Guide 13/2 would seem to be only suited for shallow gullies < 10 m wide. This Note advises that for wider gullies, a gabion weir design be properly checked for stability, seepage control and adequate energy dissipation based on Section 3 of report entitled "Use of gabions for small hydraulic works"[24]. The report's Section 4 entitled "Methods of construction and control"[25] is also very useful and practical. *The references also provide designs for various gabion weirs and side slope stabilization as well as geotextile use to prevent gabion clogging. The stepped gabion weir configuration option may be used as a head-cut control structure in medium depth gullies.*

58. USA Masonry/Concrete Head-Cut Control Structure Practice. The USDA-NRCS Engineering Field Handbook (EFH) favors well known hard spillway structures supported by vegetative measures for gully control such as: (i) drop spillways, straight and box inlet drop

[24] Tricoli Dario (2004): "Use of gabions for small hydraulic works, Section 3, Gabion structure design for dam spillway". Download at http://www.tricardi.it/idro/gabionspdf/gabions_ch3.pdf

[25] Tricoli Dario (2004): "Use of gabions for small hydraulic works, Section 4, Methods of construction and control". Download at http://www.tricardi.it/idro/gabionspdf/gabions_ch4.pdf

spillways; and (ii) chute spillways[26]. The reference contains structure sketches inclusive of inlet and outlet energy dissipation options. These structures are also used as spillways for small earth dams. Masonry or concrete structures are not recommended because they are impermeable and resist flow and the mortar inevitably breaks up after a few years. They are also rigid and crack with erosion around the front of the apron. Gabions are highly permeable and break up dissipate the flow. hey are also flexible and deform to take up the erosion at the toe of the apron. Therefore these structures are not generally recommended for soft erosive soils such as those in southeast Nigeria. Figure 6-4 on Page 6-7 of the EFH chapter has a useful table for structure selection according to the range of heads and discharges for which each structure type is appropriate.

59. Gully Control Practice in Southeast Nigeria. Okagbue & Uma published a paper in 1987 critically assessing the performance of gully erosion control measures used in Southeast Nigeria[27]. To reduce the erosive capacity of the flood water, two types of protection measures have been adopted. The first involves the construction of hydraulic works that integrate a drainage network with storage ponds to cut off upstream flood runoff and lower hydraulic loads of interceptor canals. The interceptor canals or drains, which are commonly located at the head of the advancing gully channels, drain runoff from areas adjacent to the gullies into artificial reservoirs (ponds) constructed where deep infiltration can occur. When the upstream catchment is too large for one set of interceptor canals--where possible--it is broken up into smaller catchment units whose runoff can be separately drained (see the paper's Figure 2).

60. Stabilization works include check dams on the main channels of gullies and revetments and hedges at the inner gully walls. The check dams used are generally a series of check dams constructed of wood/timbers firmly affixed in the gully bed at close spacing and connected by fairly strong horizontal wood members or planks. Sometimes the wooden poles are driven into the ground across the gully to form a two-sided framework resembling crib dams. The two sides are interconnected by cross members and braces and the intervening space is filled with *compacted earth*. The framework is held together with iron wire or rope. The revetments are in the form of wicker-work fences used as stabilization work to reduce surface flows on the inner slopes of gully walls. The fences (see Fig.4 of paper) are formed by stakes about 10 cm thick driven into the ground close together (about 0.5 m - 1.0 m apart) and interwoven with braces and the like. The wicker-work fences are sometimes accompanied by cashew tree and bamboo planting to help strengthen the soil.

61. Varied degrees of success have been achieved with these remedial measures. In some areas, gullying had apparently stabilized after two years of the construction of the remedial measures, in some the gullying has continued but at a reduced rate, while at others gullying has continued unabated despite the measures. In the successful areas the gullies were still shallow (*i.e. less than 15 m deep*) and have not cut into the cohesionless and very permeable white sands. The groundwater table is also far beyond the gully bottom as no springs or seepages are seen on the gully walls. Apparently, the effect of groundwater on gully advancement is minimal. No recent gully activity was observed during the study and vegetation had started thriving on the gully slopes.

62. In the areas of partial success which include some upslope gully spots around Nanka and Oko, gully activities were significantly reduced. Erosion seemed confined to surficial

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[26] USDA-NCRS: "Engineering Field Handbook, Chapter 6 – Structures". Download at ftp://ftp-fc.sc.egov.usda.gov/NHQ/pub/outgoing/jbernard/CED-Directives/efh/EFH-Ch06.pdf

[27] Okagbue C.O. and K.O. Uma: "Performance of gully erosion control measures in southeast Nigeria"; Forest Hydrology & Watershed Management – Proceedings of the Vancouver Symposium, IAHS – AISH, Publ. No. 167, 1987. Download at http://iahs.info/redbooks/a167/167016.pdf

removal of grains and small chunks of soil at the upslope side of the check dams and at the banks of the main gully trunks. Intense gully sliding appeared to have subsided as indicated by the absence of large volumes of recent debris at the gully bed in those areas. These partially stabilized gullies have cut into the cohesionless and very permeable sands but the groundwater level rises above the gully bottom only during the rainy season. The treated areas were classed as partially successful because they appear to work well only during periods of non-saturation of the sandy horizon.

63. the most dangerous spots around Agulu, Nanka, Oko and Amucha where the gullies had cut deep into the cohesionless sand and the sand horizon remains perpetually saturated, the control measures appear to have totally failed to stop the development and advancement of the gullies. Sliding and slumping have continued despite the control measures which were destroyed. In these areas, gully walls are indented with springs and seepage faces; boiling spots depicting quick conditions are wide spread, all showing effects of groundwater in undermining the gully walls. Internal erosion and piping results from uncontrolled seepage of groundwater to the extent that soil particles migrate to an escape exit and cause piping and erosional failure lower part of gully walls.

64. Also affecting success/failure of the concrete channel structures is the termination point of such channels. *In areas where the channels have been terminated into the gullies*, undercutting arising from channel deepening and scouring has led to the failure of the measure. Channels terminated at the local base level of rivers tend to be free from this type of failure. Tree planting as a stabilizing measure has been effective only on minor gullies i.e. those that have not reached considerable depths (less than 5 m). In the deep gullies whose slopes are constantly undermined by flood and internal erosion, the trees close to the gully edge usually uprooted as soon as the slope is undermined. Also the vegetation species (Cashew and Bamboo) used on the gully floors have failed to thrive on saturated and sometimes running sand found on the floors of the deep gullies. *Thus, in addition to gully thalweg and plan survey as well as soil sampling, seasonal groundwater depth must be ascertained for gullies generally deeper than 15 m. This will determine the success of gully control: for deep gullies incised below the water table since the gully walls are likely to remain unstable due to internal erosion even if all runoff is diverted from the gully.*

C. Slope Stabilization and Ravine Control

1. Engineering Slope Stabilization

65. Gravity Retaining Structures. The use of civil engineering structures such as various types of gravity retaining structures (including gabion, masonry and reinforced earth retaining walls) are well known practices. A useful overview is given in Chapter 4 of the FAO publication "Methods and Materials in Soil Conservation – A Manual" (see Footnote 16). Reinforced earth structures [see examples under (d) in the Figure below] are of particular interest in ravine stabilization as will be shown in the next section. Reinforced earth comprises a series of compacted soil layers separated by sheets or strips of a reinforcing medium, which may be a sheet geotextile, a sheet of woven gabion wire, a timber grid, or metal strips. A sub-vertical structure with face slope angle greater than about 70^0, is generally referred to as a reinforced earth retaining wall and can be built from reinforced soil if facing units are used to hold the soil in place. Slopes with an angle of less than 70^0, it is possible to use 'soft' facings, such as soil filled jute bags, to form the face of the slope and the natural soil is compacted behind this face. For slopes of less than about 45^0, no special facing is necessary but vegetation should be established soon after construction.

