

## **FEDERAL GOVERNMENT OF NIGERIA**



## **FEDERAL MINISTRY OF WATER RESOURCES**

### **TRANSFORMING IRRIGATION MANAGEMENT IN NIGERIA (TRIMING) PROJECT – P123112**

### **ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF)**

### **FINAL REPORT**

February 19, 2013

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## **LIST OF ACRONYMS AND ABBREVIATIONS**

AEHE	Agricultural Equipment Hiring Enterprise
AESA	Agricultural Ecosystem Analyses
AfDB	African Development Bank
AI	Access to Information Policy
ATA	Agricultural Transformation Agenda
BIP	Bakolori Irrigation Project
BIS	Bakolori Irrigation Scheme
BP	Business Policy
CADP	Commercial Agriculture Development Project
CBN	Central Bank of Nigeria
CMO	Catchment Management Office
CPS	Country Partnership Strategy
CSO	Civil Society Organization
DA	Designated Accounts
DFID	UK Department for International Development
DKIP	Dadin Kowa Irrigation Project
DKIS	Dadin-Kowa Irrigation Scheme
EA	Environmental Assessment
EAP	Emergency Preparedness and Action Plans
ECOWAS	Economic Community of West African States
EFCC	Economic and Financial Crimes Commission
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FEPA	Federal Environmental Protection Agency
FGN	Federal Government of Nigeria
FM	Financial Management
FMARD	Federal Ministry of Agriculture and Rural Development
FME <sub>env</sub>	Federal Ministry of Environment
FMLP	Federal Ministry of Labour and Productivity
FMoF	Federal Ministry of Finance
FMWR	Federal Ministry of Water Resources
FPR	Farmer Participatory Learning
GDP	Gross Domestic Product
HA	Hydrological Area
H-JKYB	Hadejia-Jama'are-Komadougou–Yobe Basin
HVIP	Hadejia-Jama'are Valley Irrigation Project
HVIS	Hadejia Valley Irrigation Scheme
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IFC	International Finance Corporation

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IMA	Irrigation Management Association
IPM	Integrated Pest Management
IUCN	International Union for the Conservation of Nature
IWMI	International Water Management Institute
IWRM	Integrated Water Resources Management
JICA	Japan International Cooperation Agency
KRIP	Kano River Irrigation Project
KRIS	Kano River irrigation Scheme
LUA	Land Use Act
LUAC	Land Use Allocation Committee
M&E	Monitoring and Evaluation
MDG	Millennium Development Goal
MIS	Management Information System
MOF	Ministry of Finance
MRVIS	Middle Rima Valley Irrigation Scheme
NAFDAC	National Agency for Food and Drugs Administration and Control
NBA	Niger Basin Authority
NBS	National Bureau of Statistics
NCA	National Council on Agriculture
NCB	National Competitive Bidding
NCWR	National Council on Water Resources
NEPAD	New Partnership for Africa's Development
NEWMAP	National Erosion and Watershed Management Project
NGO	Non-Governmental Organization
NIC	National Irrigation Commission
NIWRMC	Nigeria Water Resources Management Commission
NIWRMP	National Irrigation and Water Resources Management Project
O&M	Operations and Maintenance
OP	Operational Policy
PAD	Project Appraisal Document
PAP	Project Affected Persons
PCU	Project Coordination Unit
PDO	Project Development Objective
PIM	Participatory Irrigation Management
PL	Participatory learning
POP	Persistent Organic Pollutants
PPE	Personal Protective Equipment
PMP	Pest Management Plan
PTS	Pesticides and Toxic Substances
RAMP II	Nigeria's Rural Access and Mobility Project
RBA	River Basin Authority
RPF	Resettlement policy Framework
RBDA	River Basin Development Authority
RBMC	River Basin Management Commission
SCPZ	Staple Crop Processing Zones

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SDR	Special Drawing Rights
SPRI	Small-scale Private Irrigation Schemes
SRFP	Standard Request for Proposal
SRRBA	Sokoto-Rima River Basin Authority
TA	Transformation Agenda
TAC	Technical Advisory Committee
TRIMING	Transforming Irrigation Management in Nigeria
TtT	Training the Trainer
UBRBA	Upper Benue River Basin Authority
UNDP	United Nations Development Program
WHO	World Health Organization
WRB	Water Resources Bill
WUA	Water User Association
WUAF	Water User Association Federation



## **FOREWORD**

The Federal Government of Nigeria (FGN) identified investments in the agriculture sector as effective means to reducing poverty. The FGN recognizes that *“higher levels of investments in agriculture, both by the public and private sector, can yield much better results if the reforms are undertaken to streamline not only the incentive structures for the farmers, but also the institutional framework in which agriculture and related activities take place.”* Seeds and irrigation are highlighted as priority assets, which can be catalysts for raising productivity on the supply side. The overall management of water resources (where agriculture is the largest consumer) is also highlighted as a challenge requiring attention. Solutions through greater efficiency in water use are recognized as critical with more focus given to better management of water in areas of large and medium irrigation projects. This also requires putting in place more holistic water resources management strategies. Finally, other key water management activities identified in the **Twelfth Plan** include: steps to greatly improve governance in water management through Water User Associations, a focus on on-farm works and the rehabilitation and physical modernization of existing major irrigation systems, and integration of these activities with existing surface reservoir based canal irrigation.

In order to respond to the above challenges, the FGN has requested the World Bank to support the preparation of a project referred to as: TRANSFORMING IRRIGATION MANAGEMENT IN NIGERIA (TRIMING) PROJECT.

In addition to the policy and institutional focus, TRIMING intends to support on-the-ground Integrated Water Resources Management in the following three basins; Sokoto-Rima Basin, Upper Benue Basin, and the Hadejia-Jama'are-Komadugu-Yobe Basin (HJKYB). Also, TRIMING will support dams operational and safety management improvement, particularly for the following dams and reservoirs; Bakolori, Zobe, Goronyo, Tiga, Challawa Gorge, Ruwan Kanya operational reservoir, Hadejia Barrage and Dadin Kowa and also Irrigation management through a particular focus on enhancing capacity of water users associations.

From an Environmental and Social Safeguards point of view, The TRIMING project is rated as Category A. It triggers five safeguards policies, namely, Environmental Assessment (OP 4.01), Natural Habitats (OP 4.04), Physical Cultural Resources (OP 4.11), Safety of Dams (OP 4.37), Involuntary Resettlement (OP 4.12) – mentioned above, Pest Management (OP 4.09), and Projects on International Waterways (OP 7.50). The following safeguards instruments have been prepared and subjected to public consultation and disclosure.

1. Specific interventions will not be known in detail prior to appraisal and a **Resettlement Policy Framework (RPF)** is therefore the most appropriate instrument. This document spells out the key objectives and principles of the policy and gives guidance to the preparation of subsequent Resettlement Action Plan (RAP).
2. Similarly, an **Environmental and Social Management Framework (ESMF)** describes in general terms the potential environmental and social impacts of the sub-projects to be financed by this project. The ESMF also provides guidance for preparation of ESIA, ESMPs, and environmental audits.
3. A **Pest Management Plan (PMP)** designed to minimize potential adverse impacts on human health and the environment and to advance ecologically based on integrated pest management.
4. The Bakolori Irrigation Scheme has been submitted to a full **Environmental and Social Impacts Assessment (ESIA)** finalized, including consultation and disclosure, during project preparation. The other project-specific ESIA's will be prepared during project implementation along with the technical studies for the corresponding investments.

**The present document corresponds to the document #2 (ESMF) describe above.**

## **GABATARAWA**

Gwamnatin Tarayyar Nijeriya ta fahimci cewa zuba jaruka a sashen aiyukan gona ce kadai sahihiyar hanyar da za a bi domin saukaka talauci. Gwamnatin ta gane cewa “zuba manya-manyan jaruka, daga sashen Hukumomin Gwamnati da kuma Kamfunnan al’umma, a cikin aiyukan gona zai iya haifar da sakamako nagari idan manufar yinkurin gyara da ake yi, bata takaitu ga tallafa wa manoma da kayan aiki ba kurum, sai in ta hada da (samarda) ingantattun kafafen da zasu tallaba wa dukkan nau’o’in aiyukan gona”. Samarda ingantaccen Iri da (filayen) noman-rani na daga cikin muhimman ababen da zasu sa a samu amfanin (gona) mai tarin yawa wanda kuma zaya wadatar da mabukata. Haka kuma, gabadayan alkinta albarkatun ruwa (inda aiyukan gona ke kwashe kaso mai yawa) wani babban “Kalu Bale” ne da ke bukatar a mayar da hankali a kansa. Yana daga muhimman matakan gyara, samarda amfani da wadataccen ruwan (noman-rani), ba tare da yin almubazzarancinsa ba, ga manya-manyan da matsakaitan shirye-shiryen mona-rani. Wannan na bukatar kyawawan dabarun da tsare-tsaren alkinta albarkatun ruwa. A karshe, wasu daga tsare-tsaren adana ruwa da **Shiri na Shabiyu** ya tanada sun hada da: daukar kwararan mataakai domin inganta gudanar tattalin ruwa ta hanyar amfani da Kungiyoyi Masu Ta’ammuli da Ruwa, kula da aiyukan gyaran filayen gona da farfado dasu da kuma samarda tsari irin na zamani tare da gwamasu da ruwayen da ake ban ruwa da su a wurare daban-daban.