66. The most effective use of reinforced earth is to use reinforcement to enable a slope to be built at a steeper slope angle than can be achieved without such reinforcement. In areas where the potential for landslides is to be avoided or mitigated, particularly where new construction in steep ground has to be carried out, or where a landslip has to be repaired then reinforced earth is an effective and economic construction technique. Without reinforcement, soil has a low tensile strength. When it is surcharged it flattens and widens, undergoing lateral tensile strain. With reinforcement in place the lateral movement will only take place if the shear strength of the interface between the soil and the reinforcement is exceeded (so that there is slippage between the soil and the reinforcement) or if the reinforcement ruptures. The system therefore relies on the frictional strength between the soil and the reinforcement. The detailed design procedures depend on the material used for the reinforcement and each manufacturer provides design notes or offers a design service for his particular product.

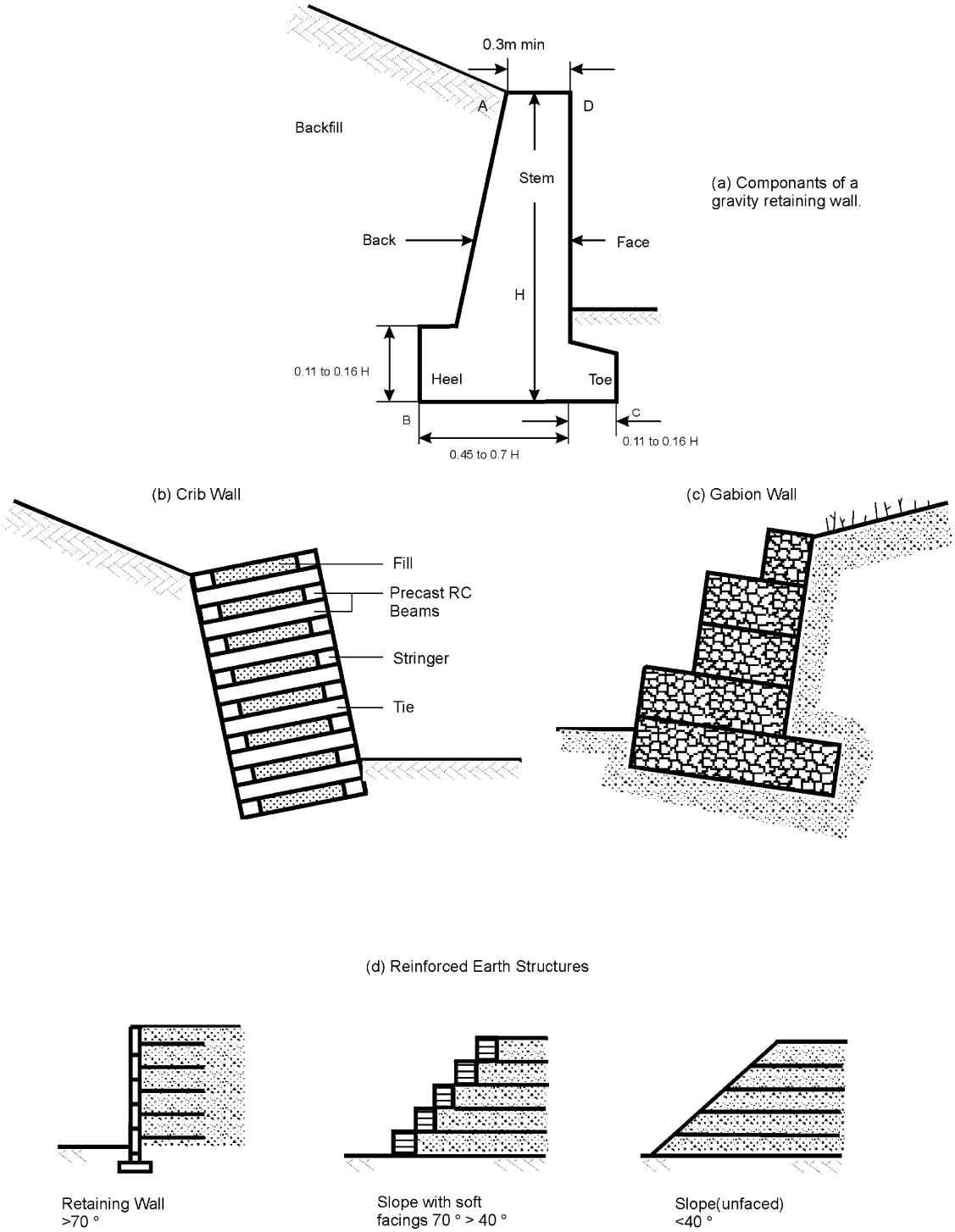
67. Geotextiles. In soil conservation engineering, geotextiles have three main roles, namely:

- They can be used in *slope protection.* This may be by acting as temporary protection for vegetation on steep slopes, and degrading as the vegetation develops and establishes itself. Alternatively, they may provide a more permanent key to allow the placement of a soil layer on the slope face into which vegetation can be planted.
- They can be used as *separators* to prevent mixing of one soil type with another. This is usually achieved by providing a barrier to migration of particles between two soils of differing grain-size while allowing free movement of water. An application in this respect may be use as a separator between a gabion or rock boulder scour protection layer and the underlying natural soil.
- They can be used for *soil reinforcement* to allow soils to carry a greater shear loading than they would otherwise be able to. By incorporating geotextile layers into a compacted fill the resulting reinforced soil structure may act as a retaining wall to mitigate against slope instability, may effect a repair to a previously slipped area, or may allow the initial construction of a steeper slope than would otherwise be possible.

The use of geotextiles in the applications above allows the re-use of local soils readily available at the site. Transport and material costs (with the exception of the geotextile itself)

are therefore reduced. It should be emphasized that geotextiles only improve the mass stability of a slope when they are used as part of a reinforced soil structure. When used as separators or in surface protection they have no influence on the mass stability of the slope and this must be separately considered and ensured if cost and effort inherent in their use is not to be wasted.

68. A wealth of proprietary brands of geotextiles are available and they can be classified on the basis of their material type and process of manufacture. They can be classified into two main types on the basis of their composition; natural fibers and plastics. Natural fibres have the tendency to rot, particularly under moist conditions, and this biodegradability can be used to advantage when such materials are used as a temporary minor strengthening or protective measure until natural vegetation has grown to take over the role. Plastics are increasingly used where the strength or function of the geotextile is required to be sustained over a long period. Synthetic geotextiles are manufactured from thermoplastic polymers which can be softened and rehardened, making them an ideal base material from which to fabricate a range of products. The polymers are generally formed into one of three basic component types: (a) a continuous *filament*, of circular cross-section a fraction of a millimeter in diameter; (b) a continuous *flat tape*, a fraction of a millimeter thick and several millimeters wide; and a *sheet or film* a fraction of a millimeter (film) to several millimetres (sheet) thick and several meters wide. The components are used to manufacture the finished geotextile product.



69. Geotextile products tend to group into the following categories: (i) *woven geotextiles* in the form of sheets typically about one mm thick and displaying a mesh of reasonably single sized regular pore openings; (ii) *non-woven geotextiles* in the form of sheets or three-dimensional mats of variable pore size; and (iii) *geomeshes, geonets and geogrids* have large pore sizes in comparison to the dimensions of the material. Technical design and installation details for of these geotextile types in their various roles are given in Chapter 6 of the FAO manual "Methods & Materials in Soil Conservation" (Footnote 16).

70. Geotextiles for Slope Protection. For slope protection, slopes and banks without a protective vegetation cover are open to the scouring effects of water, particularly if the exposed soil is sandy in composition. If the mass stability is satisfactory then aesthetic remediation using vegetation is preferable to man-made protection structures such as stone pitching, gabion revetments, etc. as it can be extremely difficult for natural vegetation to re-establish itself. The use of geotextiles in conjunction with vegetation can provide early protection as the vegetation establishes itself.

71. *Geomeshes* (two-dimensional) and *Geomats or Geomatrixes* (three-dimensional) are used to interact with young seedlings by providing a stable surface through which seedlings can take root and grow to provide a vegetative ground cover. Those made from natural fibres such as jute, coir and hemp are in the form of a mesh that allows the seedlings to be planted through it. They are biodegradable and their stabilizing influence diminishes as the ability of the rooted vegetation to take over the protective role increases. Such biodegradable natural materials should only be used where slopes are stable in terms of mass stability and sufficiently shallow to ensure that the re-establishing vegetation will be secure in the long term.

72. Where slopes are stable in terms of mass stability but too steep to guarantee the long-term security of a soil and vegetation cover synthetic geomats and geomeshes can contribute to the longer term protection of the soil surface and vegetation layer. Geomats are threedimensional random open-knit structures with a thickness of up to 20 mm. They are rolled out and pegged down onto the slope and then seeded and filled with topsoil, which is held in the mat. The mat remains under the vegetation providing continuing reinforcement in the root zone. Many proprietary brands exist and the many derivatives include those with flat bases, or composites incorporating a reinforcing grid, or impregnated with stone and bitumen, or supplied complete with a pre-grown grass turf.

73. As an alternative, in cases where slopes are so steep that soil is difficult to maintain in place and where, even if established, roots are not strong enough to adequately resist the downslope forces, *geocells* can be used to retain the surface soil on the slope. Geocells are threedimensional honeycomb structures which provide a network of interconnected cells typically 150 mm to 300 mm square and from 75 mm to 150 mm high. The geocells are typically supplied in panels and each geocell panel is laid onto the slope surface and pegged in place on the top of the slope. Further pins are added and adjacent panels are stapled together. The cells are then filled with soil. It is important that hydraulic continuity is provided between the cells so that runoff does not accumulate and saturate each cell thereby adding weight to the layer.

74. Woven textiles are strong and work well in steep slope applications and in landslip remediation. Their flexibility makes them particularly suitable if a wrapped face is required. *If a permanent rigid facing is used then geogrids should be used because a better fixing with the facing is possible*. Their greater surface area allows the development of an excellent bond with the soil. Geogrid type products and meshes which have a physical junction between the cross members and the longitudinal members, rather than having been formed from one sheet, need careful consideration because the junctions represent a potential point of weakness which would reduce the bond.

2. Ravine Control with Earthfill "Terramesh" Gabion Baskets.

75. Head-cutting by deep ravines (e.g. the Nanka gullies) are very difficult and expensive to stabilize. Nevertheless, earthfilled gabions have been used with apparent success. An example is the use of the Maccaferi "Terramesh" system designed by a consulting firm for

the Selemboa Ravine in Kinshasa in the Democratic Republic of Congo[28]. Kinshasa is built on sandy-clay soil with about 4.5 million inhabitants settled in a plain and about 1.5 million settled on a hilly "amphitheatre above the main city. Villas occupy the high parts of the hills which tower above 600 m with a gentle slope. Some more rudimentary dwellings have swept little by little across the slopes in an unplanned manner since Independence in 1960. On one of these hills is the highly eroded area of Selembao which has a residential area at an elevation of 500 m and where telecommunication antennas have been installed. The area suffers from severe erosion problems due to the bad drainage of the surface run-off which has a flow of about 16 m^3/sec for a Return Period of 50 years and an annual flow of about 8 m^3/sec.

76. Erosion was caused by: destruction of an existing collector due to, for example, maintenance problems, cultivation in the slopes and pedestrians paths parallel along the steep slopes, deforestation, chaotic urbanization without proper stormwater drainage systems, etc. This caused rills which developed into a massive ravine with a length of around 1,300 meters, a width around 60 to 70 meters and a 120 m height difference between the top and bottom of the ravine. Thus a natural catastrophe was created with dwelling and infrastructure (sewers & electricity) destruction and an immediate intervention became necessary by 2004. On the site, there are remnants of small stilling basins--closed by an earth barrier on the ravine side--allowed for the accumulation of the run-off and enabled water seepage into the ground. Unfortunately, without spillways, these rudimentary structures ere destroyed. The basins were not very effective: infiltration became slower and slower because of the alternation of the first layers of sand with thin clay horizons.

77. The remedial strategy was the following:

- Restore stable slopes: the slopes will be limited at 27° corresponding to the natural ground slope. In case where steeper slopes must be considered, the soil will be reinforced by retaining structures.
- Support embankments by retaining structures: this solution is locally essential when the ground around an important construction (a building) or around a substructure (a road) has to be supported. Support works with a wire mesh reinforced soil system was preferred: it is a flexible structure which does not require imported granular materials, and avoids additional earthmoving and the opening of borrow pits.
- Re-profiling of the banks: the ravines are partially backfilled, to create platforms and reconstruction of stable profiles. This requires massive earthmoving operations.
- To put in place an effective vegetated protection cover adapted to the area and soils.

78. The works include two parts: the control of the flows which are to be conveyed to the bottom of the embankments, and the stabilization of the embankments. First, runoff control is achieved by a main collector drain 5 m wide and 2.4 m high fed by secondary collector drains that convey stormwater to the main collector. The collected runoff is conveyed through a succession of energy dissipating drops generally 3 m high. At the end of the slope, a last basin allows the final dissipation of the water energy via a spillway that spreads the outflow in a wide channel, made up of PVC coated, flexible gabions and of PVC coated Reno mattresses. At the channel exit, where the gradient is virtually zero, the water is returned to the natural ground at a non-erosive velocity

[28] De Roeck Jean-Pierre: "Anti-Erosive measures on the Selemboa Ravine"; Construction World Special Awards issue, December 2005. Download at http://www.maccaferri.co.za/files/editorials/ZAF-ED-059-Selembao-Rev02.pdf

79. Second, the unstable slopes are remodeled according to the natural slope of the ground, between 27 and 29 degrees. In the high part of the site, this reshaping is not possible, and it has been foreseen that the use of vegetated soil reinforced walls will be required, in order to compensate the differences in terms of ground elevation. Since recreation of the embankments, according to the natural slope angle, would have required an excessive volume of fill, Green Terramesh[29] reinforced walls allow for reconstruction of stable slopes by minimizing the material required. The Green Terramesh™ walls--an environmentally friendly modular system used for soil reinforcement in mechanically stabilized slopes and embankments--were preferred for a number of technical advantages. The sandy terrain of the site shows qualities that allow it to be used as granular fill behind the facing of the Green Terramesh: i.e. soil instead of rocks are used in the wire cage. Therefore not necessary to bring in quarry materials, thus reducing the total cost and, avoiding the need for borrow pit areas. The general Terramesh system of slope stabilization for weak soils is described in a Maccafferi brochure[30].