Domin fuskantar wadannan “Kalu Balance-balancen da aka ambata a sama, Gwamnatin Tarayyar Nijeriya ta nemi Bankin Duniya da ya bayar da goyon baya ga shirinta da ake wa lakabi da: SHIRIN SABON TSARIN GUDANAR DA NOMAN-RANI A NIJERIYA – SHIRIN (TRIMING).

Bugu da kari akan wadannan manufofi da mayar da hankali a kan (samarda) ingantattun kafafen gudanarwa, SHIRIN (TRIMING) ya kuduri aniyar tallafa wa tsarin—da ke da akwai—na Sarrafa Albarkatun Ruwa a hukumomin kula da noman-rani ire-irensu kogunan; Sokoto-Rima, Upper Benue, da kuma na kogunan Hadeja-Jama’are-Komadugu-Yobe (HJKYB). Haka kuma, SHIRIN (TRIMING) za ya tallafa wa tsarin gudanarwa da inganta madatsai na ruwa, musamman a madatsai da matattarar ruwa na; Bakolori, Zobe, Goronyo, Tiga, Challawa Gorje, Ruwan Kanya, da kuma na Hadejiya Barrage da Dadin Kowa, da inganta noman-rani ta hanyar bayar da karfin guiwa ga Kungiyoyin manoman damana da na rani.

Ta fuskar Alkinta Muhalli da Tattalin Zamantakewa kuwa, an kimanta SHIRIN (TRIMING) a matakin A. Shirin na da manufofin ingantawa, kamar haka, Tantance Ingancin Muhalli (mai lamba OP 4.01), Kiblacewar Hadurra a Madatsun Ruwa (OP 4.37), Sake Matsugunnan (mazauna yankunan) da aka ambata a sama (OP 4.12) – Dakile Kwarin da ke Barazana amfanin gona (O P 4.09), sai kuma Shirye-shiryen kyautata alaka akan amfani da hanyoyin ruwa na Kasa-da-kasa (O P 7.50). Wannan jerin bayanai ne na matakan kiyaye hadurra da aka tanada, wadanda sai an tuntubi jama’ah masana kan cancantarsu kafin aiwatar da su.

1. Ba za a san dalla-dallar tanade-tanaden da ke akwai ba sai bayan—bisa manufa—an baiyanar da Tsarin Sake Matsugunai (**RPF**); domin yin haka shine mafi dacewa. Wannan daftari ya zayyana muhimman manufofin wannan kuduri tare da shata yadda za a tsara sauran shirye-shirye tsugunnarwa da za su biyo baya. Ana kiran wannan Shiri da (**RAP**).
2. Haka kuma, Ginshikin Gudanar da Alkinta Muhalli da Zamantakewar Alummah (**ESMF**) ya bayar da gundarn bayanai kan alfanun da ka iya samuwa a cikin kananan aiyukan da wannan babban shiri na

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(ESMF) za ya gudanar. Kana kuma Shirin zai bada haske a kan yadda za a gudanar da sauran tsare-tsare na ESIAs, ESMP, da kuma tsarin binciken muhalli.

3. An kirkiro shirin dakile miyagun kwari masu barazana ga lafiyar Dan-Adam da muhalli ne domin samar da kubutaccen yanayi daga aibin kwarin.
4. Kafin kaddamar da shirin noman-rani a Bakolori sai da aka yi cikiakken nazari domin gane tasirin da ka iya samuwa musabbabin Shirin Alkinta Muhalli da Zamantakewar Al'umma'ah (ESIA), an daddale (matsaya) ta hanyar daukar matakan tuntuba da fayyace bayanai (ga jama'ah) kafin kaddamar da shirin. Irin wadannan mataakai ne za a dauka kafin kaddamarwa da aiwatarwa tare da la'akari da nazarce-nazarcen kwararru akan dukkan sassan (aiyukan noma) da za a zuba jaruka a kansu nan gaba.

**Wannan daftari na da muwafaka da daftarin na 2 (ESMF) da aka zo da bayaninsa a sama.**

## EXECUTIVE SUMMARY

### 1.0 Background

The Federal Government of Nigeria (FGN), through the Federal Ministry of Water Resources (FMWR), has requested World Bank assistance to prepare the project referred to as Transforming Irrigation in Nigeria (TRIMING). The proposed project seeks to improve performance of irrigated and water resources infrastructure and institutions for enhanced productivity in selected irrigation schemes.

Based on subsisting World Bank Regulations, and in order to comply with local regulations, especially those of the Federal Ministry of Environment (FMEEnv), the project implementing organization, the Federal Ministry of Water Resources (FMWR) has made a decision to undertake the preparation of Environmental and Social Management Framework (ESMF) for the overall project. Based on the general overview, a number of sub-projects are planned under the TRIMING project. The key project areas and planned intervention sites are shown below:

**Table 1: Selected Project Areas**

Basin (hydrological area)	Sub-basin	Intervention Sites
Sokoto-Rima	Sokoto	Bakolori Irrigation Scheme
	Rima	Middle Rima Irrigation Valley Scheme
Hadejia-Jama'are Komadougou Yobe	Hadejia Jama'are	Kano River Irrigation Scheme
		Hadejia Valley Irrigation Scheme
Upper Benue	Gongola	Dadin Kowa Irrigation Scheme

Five World Bank safeguard policies, namely, Environmental Assessment (OP 4.01), Natural Habitats (OP 4.04), Physical Cultural Resources (OP 4.11), Safety of Dams (OP 4.37), Involuntary Resettlement (OP 4.12), Pest Management (OP 4.09), and Projects on International Waterways (OP 7.50) are triggered by the proposed project components of the TRIMING, thus, an ESMF is prepared. The objective of the ESMF is to establish a process of environmental and social screening that will permit the institutions responsible during project implementation to identify, assess and mitigate any adverse environmental and social impacts of the proposed interventions. The ESMF also determines the institutional measures to be taken during the program implementation, including those relating to capacity building.

### 2.0 Environmental Baseline

The **Sokoto River** (formerly known as Gublin Kebbi) is a river in north-west Nigeria and a tributary of the River Niger. The river's source is near Funtua in the south of Katsina State. It flows north-west passing Gusau in Zamfara State. Further downstream the river enters Sokoto State where it passes by Sokoto and is joined by the Rima River, then turning south in Kebbi State and reaching the confluence with the Niger River. The plains around the river are widely cultivated and the river used as a source of irrigation. The river is also an important means of transport. The Bakolori Dam, about 100 km upstream from Sokoto, is a major reservoir on the Sokoto River. It has had significant impact on downstream floodplain cultivation.

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Sokoto State and the catchment area of the Sokoto/Rima basin is in the dry Sahel, surrounded by sandy savannah and isolated hills. With an annual average temperature of 28.3 °C (82.9 °F), the area is, on the whole, a very hot area. However, maximum daytime temperatures are for most of the year generally under 40 °C (104.0 °F) and the dryness makes the heat bearable. The warmest months are February to April when daytime temperatures can exceed 45 °C (113.0 °F). The rainy season is from June to October during which showers are a daily occurrence.

The region's lifeline for growing crops is the floodplains of the Sokoto-Rima river system, which are covered with rich alluvial soil. For the rest, the general dryness of the region allows for few crops, millet perhaps being the most abundant, complemented by rice, corn, other cereals and beans. Apart from tomatoes, few vegetables grow in the region. The low variety of foodstuffs available has resulted in the relatively dull local cuisine.

According to USAID (2006), the population density in the north western region of Nigeria where Bakalori and Zobe Irrigation Projects are located is 213 persons per square kilometres and the annual growth rate of the population is estimated at 2.09%. The average household size is estimated at ten in Bakalori area and six in Zobe area.

The Hadejia-Jama'are Komadugu-Yobe Basin (HJKYB) drains a catchment of approximately 84,000 km<sup>2</sup>. in northeast Nigeria before discharging into Lake Chad. Politically, it covers five northern states, (Kano, Jigawa, Bauchi, Yobe and Borno). Over 15 million people are supported by the basin through agriculture, fishing, livestock keeping and water supply. The two major rivers of the basin are the Hadejia and the Jama'are, which meet in the Hadejia-Nguru Wetlands (HNWs) to form the Yobe. The Hadejia river rises from the Kano highlands while the headwaters of the Jama'are river are in the Jos plateau. Within the Hadejia river system the natural pattern of runoff has been modified by the construction of dams and associated large-scale irrigation schemes, most notably Tiga and Challawa dams.

The Hadejia-Nguru wetlands are on the List of Ramsar wetlands of international importance. Nguru Lake and the Marma Channel complex (58,100 ha) are designated a Ramsar Site. The wetlands are important for waterbirds, both for breeding species and for wintering and passage Palearctic waterbirds. The estimated waterbird population varies between 200,000 and 325,000. 377 bird species have been seen in the wetlands, including occasional sightings of the near-threatened Pallid Harrier and Great Snipe species.

The area supports about 1.5 million farmers, herders and fishermen. The wetlands support wet-season rice farming, flood-recession agriculture and dry-season farming using irrigation. Crops include peppers and wheat. The wetlands support fishermen, who often also farm, and provide fuel wood and leaves used for making mats and ropes. The lands are also grazed by Fulani cattle.

The Upper Benue River Basin's areas of coverage include the Adamawa, Taraba and Bauchi States. The schemes existing within the Upper Benue River Basin include: Lake Geriyo Irrigation Project; Dadin Kowa Irrigation Project; Cham Irrigation Project; Waya Irrigation Project and Lower Taraba Irrigation Project.

### **3.0 Project Description**

The Project Development Objective (PDO) of the TRIMING Project is to improve access to irrigation and drainage services and to strengthen institutional arrangements for integrated water resources management, with the overall aim to support agricultural productivity improvement in selected large-scale public schemes in Northern Nigeria.

The project will consist of four (4) major components:

- Component 1: Water Resources Management and Dam Operation Improvement (100 million US\$)
- Component 2: Irrigation Development and Management (205 million US\$)
- Component 3: Enhancing Agricultural Productivity and Supply Chains (40 million US\$)
- Component 4: Institutional Development and Project Management (35 million US\$).

### **3.0 Policy, Legal and Administrative Framework**

A number of regulations apply to the TRIMING project, including local and international regulations. The international regulations include Safeguards Operational Policies of the World Bank, and several other international conventions. Local regulations are primarily those of the Federal Ministry of Environment (FMEnv), National Environmental Standards and Regulations Enforcement Agency (NESREA), Federal Ministry of Water Resources (FMWR), Federal Ministry of Agriculture and Rural Development (FMARD), etc.

### **4.0 Associated and Potential Environmental Issues**

A number of environmental and social issues were identified as having the likelihood of being associated with the various component projects of the proposed TRIMING. Key environmental issues include:

- There will be emission of noxious gases from the exhaust of trucks, automated cranes, etc. that will be moved to the site for the purpose of project activities and this may pose negative impacts on ambient air quality around the project site;
- Mobilisation of equipment, materials and men to site may further increase the ambient noise levels of the project area and its immediate surroundings.
- The movement of trucks and cranes to the site may constitute obstructions to normal traffic in the project area and thus exacerbate traffic build-up in the area
- Dust raised from various construction activities will negatively affect ambient air quality;
- Emissions in the form of exhaust fumes and dust from vehicles and machines;
- Loss of vegetation caused by clearing of sites, installation of works, quarries and stock pile areas, and demand for fuelwood by labour force;
- Soil erosion resulting in siltation of nearby watercourses;
- Contamination of water sources caused by run-off of petroleum produce spillages, leakages from storage areas and improper disposal of fuels;
- Impact on cultural or archaeological findings due to excavation or from dust;
- Land acquisition and resettlement;
- Health and safety of workers (accidents, etc);
- Exacerbation of water-borne diseases such as malaria, filariasis, etc. in areas where irrigation canals are extended to
- Disease transmission (HIV/AIDs, STDs) to communities along route from construction workers.
- Waste generation and disposal challenges

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Key social impacts include:

- Changes to existing land uses (legal and illegal);
- Displacement or involuntary resettlement of people due to land acquisition;
- Impacts on community water management practices and relationships;
- Conflicting demands on surface or groundwater supplies;
- Impact on human health from fertilizer and pesticide use.
- land clearing and preparation, perhaps of marginal lands;
- introduction of and/ changes to fertilizer and pesticide use and fumigants for crop storage;
- moving from shifting to settled agriculture and/or from subsistence to cash crops;
- introduction of unfamiliar/exotic crops;
- crop diversification programmes with new farming systems or system components;
- crop intensification programmes;
- introduction of mechanized farming;
- irrigation and water supply and management systems;
- livestock farming

### **5.0 Analyses of Alternatives**

A number of alternatives were considered and these include: The No Project Alternative; Delayed project Alternative; and Alternative Site/Technology. After due consideration, it is indicated that the most optimal alternative, which will yield minimal negative impacts (with appropriate implementation of mitigation measures) and will yield all the anticipated positive impacts, is the current project plan.

### **6.0 Institutional Assessment and Framework for Environmental and Social Management**

The main institutions with key responsibilities for implementing this ESMF are:

- The PCU of the TRIMING project;
- Federal Ministry of Environment (FMEEnv);
- State Environmental Protection Agencies (SEPA's)
- State Commercial Agriculture Development Offices (SCADOs)
- River Basin Development Authorities (RBDAs)
- The World Bank

Although most of the institutions identified have the required knowledge base and staffing levels to undertake the successful implementation of this ESMF, some level of training and institutional strengthening are required in order to assure the successful and robust management of the projects in an environmentally sustainable manner.

### **7.0 Environmental and Social Planning, Review and Clearing Process and Procedure for Sub-Projects**

This ESMF is prepared to establish mechanism to determine and assess future potential adverse environmental and social impacts of sub-projects that are to be identified and cleared based on a community demand driven process, and then to set out mitigation, monitoring and institutional measures to be taken during implementation and operation of the sub-projects to eliminate adverse environmental and social impacts, offset them or reduce them to acceptable levels. The procedure for doing this includes the following steps:

- Environmental Screening Process
- Categorization of Sub-projects for environmental assessment;
- Assigning appropriate environmental category;
- Conduction of ER, LEA or EIA;
- Review and Approval;
- Environmental and Social Management Plan (ESMP);
- Public Consultations; and
- Monitoring and Evaluation

## **8.0 Capacity Building and Training Requirements for Environmental and Social Management**

In order to ensure proper implementation of environmental and social screening and mitigation measures, as well as effective community development, the TRIMING Project will undertake an intensive programme of environmental training and institutional capacity building estimated at 325.000 US\$ spread out over the life cycle of the project. The program will include environmental training and sensitization for various levels, including RBDAs, WUAs, LGA Staff, NGOs/CBOs and Local Service providers.

## **9.0 Consultations**

For the purpose of completeness, and in order to incorporate stakeholder views and perspectives into the project, consultations were held with relevant stakeholders in the course of this project. At this level, the consultations were limited to RBDA officials and representatives of WUAs as well as some traditional rulers. Consultations were held at Sokoto-Rima River Basin; Hadeija Jama'are River Basi and Upper Benue River Basin. Information obtained from the participants and stakeholders were taking into full cognizance in preparing and finalizing this ESMF.

## **11.0 Disclosure Requirements**

In line with the World Bank's Access to Information (AI) policy, all information relating to the TRIMING project, including this ESMF, will be disclosed to appropriate stakeholders, before being accepted for implementation. Details include the following:

### **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 is to be translated into the major languages in the sub-projects area (input major languages here).

### **Disclosure**

The ESMF has been prepared in consultation with the Federal level PCU, Federal and State MDAs, CBOs/NGOs, WUA and other relevant stakeholders. 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 ESIAs/ESMPs will be prepared for each sub-project based on the guidelines and procedures highlighted in this ESMF and would be disclosed in like manner.



## **12.0 Conclusion**

In this ESMF, an overview of regulatory issues, environmental and social impacts and mitigation measures have been presented. In addition, requirements for environmental and social management and monitoring as well as institutional strengthening have been highlighted.

It is believed that if these provisions are appropriately applied to the proposed TRIMING projects, they will assure that all project sub-components are implemented in such a way that they assure sustainable development.

## TAKAITACCEN BAYANI DOMIN MASU ZARTARWA

### 1.0 Shimfida

Gwamnatin Tarayyar Nijeriya, a karkashin Ma'aikatar Albarkatun Ruwa ta Tarayya, ta bukaci Bankin Duniya da ya taimaka wajen tsara shirin da ake kira da Shirin Inganta Noman-Rani A Nijeriya SHIRIN (TRIMING). Shi Shirin da za a gudanar ya kuduri aniyar inganta wajiban ababen bukata da sassan gudanarwa domin habaka samarda amfanin gona a cikin wasu zababbun tsare-tsaren noman-rani.

Bisa dogaro da ka'idojin da Bankin Duniya ke yin hurdodinsa, da kuma kokarin cika ka'idojin cikin gida, musamman shimfidaddun ka'idojin Ma'aikatar Muhalli Ta Tarayya; hukumar da za ta aiwatar da shirin-watau Ma'aikatar Albarkatun Ruwa Ta Tarayya (FMWR)—ta yake shawarar gudanar da tsarin Alkinta Ginshikin Muhalli da Zamantakewar Alummah (ESMF) a kan daukacin shirin. Bisa la'akari da SHIRIN (TRIMING). dungurungum dinsa aka yi wasu kananan tsare-tsare na kawo dauki a wasu filayen noma kamar haka:

#### Jadawali na 1: Zababbun Wuraren Aiyuka

Yanki (Basin) (Yankin 'Yan Kogi-Daya)	Rukunin Yanki (Sub-Basin)	Filayen Noman da Za a Tallafawa (Intervention Sites)
Sokoto-Rima	Sokoto	Bakolori Irrigation Scheme
	Rima	Middle Rima Irrigation Valley Scheme
Hadejia-Jama'are Komadougou Yobe	Hadejia Jama'are	Kano River Irrigation Scheme
		Hadejia Valley Irrigation Scheme
Upper Benue	Gongola	Dadin Kowa Irrigation Scheme

SHIRIN (TRIMING) ya haifar da tilascin rungumar manufofin kariya guda biyar na Bankin Duniya, watau, Nazarin Yanyin Muhalli (OP 4.01), Tabbacin Rashi Hadurra Ga Madatsu (OP 4.37), Tilascin Sauyin Matsugunni (na wadanda abin ya shafa) (OP 4.12), Kawar da Barazanar Miyagun Kwari (OP 4.09), da kuma Shirye-shiryen da ke da nasaba da hanyoyin ruwa na Kasa-da-kasa (O P 7.50), a matsayin wasusassa na shirin, saboda haka aka ne fitar da tsarin ESMF. Manufar ESMF dai ita ce kafa harsashin tantance tsarin Alkinta Ginshikin Muhalli da Zamantakewar Alummah (ESMF) wanda hakan ne, lokacin gudanar da aiyukan, za ya bayar da dama ga hukumomi masu ruwa da tsaki cikin aiyukan bayar da dauki su gane, su fahimci kuma su iya maganta matsalolin da ke iya cutar da muhalli ko su dagula yanayin zamantakewar al'ummah. Tsarin na (ESMF) ne za ya zaiyana irin matakan da za a dauka a hukumance yayin aiwatar da Shirin da kuma habaka kwarewa da kwazon ma'aikata.