80. The Terramesh wall's flexible structure allows for the take up of the differential settlements - unavoidable in huge embankment reconstitutions without cracking. Finally, the biodegradable mat behind the Green Terramesh façade allows establishing vegetation. The hydro-seeding method, carried out by a specialized firm, was selected as the best option. The stabilizing reinforcement structures include (*see downloaded paper for photos and a cross-section diagram*): (i) a wall length of 345m with a height between 5.40 and 6.00m; and a wall length of 200 m with a variable height between 7.80m and 8.55m. The walls are built on a first filtering layer with a 0.60m thickness. The compacted fill is separated and kept dry by a geocomposite[31] (MACDRAIN 2L), positioned in front of the excavated soil, which drains the seeping water through perforated pipes. The works were funded by the World Bank Group (IDA) at a cost of about USD8.62 million and completed in two years (January 2004 and January 2006.

3. Soil Bioengineering- Vetiver Grass for Slope & Ravine Head-Cut Stabilization

3.1 Soil Bioengineering.

81. Soil Bioengineering Practices. Soil bioengineering is an accepted cost-effective "best management practice" (BMP) used in gully control and slope stabilization and is described in the USDA-NRCS Engineering Field Handbook[32]. The manual is based on a combination of vegetative and structural components and gives design bioengineering principles, designs, construction technology and recommended vegetative materials. The techniques described in terms of applications, construction and installation include: live stakes, live fascines, brush layers, brush packs, live cribwalls, vegetated rock walls, *vegetated rock gabions*, and *vegetated riprap*. Unfortunately, although the manual is a very useful reference document for gully and slope stabilization, its vegetation recommendations are for the main regions of the USA. Thus, its application in southeast Nigeria will require the assistance of a plant biologist to select appropriate equivalent vegetation for many of the abovementioned techniques.

82. Gully control requires the integration of structures and vegetation: for example, vegetated gabions and vegetated riprap for rock chutes (see Footnotes 17 & 20). The long-

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[29] Maccaferri (Southern Africa): "Green Terramesh – Galfan & PVC Coated - Technical Data Sheet"; October 2010. Download at http://www.maccaferri.co.za/files/techdata/ZAF-TDS-GTMGalfan-Eng-Rev05.pdf

[30] Maccaferri NZ: "Maccaferri solutions for soil reinforcement works". Download at http://www.maccaferri.com.au/webfiles/MaccaferriAu/files/Soil_Reinforcement_Brochure-AUS.pdf

[31] Macaferri (Southern Africa): "MACDRAIN 2L – Geocomposite for Drainage - Technical Data Sheet"; November 2007. Download at http://www.maccaferri.co.za/files/techdata/ZAF-TDS-MD2L-Eng-Rev03.pdf

[32] USDA Natural Resources Conservation Service (1995): "Engineering Field Handbook, Part 650, Chapter 18 – Soil Bioengineering for upland slope Protection and Erosion Reduction". Download at ftp://ftp-fc.sc.egov.usda.gov/NHQ/pub/outgoing/jbernard/CED-Directives/efh/EFH-Ch18.pdf

term goal is to establish and maintain a vegetative cover that prevents further erosion. This goal is seldom realized unless the severe gully conditions can be altered immediately. Vegetation alone (except for Vetiver Grass described below) will rarely stabilize gully headcuts because of the concentrated water inflow and other pervasive forces that promote gully enlargement in an unstable channel system. Initially, the vegetation and the structure work together in an integrated fashion. The ultimate function of gully structures, however, is to help in establishing vegetation that will provide long-term protection.

83. Vetiver Grass Applications in Soil Conservation. Few existing plants have the unique attributes of multiple uses, environmentally friendly, effective and simple to use as Vetiver grass. It has a dense root system 2-3 m deep giving it the capacity to create a living wall, a living filter strip and "live soil nail" reinforcement. When Vetiver grass is grown in the form of a narrow self-sustaining hedgerow it exhibits special characteristics that are essential to many of the different applications that comprise the Vetiver System. The Vetiver System (VS) is based on the use of Vetiver grass (*Vetiveria zizanioides* L. Nash), which was first developed by the World Bank for soil and water conservation in India in the 1980s. In addition to this very important application in agricultural lands, scientific research conducted in the last 15 years has clearly demonstrated that VS has much wider applications for soil bioengineering. This is due to its unique morphological, physiological and ecological characteristics that permit it to adapt to a wide range of climatic and soil conditions.

84. Because its remarkable characteristics permit it to survive where other plants cannot, vetiver grass often acts as a pioneer plant establishing itself in hostile conditions and creating micro-climates that permit a variety of other indigenous plants to prosper. Current applications include *soil and water conservation in agricultural lands, steep slope stabilization*, mine, contaminated and saline lands rehabilitation and recently wastewater treatment. VS is now increasingly being used for these purposes in over 120 countries[33]. A technical manual describes the various applications in five separate Parts including a description of the plant and its propagation methods (using nurseries) in Parts 1 & 2 respectively[34].

85. A review conducted for the World Bank comparing the effectiveness and practicality of different soil and water conservation systems found that constructed measures must be site specific and require detailed and accurate engineering and design. Furthermore, all structured systems require regular maintenance. Most of the evidence also suggests that constructed soil conservation works reduce soil losses, but do not reduce runoff significantly and in some cases have a negative impact on soil moisture. Plant species to be used as barriers for effective erosion and sediment control should have the following features:

• Form an erect, stiff and uniformly dense hedge so as to offer high resistance to overland water flow and have extensive and deep roots, which bind soil to prevent rilling and scouring near the barrier;
• Ability to survive moisture and nutrient stress and to re-establish top growth quickly after rain;
• Minimum loss of crop yield implying that the barrier should not proliferate as a weed, not compete for moisture, nutrients and light and not be a host for pests and diseases; and