## **2.0 Ababen Lura Kan Muhalli**

Kogin Sokoto (da ada aka sani da Gulbin Kebbi) kogi ne da ya ke a arewa-maso yamman Nijeriya kuma yana malayawa har ya gangarawa cikin Kogin Neja. Mabubbugar kogin nan kusa da Funtua a kudancin Jihar Katsina, in a miki ne daga Sokoto, kimanin kilo mita 275. Yana malayawa a arewa-maso yamma ya zarce uwa Gusau a Jihar Zamfara wanda shine cika Datsin Gusau da ke ba garin rowan sha. Daga nan kogin sai ya cigabada malalawa har ya shiga Jihar Sokoto, a inda zai kewaye (garin) Sokoto can ya hadu da Kogin Rima, sa'annan ya juya kudu ya malala ta cikin Birnin Kebbi a cikin Jihar Kebbi. Kwatankwacin kilo mita 120 kudu da Birnin Kebbi, sai ya sadu da magangamunsa su afka cikin Kogin Neja.

Ana noma da dama daga filayen da ke daga kogin, kuma ana amfani da shi wajen noman-rani. Kuma kogin na da muhimmancun gaske wajen zurgar-zurgar sufuri. Datsin Bakori, da tsawonsa kimanin kilo mita 100 daga Sokoto, wani babban matari ruwa ne da ke a kan Kogin Sokoto. Kogin na da muhimmin tasiri saboda noman filayen da yake ambaliya a kansu.

Yankin Jihar Sokoto da sauran sassan da ke amfana da shirin (noman-rani) na Sokoto/Rima busashen yanayi ne, da ke kewaye da fadadan filaye masu jigawa da kuma tsaunuka jefi-jefi. Dumamar yanayin a shekara ya kai kiyasin awo 28.3 na ma'aunin santigiri, watau kwatankwacin awo (82.9) na ma'aunin farhiti; shi dai yankin dungum zafi gare shi kwari, ko da yake dai a mafi yawan lokuttan shekara zafin bai cika haura kiyasin awo 40 na santigiri ba, kwatankwacin (104.0) a ma'aunin farhiti, duk da haka dai zafin ba ya da matsanancin takurawa. Watannin gumi a yankin sune Fabrairu zuwa Afrilu lokacin da dumama da rana ta kan haura awo 45 na santigiri (113.0) na farhiti. Lokacin damana kuma yakan fara ne daga watannin Yuni zuwa Okotoba lokacin da akan samu rowan sama akai-akai.

Wajen samarda amfanin noma kuwa yanki ya dogara matuka a kan filayen (noma) da Kogin Sokoto-Rima ke malalawa a kansu, domin yana sharo kasa mai albarka zuwa ga filayen. A sauran sassan yankin kuwa akan samu amfanin gona gwalgwado, kamar gero wanda shine ake samu da yawa kwari, sai masu bimasa kamar shinkafa, dawa, saura ababan nomawa da kuma wake. Baya ga tumatari akwai kadan daga kayan marmari da ake nomawa a yankin. Rashin wadatar nau'o'in abinci yasa dole ake hakuri da cimaka iri daya kusan ko da yaushe.

Kamar yadda (rahoton) USAID na shekara ta 2006 ya nuna, a Nijeriya, akwai dandazon al'umma—da ya kai kimanin mutane 213 cikin ko wane wuri mai fadin kimanin murabba'in kilo mita—a arewa maso yamma, watau a yankin Bakori da Zobe inda ake gudanar da aiyukan noman-rani; yankin da a cikinsa kiyasin hayaiyafar al'umma ya kai kishi 2.09 a cikin 100. Kuma an kiyasta matsakaicin nauyin iyalin magidanta day a kai mutane goma (10) a yankin Bakori, a yanki Zobe kuwa mutane shida (6).

Kogunan Hadejiya-Jama'are-Komagudu-Yobe (HJKY) kuwa duk suna gudani ne a cikin arewa-maso-gabas na Nijeriya, a fadin wurin da kiyasinsa ya kai murabba'in kilo mita 82,000; kogin ya ratsa jihohi guda biyar, (Kano, Jigawa, Bauchi, Yobe da Barno), kafin kwarararsa a cikin Tafkin Chadi. Kimanin mutane miliyan goma sha biyar ne a wuraren ke morar shirin aiyukan nomad a suka hada da kamun kifi, kiwon dabbobi da kuma bayar da ruwan sha. Koguna biyu mafiya girma sune na Hadejiya da na Jama'are, wadanda suka hade a dausayin dake tsakanin Hadejiya da Nguru (HNWs) kuma suka kwarara a cikin Kogin Yobe. Kogin Hadejiya ya taso ne daga Tsaunukan Kano, a yayin da Kogin Jama'are shi ya taso ne daga tuddan Jos. An canza tsarin asali na gudanin Kogin a musababin manyan manyan aiyukan noman-rani da ke gudana a madatsan ruwa na Tiga da na Challawa.

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Dausayin Hadejiya-Nguru na cikin irinsa da ke da muhimmanci a tsakanin kasashen duniya. Tafkin Nguru da rututun Makwararun Marma da ke akan filin da ya kai kimanin kadada dubu hamsin da takwas da dari daya (58,100) duk an tsara su ne bisa irin safurin na Ramsar. Irin wannan dausayi na da muhimmancin gaske wajen renon nau'o'in tsuntsayen bakin ruwa, yada zango da shakatawa. An kiyasta cewa akwai nau'o'in irin tsuntsayen bakin ruwa da yawansu ya kama daga 200,000 zuwa 325,000. An tabbatar da ganin gungu-gungun tsuntsaye daban-daban da suka kai 377 a dausayin, cikinsu harda a nadirin tsuntsayen da ake tsoron bacewarsu (karewarsu).

Wannan yanke na amfanar manoma, makiyaya, da masunta kimanin 1,500,000. Ana noman shinkafa a kan dausayin a in damana ta sauka, bayan daukewar damana, kuma idan malalen ruwan dausayin ya janye kana da rani kuma ayi noman-rani. Irin ababen da ake nomawa a wurin sun hada da tattasai iri daban-daban da kuma alkama. Dausayin na amfanar masunta, wadanda wani lokaci sukan yi noma a wurin, haka kuma dausayin na samar da itacen makamashi da nau'o'in tsirrai da ake sakar tabarma ko tukar igwai da su. Kuma dai dabbobin Fulani na yin kiwo a wurin.

Yankin Kogin Benue ya hada da Jihohin Adamawa, Taraba, da Bauchi. Wuraren da ake gunar da shirin noman-rani a yankin sune: Tafkin Geriyo, Dain Kowa, Cham, Waya da geffan Taraba.

### **3.0 Bayanan Shirin**

Shirin TRIMING da aka kuduri aniyar yi za ya kunshi manyan bangarori guda huɗu (4), like da ko wane bangare kuma akwai wasu kananan sassa. Manyan bangarorin sune:

- Bangare na 1: Tattala Albarkatun Ruwa da Inganta Amfani da Datsi.
- Bangare na 2: Tattalawa da Fadada Noman-Rani.
- Bangare na 3: Habaka Aiyukan Gona da Tsarin Isar da albarkatun (ga mabuta).
- Bangare na 4: Fadada Cibiyoyin (Aikin) da Kyautata Tsarin Gudanar da su.

### **4.0 Manufofi, Dokoki da Tsarin Gudanarwa**

Za a yi amfani da wasu dokoki da ka'idoji, da suka samo asali daga cikingida da waje, wajen aiwatar da shirin TRIMING. Ka'idojin na waje sune na Bankin Duniya da wasu da aka samar daga wasu Kungiyoyin Kasa da Kasa (masu alaka da irin wannan shirin). Ka'idojin cikin gida kuwa sune wadanda suka samo asali daga Ma'aikatar Kula da Muhalli Ta Tarayya, (FMEnv) Hukumar Kiyayewa da Tilasta Ka'idojin Amfani da Muhalli (NESREA), Ma'aikatar Albarkatun Ruwa Ta Tarayya (FMWR), Ma'aikatar Gona da Raya Karkara Ta Tarayya (FMARD), da dai makamantansu.