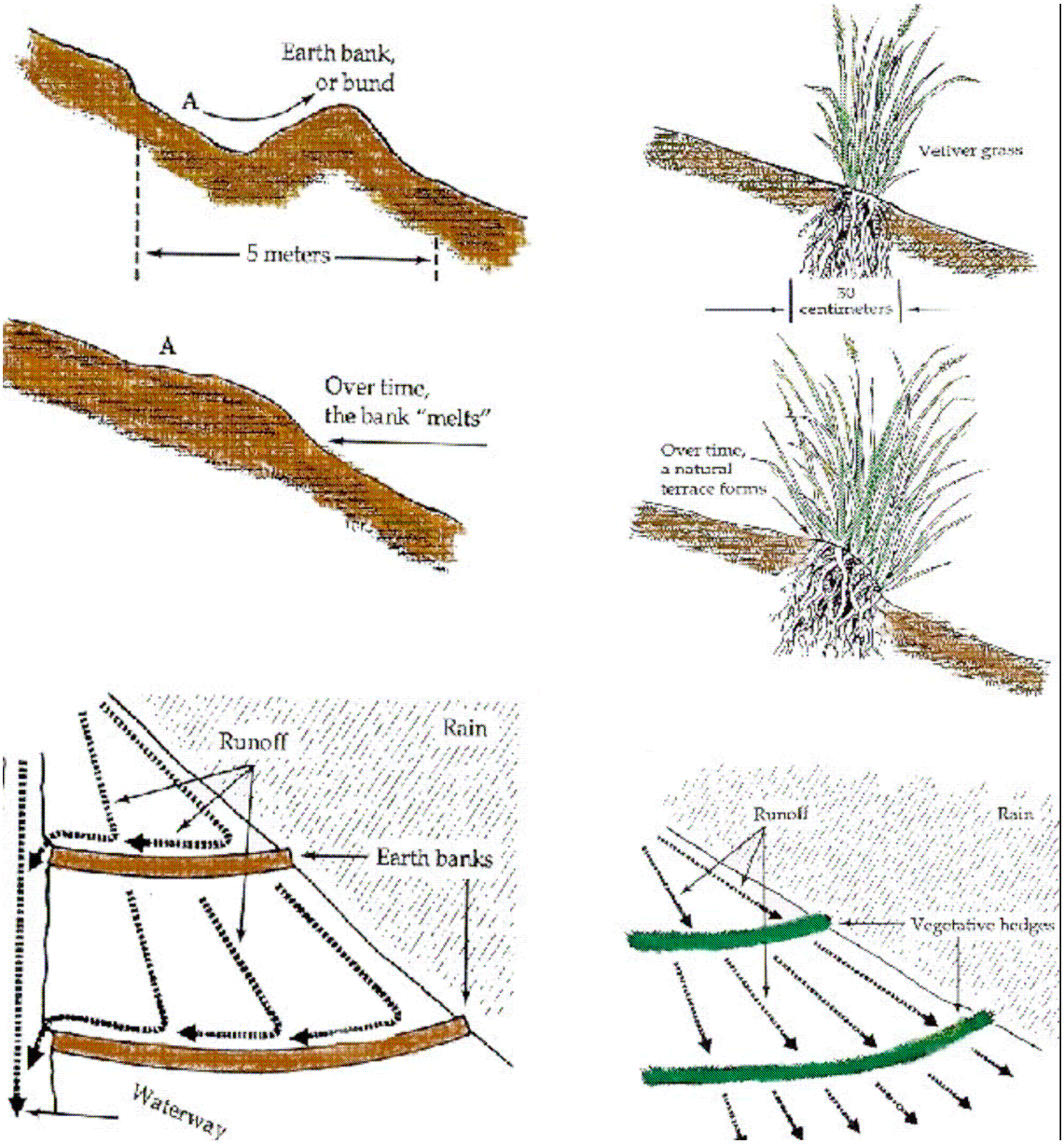
[33] Truong P.N.V. and Loch R.: "Vetiver System for Erosion and Sediment Control"; ISCO 2004 - 13th International Soil Conservation Organisation Conference – Brisbane, Australia;July 2004. Download at http://www.vetiver.org/AUS_Sediment.pdf

[34] Truong P.N.V, Tran Tan Van and Pinners E.: "Vetiver System Applications –A Technical Reference Manual"; The Vetiver Network Intenational (TVNI), 2008. Download at http://www.vetiver.org/TVN-Manual_Vf.pdf

• Preferably require only a narrow width to be effective and supply products of economic value to farmers.

Vetiver grass exhibits all these characteristics and it is unique in that it can thrive in arid and humid conditions, growing under some extreme soil conditions and survives wide temperature ranges.

86. Since the Vetiver barriers only filter the runoff and do not convey it, water seeps through the dense vetiver hedge reaching the bottom of the slope at lower velocity without causing any erosion and without being concentrated in any particular area. This is known as the "flow- through system" as shown below. This is in sharp contrast with the contour terrace/waterway system in which runoff water is collected by the terraces and diverted as quickly as possible from the field to reduce its erosive potential.



All runoff water is therefore collected and concentrated in the waterways where most erosion occurs in agricultural lands, particularly on sloping lands, and this water is lost from the field. With the "flow-through system", not only is this water conserved but also no land is wasted

on grassed waterways [35](see figure below). The vetiver hedge builds up a natural bund that is not easily broken by runoff and does not require regular maintenance as do mechanically constructed contour banks or bunds[36].

3.2 Vetiver Grass for Steep Slope Stabilization

87. Presently Vetiver grass has also been widely used for erosion and sediment control on steep slopes around the world: including Africa, Asia, central and south America, southern Europe and Australia where it has been used successfully to stabilize steep batters of road and railway in north, central and south east Queensland. In China, the Vetiver System has been used for erosion and sediment control on more than 150,000 km of railway, highway and road batters by 2004. Part 3 of the Vetiver Technical Reference Manual (Footnote 33) explains the basis of Vetiver's efficacy for slope stabilization and its various applications[37].

88. vegetative cover provided by grass seeding, hydro-seeding or hydro-mulching normally is quite effective against sheet erosion and small rill erosion, and deep-rooted plants such as trees and shrubs can provide some structural reinforcement for the ground. However, on newly-constructed slopes, the surface layer is often not well consolidated, so even well-vegetated slopes cannot prevent rill and gully erosion. Deep-rooted trees grow slowly and are often difficult to establish in such hostile territory. In these cases, because of the inefficiency of the vegetative cover, engineers opt for structural reinforcement. In short, traditional slope surface protection provided by local grasses and trees cannot, in many cases, ensure the needed stability. Taking cue from the agricultural sector and exploring the possibility of introducing vetiver as a new vegetative candidate for bioengineering slope stabilization work, a study of the tensile root strength properties of vetiver in its resistance to shallow mass stability and surficial erosion was undertaken in 1996. It emerged that the tensile strength of vetiver roots is as strong as, or even stronger, that of many hardwoods. In fact, because of its long (2-3.5 m) and massive root networks which are very fast-growing (already functionable in only 4-6 months), it is better than many types of trees which normally take 2-3 years to be effective.

89. Slips or slides on slopes fall into 2 categories: deep seated and shallow seated. The deep-seated problem is geotechnical or geological in nature. It can only be addressed taking into account slope geometry, soil strength, climatic condition, groundwater characteristics, etc. and can be ascertained by slope stability analysis. For shallow-seated slip or shallow mass movement, the problem is somewhat difficult to quantify. Shallow slips of 1.0-1.5 m, on the other hand, comprise the majority of problems faced after slope formation, especially in regions with prolonged and high rainfall. This problem still arises despite the fact that slope analysis might have shown a slope to have adequate overall factor of safety. To tackle this problem, engineers conventionally rely on the use of 'hard' or 'inert' material such as mortared riprap, shotcrete or the like to seal off the slope to prevent water infiltration that is deemed to be the cause of the slippage in the first place. However, this does not always succeed.

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[35] Greenfield J.C.: "The Vetiver System for Soil and Water Conservation"; The Vetiver Network Intenational USA; 2008. Download at http://www.scribd.com/doc/6634337/Vetiver-System-for-Soil-and-Water-Conservation (may require a subscription) or, free from The Vetiver Network International's web site at http://www.vetiver.org/g/soil_erosion.htm#soil_water or refer to Part 5 of the Technical Reference Manual (Footnote 33).