### **5.0 Abubawa da Ka Iya Zama Matsalolin Muhalli**

An gano wasu lamurra majibanta muhalli da zamantakewar al'umma da ka iya zama matsaloli ga bangarori da sassan wannan shirin TRIMING da ake nufin kaddamarwa. Muhimmai da cikin matsalolin sun hada da:

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- Za a samu firjin iska da tururi masu dauke da guba daga na'urori da za a yi amfani da su fili (ko filayen) da za a yi shirin; wannan na iya gurbata yanayin iskan (shaka) a filayen da kewayensu;
- Tura alolin aikin dajigilar ma'aikata (da leburori) zuwa wuraren aikin za su kara kwaramniya (mai damuwa) filayen aiyukan da makwabtansu;s
- Kaikawon manya matocin (aiki) da na'urori na iya zama barazana ga walwalar kaiwa da komowar ababan hawa a yankin da ake (kokarin kafa) shirin;
- Kurar da ake tayarwa a yayin gudanar da aikace-aikace itama zata dagula ingancin iskar (shaka) a wurin;
- Samuwar (kari) firje-firje hayaki da kura daga na'urori da motoci da ke kaiwa da komowa (a filayen aikin);
- Sauyin yanayin yadda asalin wuri yake (tunbuke tsirrai da itace) a dalilin share filin aiwatar da shirin, kakkafa kayan aiki, wurin tara shara da wasoson leburori akan itacen wuta;
- Zaizayar kasa a sanadiyyar Karin magudanan ruwa da ka shigo da wuraren da ke kusa da wurin aikin;
- Gurbatar wuraren da ke samar da ruwan (sha) musabbabin kwararar sinadaran man-fetur, fashewar ma'adanar sinadaran ko kuma rashin cikakkar kula wajan zubar da makamasan da suka gama amfani;
- Bata kayan al'adu da tarihi–da tsawon zamani ya binne–a dalilin kwalkwalar kasa da kura;
- Samarda filaye domin sake matsugunni (ga wadanda aikin ya tayar);
- (Kiwon) lafiyar ma'aikata da basu kariya (daga hadurra), da sauransu;
- Karuwar cuce-cucen da ruwa ke haifarwa, kamar zazzabin cizon sauro da ire-irensu, a yankunan aka hahaka magudanun ban ruwan noman-rani;
- Yaduwar cuce-cucen da ake samu ta hanyar jima'i (kamar kanjamau) a tsakanin al'ummu da ke cudanya da ma'aikata a kan filayen.
- “Kalu bale” game da matsalolin Tara shara da kwasheta.

### **Matsalolin zamantakewar al'umma sune:**

- Samuwar canje-canjen dokokin (mallaka) daamfani da filaye (watau halcci da haramcinsu);
- Tayarwar da mutane ko tilasci dangane da canjin matsugunnai a dalilin amsar filayen da aka yi;
- Tasirin tattalin ruwa da yadda ya kamata ayi amfani da shi kan jama'ar wurin;
- Matsalar sabanin bukatun (mutane) a kan bayar da ruwan tuddai da na cikin kwari;
- Tasirin amfani da taakin zamani da magungunan feshi a kan lafiyar jama'ah;
- Sharar filaye da gyaransu, wadanda ba ma wasu manya bane;
- Kaddamar da, ko canza nau'in takin zamani ko magungunan feshi ga shuka da wadanda a ke amfani da su wajan adana amfanin gona;
- Canza salon aikin gona, daga loto-loto zuwa ga dan kullun/ko kuma daga na samarda abinci zuwa ga na neman kudi;
- Kaddamar da sabbin samfurin iriruka (na shuka) da ba a saba da su ba;
- Shirye-shiryen samar da nau'ukan irin shuka tare da gabatar da sabbin dabarun noma ko abubuwa masu alaka dadabarun;
- Shirye-shiryen bayar da horo horo a kan iriruka;
- Gabatar da noman zamani;
- Ilmantarwa a kan ban ruwa, samarda shi da yadda ake tattalinsa;
- Kiwon dabbobi.

## **6.0 Nazari kan Zabin Hanyoyin bi**

An yi nazari hanyoyi da dama da za a bi wajan aiwatar da shirin ba tare samun matsaloli masu nauyi kwari ba (watau yadda ba za a saba wa jama'a ba sosai) kuma a samu nasarar abin da aka tunkara, dan haka aka zabi wannan shirin a matsayin wanda yafi dacewa.

## **7.0 Jinjina dacewar Hukumar Alkinta Muhalli da Zamantakewar Al'ummah**

Muhimman hukumomin da nauyin aiwatar da wannan shiri na ESMF sune:

- Sashen kula da aiwatar da shirin TRIMING (PCU);
- Ma'aikatar Muhalli ta Tarayya (FMEnv);
- Hukumomin Kiyaye Muhalli na Jihohi (SEPA's);
- Ofisoshin Jihohi na Habaka Noman Kasuwanci (SCADO's);
- Hukumomin Kula da Habaka Koguna (RBDAs);
- Bankin duniya.

Duk da dai da yawa daga hukumomin suna da sanin makamar yadda za su aiwatar da shirin ESMF cikin nasara, bisa dogaro da kwarewar ma'aikatansu, har haka akwai bukatar bayar da wani horo ko yaya tare da kara inganta hukumomin domin samun tabbacin tunkarar gudanar da shirin cikin kyakyawan yanayi da samun nasara.

## **8.0 Shirya Muhalli da Zamantakewa, Bin-diddiki da Tabbatar da Tsari da kuma hanyoyin (yin) Kananan Aiyuka**

Shirin ESMF ya shirya fitar da wasu dabarun da za su zama ma'aunin bi dan shata gudanarwa da hasashen abubuwan da ka iya zama matsaloli ga muhalli da al'ummah yayin gudanar da kananan aiyuka bisa bukaton jama'a, sa'annan a sanya masu sa ido da warware matsaloli da ka taso wajan gudanar da aiyukan domin sassafta ko kauda al'amurra masu iya cutar da muhalli da al'ummah. Matakan aiwatar da hakan sune:

- Tantance Cancantar Muhalli;
- Rarraba kananan aiyuka aji-aji domin gane yadda suka shafi muhalli;
- Lakaba wa kowane muhalli wata daraja (da ta dace da shi);
- Gudanarwa ... ER, LEA ko EIA;
- Dalla-dallar naarin matakan (da aka bi wajan) bayar da izini;
- (Rubutaccen) Shirin Alkinta Muhalli da Zamantakewar al'ummah;
- Tuntubar Al'ummah (dan jin ra'ayinsu); da kuma
- Sa ido da Tunani (kan ababan da aka gani).

## **9.0 Karfafawa da Samar da Abubun bukata domin Bada Horo kan Alkinta Zamantakewa da Muhalli**

Domin samar da sahihiyar hanyar tantance cancantar muhalli da kauce wa musgunawa da kuma habaka cigaban al'ummah, Shirin TRIMING ya yi gagarumin tsarin bayar da horo kan muhalli da kuma karfafa hukumar da ke dauke da nayin gudanar da shirin har iya tsawon lokaci da shirin za ya kamala. Shirin za ya kunshi bayar da horo kan muhalli da ganar da (wadanda abin ya shafa) a kowane mataki, kamar su RBDAs, WUAs, Ma'aikatan LGA, Kungiyoyin da ba na Gwanati bad a Mahidimta na Cikin Al'ummah.

## **10.0 Tuntuba**

Domin samun ra'ayoyin masu ruwa da tsaki cikin sabgar, da kuma ganin ba a bar kowa baya ba cikin aiwatar da shirin, an yi tuntubar mutane da suka cancanta da dama. A wannan matakin, tuntubar ta takaitu ga jami'an RBDA da wakilan WUAs, da kuma wasu shugabannin gargajiya (iyayen kasa). Haka ma an tuntubi hukumomin raya Kogunan Sokoto, Hadejiya-Jama'are da na Tuddan Benue. Ba kamala wannan shiba said a sai da aka yi la'akari da bayanai da ak samu daga wadanda suka shiga shirin (tuntubar) da kuma duk masu ruwa da tsaki cikin sabgar.

## **11.0 Bayar da Bayanai**

Bisa la'akari da manufar Bankin Duniya ta wajibcin bayar da bayanai, kafin yarda da aiwatar da Shirin TRIMING da ESMF, babu wani abu da za a boye ga duk wanda ya cancanci sanin abinda ake ciki game da wannan shirin. Karin bayani shine kamar haka:

### **Fassara (Daftarin) a cikin Manyan Harsunan (Mutanen) Yankin Awatar da Shirins**

Domin tabbatar da cewa mutanen da Shirin ya shafa basu da jahilcin abubuwan (alhairai ko matsalolin) da suke fuskanta, ya zama dole a fassara Takaitaccen bayanin, da aka rubuta domin masu zartar da shirin, a cikin manyan harsunan mazauna yakin da za a aiwatar da shirin (a nan sai a saka manyan harsunan da ake nufi).

## **Sanarwa**

An tsara shirin ESMF ta hanyar tuntubar sashen kula da aiwatar da shirin na Gwamnatin Tarayya PCU, sassan da ke lura da harkokin raya kasa na Tarayya da na Jihohi MDAs, Kananan Kungiyoyin Jama'a da wadanda Ba na Gwamnati ba CBOs/NGOs, WUA da macancantan masu ruwa da tsaki a cikin shirin. Ana sa ran za a sanarwa Jama'a cewa wannan daftari na ESMF abu ne da yake a bude yadda ana nazarinsa domin kawo gyara ko yi masa sharhi ta hannun Ma'aikaton Muhalli na Tarayya ko na Jiha a wasu Cibiyoyi da za a aiyana a matakin Tarayya ko kuma a Jihohin dake da hannu cikin shirin, da kuma cibiyoyin yada labarai na Bankin Duniya. Za a tsara wa ESIAs/ESMPs bayanai yadda za a gudanar da daidaikun kananan aiyuka bisa ga tsarin ka'idojin dad a ke cikin wannan daftari na ESMF, kuma suma bad a dadewa ba za sanar da al'ummah abinda suka kunsu.

## **12.0 Kammalawa**

A cikin wannan daftari na ESMF an yi tsokaci kuma an gabatar da bayanai a kan lamurra masu nasaba da ka'idojin aiwatarwa, tasirin shirin a kan muhalli da tsarin zamantakewar al'umma da kuma yadda dauki matakan yayyafa ruwa ga damuwar da ka iya tasowa game da shirin a tsakanin al'ummah. Bugu da kari kuma, an yi bayanai a kan alkinta muhalli da zamantakewar al'umma, sa ido da kuma karfafa hukumomin aiwatarwawa.

An yi imanin cewa idan dai har anyi amfani da wadannan kudurce-kudurcen yadda ya kamata acikin Shirin TRIMING da ake son kaddamarwa, to lallai kwalliya za ta biya kudin sabulu.

## **1.0 BACKGROUND AND INTRODUCTION TO THE TRIMING PROJECT**

### **1.1 Background Information**

The Federal Government of Nigeria (FGN), through the Federal Ministry of Water Resources (FMWR), has requested World Bank assistance to prepare the project referred to as Transforming Irrigation Management in Nigeria (TRIMING). The proposed project seeks to improve performance of irrigated and water resources infrastructure and institutions for enhanced productivity in selected irrigation schemes.

There are several regulations that relate to projects of this nature and the need for environmental management and sustainability in their implementation. These regulations include local and international conventions, treaties and guidelines. One of the international requirements of the funding agency, the World Bank, as captured in the Operational Policy/Bank Policy (OP/BP 4.01) is environmental assessment of proposed projects prior to their implementation. In keeping with this, and in order to comply with local regulations, especially those of the Federal Ministry of Environment (FMEEnv), the project implementing organization, the Federal Ministry of Water Resources (FMWR) has made a decision to undertake the preparation of Environmental and Social Management Framework (ESMF) for the overall project. Based on the general overview, a number of sub-projects are planned under the TRIMING. The key project areas are:

- Sokoto-Rima basin with Bakolori, Goronyo and Zobe irrigation scheme
- Hadejia Jamaare basin with Kano River and Hadejia Valley irrigation schemes
- Upper Benue basin with Dadin Kowa dam

Table 1.1 shows the coverage of the proposed interventions.



**Table 1.1: Overview of Coverage of Irrigation Schemes in the Coverage of TRIMING**

Basin (hydrological area)	Sub-basin	Irrigation Site	Dam
Niger North (HA-1)	Sokoto Rima	Bakolori Irrigation Scheme	Bakolori dam
		Middle Rima Irrigation Valley Scheme	Goronyo and Zobe dams
Hadejia Jamaare Komadougou Yobe or Chad Basin (HA-8)	Hadejia Jamaare	Kano River Irrigation Scheme	Tiga and Challawa Gorge dams
		Hadejia Valley Irrigation Scheme	Hadejia barrage
Upper Benue (HA-3)	Gongola	Dadin Kowa Irrigation Scheme	Dadin Kowa dam

There are four key components to the above listed projects, and they include:

- **Component 1: Water Resources Management and Dam Operation Improvement**  
Subcomponent 1.1: Support to Integrated Water Resources Management  
Subcomponent 1.2: Dam Operations and Safety Improvements
- **Component 2: Irrigation Development and Management**  
Subcomponent 2.1: Irrigation and Drainage Investments  
Subcomponent 2.2: Improving Irrigation Management  
Subcomponent 2.3: Support to Productive Water Use
- **Component 3: Enhancing Agricultural Productivity and Supply Chain**  
Sub-component 3.1: Matching grants for improvement of productive water use in agricultural processing and mechanization  
Sub-component 3.2: Support Research & Development
- **Component 4: Institutional Development and Project Management**  
Subcomponent 4.1: Project Management and Monitoring and Evaluation  
Subcomponent 4.2: Institutional Development and Governance.

This Draft Report presents an overview of the ESMF, the basic findings, and recommendations.

## **1.2 Introduction**

Nigeria is adequately blessed with an abundance of all the resources and factors required to excel in agricultural productivity. Chief among these factors are: Manpower, landmass, edaphic and climatic factors. However, gross neglect of the agricultural sector over the last three decades or thereabouts, due to comprehensive focus on the petroleum sector, has led to a substantial deterioration of the agricultural sector in Nigeria, to the extent that, from being a mainstay of the Nigerian economy, agriculture has been relegated to the backwaters of irrelevance, until recently.

With the realization that petroleum resources alone are not adequate to maintain the country's huge resource requirements, and with support from international organizations such as the World Bank, agriculture is gradually regaining some level of prominence in Nigeria. A series of projects are currently being assisted by the World Bank in the agricultural sector and include the various Fadama projects, and the current one, Transforming Irrigation Management in Nigeria (TRIMING) project, for which this safeguard is being prepared, comes up. The project is expected to involve, among others, civil works such as construction and/or rehabilitation of infrastructure.

As a responsible organization, with deep concern for environmental conservation and sustainable development, the World Bank typically applies its environmental and safeguard policies to any project it is involved in, directly and/or indirectly. For the current project, The World Bank's OP/BP 4.01 (Environmental Assessment), among others, is triggered by the planned projects. However, since details for most of the projects (apart from the Bakolori Irrigation scheme) are not very clear yet, the bank requires the preparation of environmental and social management framework (ESMF) reports for the global project. This ESMF will provide guidelines on how to proceed with project specific environmental assessment, when details of each project are determined. This ESMF has been prepared along line with a Resettlement Policy Framework (RPF), another policy document meant to address resettlement issue with regards to land take and displacement.

### ***ESMF for Proposed TRIMING Project – Final***

A project's environmental management framework (ESMF) consists of the set of mitigation, monitoring, and institutional measures to be taken during implementation and operation to eliminate adverse environmental impacts, offset them, or reduce them to acceptable levels. The plan also includes the actions needed to implement these measures. Environmental Assessment (EA) are essential elements for Category A projects, such as those planned to be undertaken under the TRIMING Projects.

#### **1.3 Objectives and Scope of Work for the ESMF**

The objective of the ESMF is to establish a process of environmental and social screening that will permit the institutions in charge of project implementation to identify, assess and mitigate any adverse environmental and social impacts of the proposed interventions. The ESMF also determines the institutional measures to be taken during the program implementation, including those relating to capacity building.

More specifically, the objectives of this ESMF, as clearly elucidated in the Terms of Reference document, which forms part of the contract document, are:

- (i) To assess the potential environmental and social impacts of sub-projects, whether positive or negative, and propose mitigation measures which will effectively address the negative impacts;
- (ii) To identify potential environmental policies, legal and institutional framework pertaining to the project;
- (iii) To establish clear directives and methodologies for the environmental and social screening of sub-projects to be financed by the project;
- (iv) To guide the development of specific Environmental and Social Impact Assessments (ESIAs) activity as might be needed for specific sub-projects.
- (v) To assist the Project Management Unit in the recruitment of qualified specialists to carry out screening and oversee environmental and social assessments as they are conducted.

Given the foregoing, the consultant has undertaken the implementation of the following scope of the works:

- a. Preparation of the Environmental and Social Management Framework (ESMF) taking into consideration the activities in component 1, 2 and institutional arrangements for project implementation. Specifically, the focus was on:
  - i. Project (Agriculture, Irrigation schemes, water resource;) description;
  - ii. Project components and associated activities;
  - iii. Institutional and Implementation Arrangement for the ESMF
- b. Preparation of an environmental and social checklist, to be used as a screening mechanism for the identified activities of the project.
- c. Identification of relevant regulations and guidelines, which will govern activities of the nature contemplated by the proposed project including International, National and State legislation and regulations.

#### **1.4 Study Approach and Methodology**

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

##### **1.4.1 Project Strategy**

The preparation of the ESMF was for a period of 10 weeks - within which the tasks as stated in the Terms of Reference (TOR) were accomplished. The indicative work plan, desktop study, scoping activities to understand the projects field of influence, site visits, review of the existing laws and policies currently in place nationally as well as relevant World Bank policies and processes constituted activities for successful project output.

Below is a brief description of activities performed in the implementation process of the methodology.

##### **1.4.1.1 Literature Review**

The approach was based on review of available literature and other strategic planning documents at the national and state level. Documents consulted in the process of preparing the ESMF study include:

### ***ESMF for Proposed TRIMING Project – Final***

- Federal environmental laws regulations, decrees, acts, policies and guidelines;
- Draft Project Appraisal Documents (PAD);
- World Bank Safeguards Policies;
- Baseline information relating to the physical, biological and socio-cultural environment of project areas;
- FMEEnv Environmental Impact Assessment Act (Decree No. 86). 1992;
- World Bank Environmental, Health and Safety Guidelines;
- Existing published and unpublished papers and research on the project area such as:
  - ROPISIN Report;
  - The World Health Organization's submission to the World Commission on Dams (WCD);
- ESMF's prepared by other World Bank projects in Nigeria and other parts of the world e.g. Nigeria Erosion Watershed Management Project (NEWMAP); Lagos Metropolitan Development Governance Project (LMDGP), etc.