[36] "Comparing constructed contour banks with Vetiver hedges"; download at http://www.vetiver.org/KEN_compz_%20vet_banks_oo.pdf

[37] This chapter is updated and available as an engineer's handbook. Download from http://www.scribd.com/doc/6634318/Vetiver-System-for-Slope-Stabilization or from the TVNI slope stabilization portal at http://www.vetiver.org/g/slope_protection.htm

90. An alternative solution is to resort to vegetation, in this case vetiver, to help strengthen the surficial 1.0-1.5 m layer that is prone to slippage (see Fig 1 on page 44 in Part 3 of the Technical Manual). When vetiver roots interact with the soil in which it is grown, a new composite material comprising roots with high tensile strength and adhesion embedded in a matrix of lower tensile strength is formed. Vetiver roots reinforce a soil by transfer of shear stress in the soil matrix to tensile inclusions. In other words, the shear strength of the soil is enhanced by the root matrix. Vetiver root systems are about 3 times stronger than all other grasses with high mean tensile strength of 75-85 MPa, or *approximately one sixth the strength of mild steel*. When the dense and massive root networks act in unison, they resemble the behavior of `soil nails' normally used in civil engineering works. With its innate power to penetrate through hardpans or rocky layers, the action of vetiver roots is analogically likened to 'living soil nails'.

91. *Thus, vetiver can increase soil shear strength by a factor of about 40 and, when planted on slopes, vetiver will also reduce slope pore pressures through the removal of water by transpiration.* On steep (30^0 - 60^0) slopes, the space between Vetiver rows is very close and has a Vertical Interval of about 1m. Therefore, moisture depletion would be greater and further improve the slope stabilisation process. However, to reduce this potentially harmful effect of Vetiver on steep slopes in very high rainfall areas, as a precautionary measure, Vetiver hedges could be planted on a gradient as Vetiver hedges could be planted on a gradient of about 0.5% as in graded contour terraces to divert the extra water to stable drainage outlets.

92. Application of Vetiver Grass for Urban Ravine Control. The above Vetiver System principles were successfully applied to stabilizing the head of a ravine in Kikiwit city in the Democratic Republic of Congo by a USAID-supported NGO and community participation[38]. The town of Kikwit extends over 92km^2 and neighborhoods have been built in the valleys or between stream beds of the Kwilu River as well as on the slopes and beds of this same river. Slopes of 25 degrees are common in the region. Kikwit's climate is tropical and humid having an average annual rainfall of 1,500 mm within 8 months of rainy season and 4 months of dry season. There is a great variation in the soil of Kikwit: the superficial cover is often of a sandy nature and at the deeper level one finds gray and red clay as well as argillites. The vegetative coverage varies with grassy savannas on the plateau, forested savannas on the slopes and forests in the valleys.

93. For years, there were no efforts by the national or regional governments or the local municipality to prevent soil erosion in the valleys surrounding the town. Soil erosion and mud slides developed rapidly year after year with the abundant rainfall and increased construction for which there was no urban planning. With defective and/or lack of appropriate drainage systems, rushing water flowed through small ravines, down the slopes, carrying stones, bricks, large amounts of mud and debris and, unearthing trees and bushes. With time, the ravines become much greater in size and progressively entered the town, tearing down hundreds of houses, schools, roads and other used community infrastructures. The Kikwit ravines generally have a mobile bed, due to the frequent interventions that change their shape and direction. These sites have become so denuded and precarious that the entire population of neighborhoods had no other choice than to leave and the town is now divided into isolated patches.

94. The Malawi Ravine was selected as a demonstration site for the project with the purpose of show the local community new anti-erosion techniques with Vetiver Grass

[38] Ndona A. & P. Truong: "Community mobilization for the control of ravine erosion with Vetiver technology". See http://www.vetiver.org/ICV4pdfs/DC04.pdf . A Power Point presentation of this application is given at http://www.vetiver.org/ICV4-ppt/DC04-PP.pdf

(*Vetiver Zizanioides*) and organizing them to participate in controlling the gully head. Previously named Malawi Ravine, its three heads have already reached the neighborhood bearing the same name and have caused the disappearance of houses. The progression of these three heads of the ITPK ravine is menacing the only professional technical school of the town (ITPK), the general hospital, the central market, the cathedral and the biggest paved road of the town. Its depth has reached around 5-7 m at the level of these structures and 15-20 m at the bottom of the ravine.

95. With the support the NGO, the participatory process began with vetiver information & training workshops. As a result, certain local associations became actively involved by establishing their own vetiver nurseries to meet the plant quantity requirements for the 1.5 ha demonstration plot. This plant multiplication phase took 12 months, from October 2004 until September 2005. Local community participation in multiplying vetiver had a double advantage; not only did it allowed the population to amass vegetative materials for their individual needs, it also offered them a new source of income through the sale of the vetiver shoots.

96. Implementation of the Vetiver System was done in three phases (see photos in the downloaded paper) as follows.

a) *Re-profiling the ravine through with slope terracing.* The vetiver system consists of planting one or several hedges along the slope's contour lines If the area to be protected is very steep, one must initially readjust the profile the ravine prior to planting the hedges. However, since ravine slopes are steeper than 45º, the slopes are not stable and are often subject to landslides and collapse until reaching an equilibrium profile. It is therefore difficult and nearly impossible to plant a hedge of vetiver along contour lines in this case. Thus successive narrow bench terracing along the slope was undertaken to facilitate the planting and to create a more stable slope profile to prevent further collapses or landslides. These terraces have variable height and width depending on soil texture. Cuts are easy to make on loam and sandy loam soils but creating terraces on sandy soil is more difficult due to the fragility of the soil. Thus tree branch posts were sunk in places to secure particles of the fragile soil. Terraces of this type were generally 50 to 100 cm in width and height. The floor of the ravine was also transformed into water retention basins to reduce runoff velocity.
b) *Vetiver Planting (hedge placing).* The successive vetiver hedges were planted on terraces contour lines established during the re-profiling of the ravines. The distance between two hedgerows were set between 50-100cm and the vetiver splits (composed of three tillers) were planted 10 cm apart in order to quickly form a dense hedge (usually after a few months).
c) *Maintenance.* After planting, regular maintenance visits were made during the first 4 months. These maintenance visits consisted primarily of watering right after replanting to assure good establishment. Three weeks after the initial planting, a few plants had not survived, and these were replaced with new ones in order to avoid gaps between plants and to assure hedge density. According to need, areas were hoed and fertilizer was applied (NPK: 17-17-17 and Urea) to reduce weeds and to permit good vetiver plant growth.

97. In the first 30days, one could not observe the forming of the dense hedgerows as they relate or depend on the level of development of the plants. However, the extension of the ravine heads and landslides had been stopped, not because of the Vetiver, but mostly because of the re-profiling which gave the slopes a profile of equilibrium. *The water retention basins also stopped the progress of the heads as they limited the water run-off on the ravine before*

the vetiver hedges had reached an optimum development height capable of stabilizing the site. However, 60 days after planting the plants had reached their average growth level, leaves started to reach normal heights and the new tillers had grown from the base. Consequently, hedges density was also average, that is, one could still see space and distinguish between the plants in the hedgerows.

98. After 120 days, one could see that the vetiver plants started to reach a good level of growth by observing the height of its leaves and the growth of new and more tillers. Growth was reaching a point were plants in the hedgerows began close in on each other. No further landslides were observed. At 240 days after the start of the demonstration plot, plants had reached their maximum height at approximately 1.5 to 2m providing healthy and dense hedgerows. Thus Vetiver hedge development on the site transformed the landscape into a form of savanna, allowing the growth of other new and indigenous grasses. The vetiver technology showed to be an effective and appropriate solution to stopping the progression of urban erosion: *the three heads of the ITPK ravine and its slopes have totally stabilized by the dense savanna of vetiver.*

99. Similar problems exist in Brazzaville. Conventional ravine and slope stabilization structures are very expensive and not sustainable, including the use of cheaper soil-filled sandbags. Messrs. Truong and Ndona who were responsible for the Kikiwit demonstration, came up with the idea of growing vetiver in the sandbags to anchor them, reduce soil saturation and reduce seepage pressures and. form hedges to slow runoff. A Powerpoint presentation may be downloaded to see the concept.[39] No update is currently available on the Vetiver Network International's website as to the demonstration's outcome and viability.