#### **1.4.1.2 Data Gathering**

Data on the details of the environmental management policies and regulations were sourced from different institutions, including the Federal Ministry of Environment (FMEEnv); The Federal Ministry of Water Resources (FMWR); Federal Ministry of Agriculture and Rural Development (FMARD); Relevant River Basin Development Authorities (RBDAs); etc. Information gathered was reviewed to obtain detailed descriptive, qualitative and quantitative data on the physical environmental, sociological, and economic laws, regulations, standards, and policies relating to the project.

In addition, environmental and social screening and scoping of the project's field of influence and activities were undertaken in line with the FMEEnv guidelines and the World Bank.

#### **1.4.1.3 Field Visits**

This activity involved:

- Visits to the key intervention sites, including Bakolori; Hadeija Jama'are; and Dadin-Kowa Irrigation Schemes
- Potential Environmental and Social Impacts Identification and Prediction; and

- Oral interviews, and focused group discussions.

Issues covered during the field visits include:

- Typical agricultural activities;
- Types of pests encountered and damage level attributable;
- Women groups issues;
- Perception of the proposed interventions and expectations

#### **1.4.1.4 Stakeholder consultations**

Consultations were held with relevant stakeholders, including RBDAs, WUAs, Women groups, and traditional rulers. Basic issues covered were as listed above. Details of consultation activities are presented in Section 9 of this report.

### **1.5 Report Structure**

The report is arranged as follows:

Section 1	Background and Introduction
Section 2	Environmental Baseline Data
Section 3	Description of Proposed Project
Section 4	Policy, Legal and Administrative Framework
Section 5	Associated and Potential Environmental and Social Issues
Section 6	Analyses of Alternatives
Section 7	Institutional Assessment and Framework for Environmental and Social Management
Section 8	Environmental and Social Management Planning, Review and Clearing Process for Environmental and Social management
Section 9	Capacity Building and Training Requirements for Environmental and Social Management
Section 10	Consultations
Section 11	Disclosure Requirements
Section 12	Conclusion

In addition to the foregoing, attachments are provided on various themes.

## 2.0 ENVIRONMENTAL AND SOCIO-ECONOMIC BASELINE DATA

### 2.1 General overview of Nigeria

Nigeria is situated in West Africa lying between latitudes 4°00 N and 14°00N and longitudes 2°500 W and 14°45 E, bordered to its south by the Gulf of Guinea for about 850km, by the Republic of Benin to the West for 773km, Republic of Niger to its North for 1497km, Chad at its North Eastern Boundary (water boundary) for 87km and Cameroon to its East for 1,690km (see Figure 2.1).

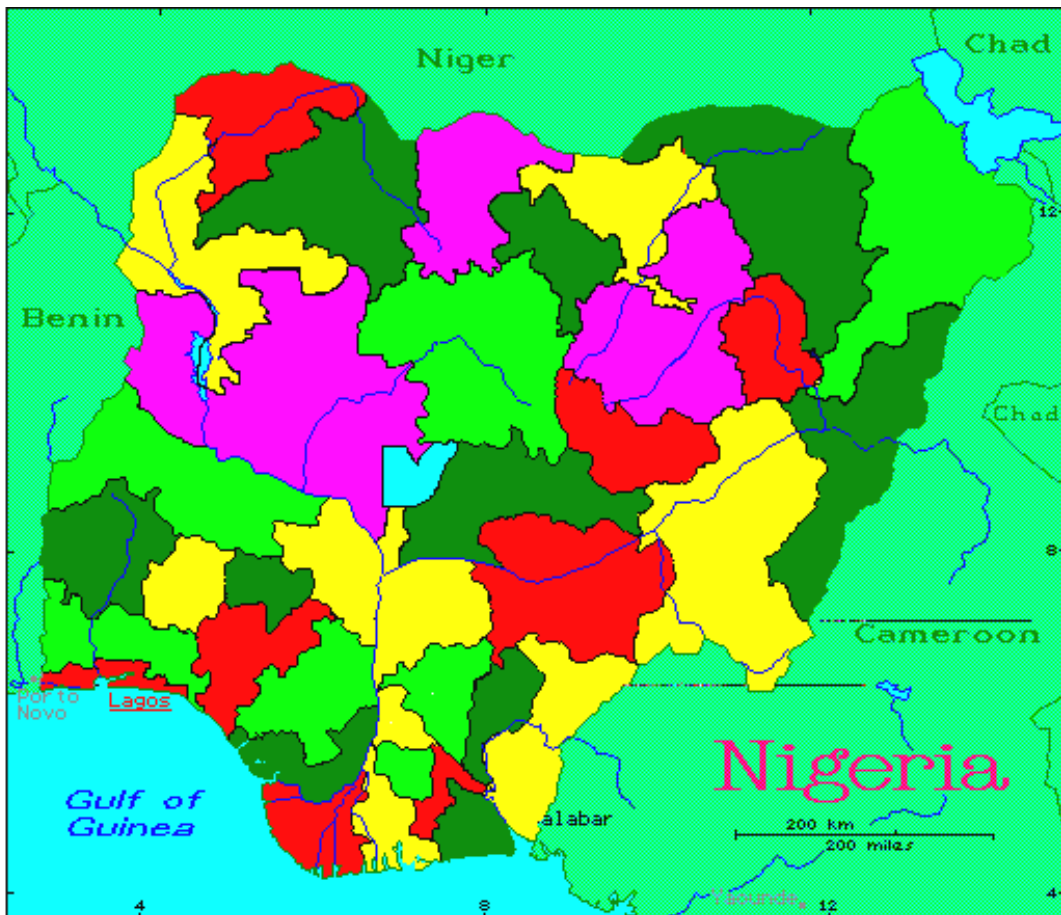


Figure 2.1: Administrative Map of Nigeria Showing State boundaries

Nigeria has a total area of 923,768km<sup>2</sup> of which the total land area is 913, 768km<sup>2</sup> and 10,000km<sup>2</sup> is water. Nigeria is blessed with abundant water resources estimated at 226 billion m<sup>3</sup> of surface water and about 40 billion m<sup>3</sup> of ground water.

The main characteristics of the biological, physical and socio-economic environment of the project area are summarized below.

### **2.1.1 Physical Environment**

#### *Climate*

Nigeria's climate varies from arid in the north, tropical in the centre and equatorial in the south. The climate is largely controlled by prevailing winds and nearness to the Atlantic Ocean. The two dominant air masses are the dry wind from the Sahara and the wet wind from the Atlantic Ocean. Marginal alterations have been recorded due to landform characteristics, configuration of surrounding shoreline and the generally flat topography of the country.

#### *Rainfall*

Rainfall is the single most important element for defining the climatic seasons in the tropics. Hence, Nigeria has two dominant seasons; the wet and the dry seasons. Rainfall throughout Nigeria depends on the interaction of the tropical maritime air mass and the tropical continental mass which meet along the inter-tropical convergence zone (ITCZ). The annual average rainfall around the country is between 1000mm and 3600mm (NIMET, 2012)

#### *Temperature*

Nigeria's climate is characterized by relatively high temperatures throughout the year. The average annual maximum varies from 35°C in the north to 31°C in the south; the average annual minimum from 23°C in the south to 18°C in the north. On the Jos plateau and the eastern highlands altitude makes for relatively lower temperatures, with the maximum no more than 28°C and the minimum sometimes as low as 14°C.

#### *Wind*

Two principal wind currents affect Nigeria. The south-westerlies dominate the rainy season of the year while north-easterlies dominate the dry season. Depending on the shifts in the pressure belts in the Gulf of Guinea, these winds are interspersed respectively by south-easterlies and north-westerlies in different parts of the year. The wetter winds prevail for more than 70% due to the strong influence of the breeze from the Atlantic Ocean.



Mean annual wind speed varies between 2 to 6 m/s. Speeds in dry season (November - March) are lower. In the wet season (April–October), daily average speed could rise to 15m/s. Values of up to 25 m/s are sometimes experienced due to inducement by convective rainfall activities and relative diffusion.

### *Ambient Air Quality*

Generally, air quality in the area complies with regulatory standards, although, slight variations are noticed in major industrial cities like Lagos, Ibadan, Aba, Kano, Port Harcourt and Kaduna. The Federal Ministry of Environment (FMEnv) has developed standards for ambient air quality. These standards are presented side-by-side with that of the World Bank, 1999, in Table 2.1 below.

**Table 2.1: Ambient Air Quality Standards**

Contaminant	Concentrations (ppm)	
	FMEnv (1999)	World Bank (1999)
CO	10	
NOx	0.04 – 0.06	0.08
SO2	0.01	
PM10	73.8	80hg/m3
TSP	250hg/m3	80hg/m3

### *Geology*

Nigeria lies on the southern portion of the West African Craton. The geological setting comprises broadly crystalline basement complex rocks and sedimentary formations. They occur in equal proportions around the country. The former are highly mineralized and give rise to soils of high nutrient status, although variable from place to place. The latter are found in the south-east, north-east and north-west of the country, and give rise to sandy and less variable soils that are deficient in plant nutrient.