D. Road and Stormwater Drainage Erosion Control Practices

1. Road & Stormwater Drainage Erosion Control Approach for Southeast Nigeria

100. The review in this Note's Section A.3 above of gully formation and damage causes due inadequate road and urban stormwater drainage practices led to the following strategic conclusions:

a) *Roads requiring reconstruction because of gully erosion damage*. Most of the road gully erosion causes and the remediation works were either partially successful or unsuccessful because of the following major reasons: a) poor design and quality assurance of construction; (b) inadequate roadside drains and lack of proper/safe termination of drains and culverts at the valley bottom; c) inadequate or lack of effective measures to protect slope surfaces; and d) lack of road maintenance. These lacunae have to be addressed in priority road repair works *together with the threatening gully's headcutting control and bed stabilization as the first priority phase of the remedial works*. For example--based on this Author's review of a road design for a road cut by a large active gully--it is not good sustainable practice to rebuild the damaged road to cross the gully using an expensive concrete bridge supported by piles and earthfill over large box culvert placed in the gully. If the gully has not been stabilized, erosion will block the culvert and/or erode the culvert inlet/outlet foundations leading to collapse of the cross-drainage structure. Approval of feasilibity reports based on survey, investigations and preliminary as well as detailed

[39] Ndona A, and P.Truong: " Ravine Rehabilitation in Brazzaville, Congo". Download at http://www.vetiver.org/CON-Ravines%20Brazzaville.pdf

designs and bid documents must be based on vetting by experienced road engineers for quality assurance to ascertain that the above deficiencies do not reappear.

b) *Urban stormwater drainage and gully erosion*. Growing, unplanned and uncontrolled urbanization in most towns and cities in southcentral and southeastern Nigeria will surely result in increasingly severe flooding and gully erosion damage unless stormwater drainage systems are installed and/or improved on a priority basis within a rolling medium-term master plan framework. Priority stormwater drainage plans and designs in gully affected urban areas, while addressing viable diversion and disposal of gully creating runoff must also address viable gully head-cutting control and gully stabilization as a single package. Designs need to be vetting by experienced road and drainage engineers. New housing estates, large industrial and public utility facilities should only be approved on the basis of a viable *erosion & sedimentation control plan* whose drainage is based on safe disposal without adversely affecting downstream areas. Appropriate State regulations & guidelines modeled on similar erosion and sedimentation regulations elsewhere (e.g. USA, Australia, Malaysia) should be issued to enforce this requirement

c) *Rerouting of damaged roads and basin-wide road network gully threats*. Corrective measures roads irreparably destroyed by gully erosion needing unavoidable priority road diversions require a strategic management approach based on a catchment/drainage basin scale. The diversion plan should be cognizant of erosion inducing causative factors of the proposed rerouting such as the engineering geological properties of the soils, basin geomorphology and gully erosion potential. In parallel, a survey is required to identify other roads in the area threatened by advancing gullies and medium-term treatment priorities determined based on the proximity of these gullies to the roads, important infrastructure and valuable properties and, the likely time left prior to road and asset damage. If possible, the survey should be GIS-based using a base map of existing roads. In the loner term, the survey should be extended to the whole state so that it can be easily updated from time to time as new gully threats arise. Where gullies are still shallow and easy to stabilize in a cost-effective manner should also be prioritized and budgeted. The potential damage that may be caused by drainage outlets of proposed road diversion should also be reviewed using these considerations.

d) *Professional Sensitization*. Southeast Nigeria is a ‘sensitive” area for road and stormwater drainage infrastructure to which the civil engineering profession is inadequately “sensitized” and lacking in guidance regulatory and/or professional guidelines for design and construction. Designs are probably undertaken in a textbook manner and according to the Federal Highway Manual which does not differentiate the specific drainage good practices requirements for southeast Nigeria. NEWMAP should support the preparation for SE Nigeria of: (i) updated rainfall intensity-duration-frequency curves for hydrological design of road & stormwater drainage as well as gully reclamation; and (ii) road and urban stormwater design & construction good practice guidelines adapted to erosive soil conditions. An experienced consulting firm consortium (international & national) should be tasked with preparation of draft road and stormwater drainage guidelines material for the prevention of gully erosion for review by an expert committee appointed by FMoE and the Federal highways agency. As part of its duties, the consortium should conduct workshops to sensitize the engineering profession and incorporate workshop feedback received into its draft guidelines. NEWMAP should also support a National Panel to develop practical guidelines for SE Nigeria gully control

practices. The Panel should be composed of engineers and academics with gully control experience and be supported by one or two very experienced international experts. In the interim, an updateable roster should be established of prequalified national consulting firms with proven experience and performance in road and stormwater drainage design and construction supervision for both Federal and State projects.

1.2 Good Road Drainage Practices

101. Key Drainage Design Practices. The design key issues that should be addressed in a rural and urban road drainage design include:

a) *Hydrological Design Criteria*. Drainage of main highways and secondary or urban roads are based on runoff estimates derived by the "Rational Formula" using storm intensities with an Average Recurrence Interval (ARI) of about 50-100 years and 25 years respectively. Unpaved rural roads are usually based on an AVI of 10-15 years. Similarly, if data exists for streams/rivers that the road has to cross, the same should apply: if not, cross-drainage and bridges would be also sized by catchment characteristics, area and storm frequency as above. The resultant runoff estimates are used for design sizing of road surface drainage ditches (inclusive of the contribution of steep slopes abutting the road), tailwater height at cross-drainage culvert entrances and design water level above grated catchpits (especially in road valleys where drain discharge is contributed from both sides). The ARI therefore determines the cost of road components depending on its importance and traffic volume and usually the less important the road, the lower the ARI used as a cost-saving measure. In urban areas, a higher ARI is used since backwater from culverts and catchpits that are undersized cause flooding of properties and are a road safety hazard. *However, for southeast Nigeria with its erodible soils, gully formation hazards and poor road maintenance culture, this Author recommends an ARI of at least 50 years for secondary roads and 25 years-50 years for unpaved roads (depending on location and topography). It is better to overdesign and "gully proof" a road than to end up with the later economic damages and expensive gully repair investments: left too long a deep gully that cut a road can become irreparable and an even more expensive road diversion is needed.*

b) *Drainage Structure Alignment & Energy Dissipation*. Given their computed design discharges and estimated inlet conditions, drainage ditches, culverts, grated catchpits and cross-drainage structures need to be appropriately aligned and sized ensuring that inlet and exit drainage exit velocities are minimized to a non-erosive velocity with appropriate energy dissipation designs including riprap of the outlet area soil. In particular, culverts should not flow full at design discharge and tailwater head: otherwise any subsequent increase in head will result in "orifice flow" and less discharge capacity. A larger diameter also provides less chance of orifice flow due to blockages from sediment, debris and garbage (the latter is a common problem in urban areas). Trash racks are desirable to enable easy removal of debris and large garbage.

c) *Drainage Discharge Disposal*. Drainage channels must be appropriately terminated at safe outlet disposal locations and the alternative routes to such outlets fully surveyed. For culvert and catchpit outlet locations, topographical survey and soil conditions should extend at least 300-500 m depending on location conditions. For roads being rehabilitated, the conditions at existing outlets need to be surveyed and where erosion is found, or gully erosion has been caused, redesign is essential and gully stabilization is essential as a first priority.

d) *Slope Stabilization of Cuts and Fills.* Repair of roads affected by gullies often involves a new road section alignment and pavement in either cut or fill or both. A full soil survey of soil and drainage conditions (including groundwater) in the potential cut areas must be undertaken to determine the appropriate slope stabilization designs and methods required. If cut embankments and fill sections in the existing road sections elsewhere show signs of instability or slips that can block these road sections or cause their culverts and other drainage structures to fail, these sections need also to be addressed in order of hazard priority. In fill road sections, care should be taken that: (i) fills are protected and not scoured by high tailwater inlet velocity; and (ii) culvert alignment and design provides for safe conveyance of high velocity flow down to the energy dissipation outlet and pool without creating a danger of fill erosion.

102. Technical Guidelines for Road Management Practices. There are no specific guidelines available for good road drainage and erosion control practices in sensitive erosive sandy soil areas in tropical rainfall areas. Causes of erosion may include: removal or reduction of protective cover, destruction or impairment of natural soil structure and fertility, increased slope gradients created by construction of cut and fill slopes, decreased infiltration rates on parts of the road, interception of subsurface flow by the road cut slopes, decreased shear strength, increased shear stress, or both, on cut and fill slopes, and concentration of generated and intercepted water. The closest are best management practices (BMPs) suited to "sensitive" watersheds in upland forest areas. Two such manuals are: (i) FAO Conservation Guide 13/5 entitled "*Road Design & Construction in Sensitive Watersheds*" based on international practices[40]; and (ii) "Best Management Practices Field Guide" based on USDA Forest Service practices[41].

103. The objective of *FAO Conservation Guide 13/5* is to assist professionals concerned with the planning and implementation of watershed management activities by providing practical information supported by examples from a wide variety of situations. It was written as a guide to reducing environmental impacts of forest roads in mountain watersheds. Its purpose is to (a) identify potential threats to water quality from the construction and maintenance of roads, and (b) *recommend procedures, practices, or methods suitable for preventing, minimizing, or correcting erosion problems*. It discusses proper planning, reconnaissance, road standard development, erosion control, slope stabilization, drainage design, and maintenance techniques as well as cost analysis procedures that can be applied in the design, construction, and maintenance of forest roads. Specific questions relating to road design procedures, general layout and construction methods are left to be found elsewhere. Causes of erosion considered may include: (i) removal or reduction of protective cover; (ii) destruction or impairment of natural soil structure and fertility; (iii) increased slope gradients created by construction of cut and fill slopes; (iv) decreased infiltration rates on parts of the road; (v) interception of subsurface flow by the road cut slopes; (vi) decreased shear strength, increased shear stress, or both, on cut and fill slopes; and (vii) concentration of generated and intercepted water. It has seven chapters including: Road Planning & Reconnaissance, Road Design, Drainage Design and Surface & Slope Protection Measures.

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[40] Anonymous: "Watershed Management Field Manual - "Road Design & Construction in Sensitive Watersheds"; FAO Conservation Guide 13/5, FAO, Rome 1998.

[41] Keller G. and J. Sherar; "Low Volume Roads Engineering Best Management Practices Field Guide"; USAID, July 2003. *Individual chapter download* is recommended because they are each large (3-12 MB) due to colored photos and allow the reader to select topics of direct interest from the Table of Contents. Download at http://ntl.bts.gov/lib/24000/24600/24650/Index_BMP_Field_Guide.htm. .

104. *Low Volume Roads BMPs Field Guide* is an excellent reader friendly collection of Fact Sheet type chapters with excellent sketches and photos describing the BMPs for roads in sensitive watersheds. It is intended to provide an overview of the key planning, location, design, construction, and maintenance aspects of roads that can cause adverse environmental impacts and to list key ways to prevent those impacts. The BMPs are general techniques or design practices that, when applied and adapted to fit site specific conditions, will prevent or reduce, inter alia erosion and sedimentation impacts. Most of these impacts are preventable with good engineering and management practices and roads that are not well planned or located, not properly designed or constructed, not well maintained or, not made with durable materials often have negative effects on water quality and the environment. Fortunately, most of these BMPs are also sound engineering practices and ones that are cost-effective by preventing failures. This guide tries to address most basic roads issues in as simple a manner as possible. Complex issues should be addressed by experienced engineers and specialists. Included are key "DO's" (RECOMMENDED PRACTICES) and "DON'Ts" (PRACTICES TO AVOID) in low-volume roads activities, along with some relevant basic design information. These fundamental practices apply to roads worldwide and for a wide range of road uses and standards. Often recommended practices have to be adapted to fit local conditions and available materials. Additional information on **how** to do the work is found in other references and upon local laws and regulations. The topics covered in this manner are similar to those of FAO Conservation Guide 13/5 but has separate chapters on *bridges, erosion control and stabilization of gullies*.

105. Useful Road Drainage Hydraulics Design Manuals. Aside of the BMPs, road drainage design requires a knowledge of hydrology and hydraulics applied to the various road drainage components, especially culverts and energy dissipation. An excellent design guideline on the complex topic of culvert design for highway and urban roads for tropical conditions similar to those of Southeast Nigeria is the Malaysia "Guideline for Road Drainage Design -Vol 2- Hydraulic Design of Culverts" issued by the Road Engineering Association of Malaysia[42]. It applies to both highways and urban roads and covers: (i) general criteria (including culvert location); (ii) culvert type selection; and (iii) factors to be considered in hydraulic design of culverts. However the most useful design manual based on all hydrological and hydraulic aspects of road drainage components (inclusive of risk issues and economic analysis) replete with design examples for all topics covered is the 5th edition of the South African National Roads Agency's "Drainage Manual"[43]. The complete manual is 34 MB pdf but its worth the time to download and is an asset in any road design office.

106. Urban Stormwater BMP and Drainage Management & Design Guidelines. For southeast Nigeria, the most useful document is the Malaysia Urban Stormwater Manual. This manual has forty-eight chapters and is divided into eleven parts. The first three parts contain background information on environmental process and stormwater management, administration aspects and planning processes. The remaining parts contain detailed information on hydrology and hydraulics, runoff quantity control and conveyance, structural and non-structural water quality controls, water quality controls during construction, vegetation and watercourse management and special stormwater applications. Worked

[42] Anonymous: "Guideline for Road Drainage Design -Vol 2- Hydraulic Design of Culverts"; Road Engineering Association of Malaysia. .http://www.scribd.com/doc/62214894/Hydraulic-Design-of-Culverts-v2

[43] Anonymous: "Drainage Manual"; African National Roads Agency Ltd, Pretoria 2006. Download at http://www.nra.co.za/live/content.php?Category_ID=148

examples are given for all design aspects. It has to be downloaded by individual chapters according to the reader's interest from the ToC at the download website[44].

107. Erosion & Sedimentation Control BMPs for Construction Sites. The US States, Australia and Malaysia have erosion & Sediment Control (ESC) regulations for which Fact-Sheet type BMPs and drawings are available for downloading. The most appropriate for southeast Nigeria is probably the Malaysian BMP document[45] and the Australian ESC Guide for Site Managers[46]. Standard drawings for BMP facilities Australia can also be downloaded.