### *Topography*

Nigeria has varying landforms and much of the country is dominated by plains, generally less than 610m above sea level. The eastern border with the Republic of Cameroun is lined by an almost continuous range of mountains which rise to about 2,419m at Chappal Waddi, the highest known point in Nigeria.

In the North, the Jos Plateau rises abruptly from a general level of about 609.5m in the Hausa Plains to an average level of some 1,219m but reaches 1,781.6m in Shere Hills. The area west of the River Niger is dominated by the plain, which rises gently from the coast northwards to the area of crystalline rocks where inselbergs rise abruptly above the surrounding plains. The Idanre Hills, the highest point of these inselbergs, rises to about 981m above sea level.

In general, the land surface of the country could be classified into three broad physical units or major relief features namely: the plains; the highlands; the troughs and the river valleys.

### *Soils Characteristics*

The broad pattern of soil distribution in the country reflects both the climatic conditions and the geological structure; heavily leached, reddish-brown, sandy soils are found in the south, and light or moderately leached, yellowish-brown, sandy soils in the north. The difference in color relates to the extent of leaching the soil has undergone. Nigeria soils are highly weathered and are characterized by light texture, low pH, low organic matter, low potassium levels, variable phosphorous levels with clay contents ranging between 7%-43%.

### *Surface and Ground Water Hydrology*

Nigeria has two major rivers, the Niger and the Benue, which traverse the northwest and northeast portion of the country, then merge at Lokoja before draining down to the Atlantic. There are several other rivers and quite a number of minor streams and rivulets that crisscross the entire Nigerian land mass. These include the Ogun, Oshun, Imo, Cross, Osse, Nun and the Anambra rivers in the south and the Kaduna, the Gongola, and the Hadeija rivers in the North.

Generally the water quality in the rivers of Nigeria is very good. The average electrical conductivity in the main rivers ranges between 48-65 Umhos/cm<sup>2</sup> and the total dissolved solids (TDS) concentration is about 100mg/l. The pH is less than 6.5, although higher values were reported in swamps and floodplains with levels of 100-150 Umhos/cm<sup>2</sup>. These rivers are also low in nutrients, with an average nitrogen content of 0.32mg/l and a total phosphorous content of 0.1 mg/l. The data indicate water of high quality according to FMEnv limits.

## **2.1.2 Biological Environment**

### *Fauna*

Animals found in both forest and savannas include leopards, golden cats, monkeys, gorillas, and wild pigs. However, persistent hunting, and destruction of habitats due to agricultural activities and other human development efforts have decimated wildlife populations, to the extent that quite a number of them are threatened and/or outrightly endangered. Today, many of these animals can be found only in protected places such as the Yankari Park, Gashaka Gumti Park, and Cross River Park.

Rodents such as the squirrel, porcupine, and cane rat constitute the largest family of mammals, and are fairly ubiquitous around Nigeria. The northern savannah abounds in guinea fowl and francolins (bush fowls). Other common birds include quail, vultures, kites, bustards, and gray parrots. The rivers contain crocodiles, hippopotamuses, and a great variety of marine life.

In the rain forest, few large animals notably gorillas, chimpanzees, baboons and monkeys are present. Crocodiles, lizards, and snakes of many species are also present. Hippopotamuses, elephants, giraffes, leopards, and lions now remain only in scattered localities and in diminishing number. Wildcats, however, are more common and widely distributed. Wildlife in the savanna includes antelope, lions, leopards, gazelles, and desert hyenas. Nigeria also abounds in bird life with a great number of species being represented.

### *Flora*

Vegetation varies directly in relation to climate, soil, elevation, and human impact on the environment. In the low-lying coastal region, mangroves line the brackish lagoons and creeks, while swamp forest grows where the water is fresh. Farther inland, this vegetation gives way to tropical forest, with its many species of tropical hardwoods, including mahogany, iroko, and obeche.

North of the forest is the Guinea Savannah, a region of tall grasses and trees. The southern margin of the Guinea Savannah has been so altered by humans that it is also called the

derived savannah. Beyond the Guinea savannah lies the Sudan Savannah, a region of shorter grasses and more scattered, drought-resistant trees such as the baobab, tamarind, and acacia. In the northeastern corner of Nigeria, the very dry semi-desert Sahel Savannah persists.

## **2.2 Specific Information About the Project Locations**

### **2.2.1 Overview of Coverage of the Project Area**

As indicated earlier, a number of river basins are covered by the planned TRIMING Project. This subsection presents overview information about these basins.

#### **2.2.1.1 The Sokoto Rima Basin**

##### **Sokoto State**

Sokoto State is located in the extreme northwest of Nigeria, near to the confluence of the Sokoto River and the Rima River. Based on the 2006 national Census, the state has an estimated population of more than 4.5 million people. Sokoto City is the modern day capital of Sokoto State (and its predecessor, the Northwestern State).

The name Sokoto (which is the modern/anglicised version of the local name, Sakkwato) is of Arabic origin, representing suk, 'market'. It is also known as Sakkwato, Birnin Shaihu da Bello or "Sokoto, Capital of Shaihu and Bello"). Being the seat of the former Sokoto Caliphate, the city is predominantly Muslim and an important seat of Islamic learning in Nigeria. The Sultan who heads the caliphate is effectively the spiritual leader of Nigerian Muslims.

##### **Climate and Agriculture**

Sokoto State and the catchment area of the Sokoto/Rima basin is in the dry Sahel, surrounded by sandy savannah and isolated hills. With an annual average temperature of 28.3 °C (82.9 °F), the area is, on the whole, a very hot area. However, maximum daytime temperatures are for most of the year generally under 40 °C (104.0 °F) and the dryness makes the heat bearable. The warmest months are February to April when daytime temperatures can exceed 45 °C (113.0 °F). The rainy season is from June to October during which showers are a daily occurrence. The showers rarely last long and are a far cry from the regular torrential rain

known in wet tropical regions. From late October to February, during the *cold season*, the climate is dominated by the Harmattan wind blowing Sahara dust over the land. The dust dims the sunlight thereby lowering temperatures significantly and also leading to the inconvenience of dust everywhere in houses.

The region's lifeline for growing crops is the floodplains of the Sokoto-Rima river system, which are covered with rich alluvial soil. For the rest, the general dryness of the region allows for few crops, millet perhaps being the most abundant, complemented by rice, corn, other cereals and beans. Apart from tomatoes, few vegetables grow in the region. The low variety of foodstuffs available has resulted in the relatively dull local cuisine.

### **The Sokoto River**

The **Sokoto River** (formerly known as Gublin Kebbi) is a river in north-west Nigeria and a tributary of the River Niger. The river's source is near Funtua in the south of Katsina State, some 275 km in straight line from Sokoto. It flows north-west passing Gusau in Zamfara State, where the Gusau Dam forms a reservoir that supplies the city with water. Further downstream the river enters Sokoto State where it passes by Sokoto and is joined by the Rima River, then turning south and flowing through Birnin Kebbi in Kebbi State. About 120 kilometers south of Birnin Kebbi, it reaches its confluence with the Niger River.

The plains around the river are widely cultivated and the river used as a source of irrigation. The river is also an important means of transport. The Bakolori Dam, about 100 km upstream from Sokoto, is a major reservoir on the Sokoto River. It has had significant impact on downstream floodplain cultivation. Figure 2.2 shows the drainage map of the Sokoto River.



Figure 2.2: Drainage map of the Sokoto Rima Basin

### **Socio-economics of the Sokoto-Rima Area**

The socioeconomic characteristics of the Sokoto-Rima River Basin were based on the findings documented in the Sokoto-Rima Pre-feasibility Report (FMWR/WB/IR/QCBS/12/1) and the information gathered on the stakeholder's perspective and response during the 5days stakeholders consultation carried out on 19<sup>th</sup> – 24<sup>th</sup> January, 2014.

### **Population and Demographic Characteristics**

The Sokoto-Rima River Basin population and demographic characteristics in Bakolori and Zobe irrigation project areas, based on the Nigerian Population Commission (NPC) census of 2006, is as shown in Table 2.2. Three LGAs each, geographically located within the Bakolori and Zobe irrigation project areas were selected for the description of the demography of the area. According to USAID (2006), the population density in the north western region of Nigeria where Bakalori and Zobe Irrigation Projects are located is 213 persons per square kilometres

and the annual growth rate of the population is estimated at 2.09%. The average household size is estimated at ten in Bakalori area and six in Zobe area (Enplan 2013).

**Table 2.2: Population in three LGAs of Bakalori and Zobe Irrigation Project Areas**

Irrigation Project Area	LGA	State	Population		Total
			Male	Female	
Bakolori	Bakura	Zamfara	92,864	94,041	186,905
	Maradun	Zamfara	106,599	104,253	210,852
	Talata Mafara	Zamfara	108,412	106,766	215,178
Zobe	Dan Musa	Katsina	58,527	55,164	113,691
	Dutsin-Ma	Katsina	89,227	80,444	169,671
	Safana	Katsina	94,400	89,379	183,779

Source: National Population Commission (NPC) Census 2006.

### **Socio-economic Characteristics**

#### *Household Livelihoods, Income and Assets*

- **Bakolori**

In the pre-feasibility socio-economic assessment was conducted in September 2013 by Enplan 11 villages in the Bakolori project area were visited covering the three selected Local Government Areas consisting of: Bakura LGA, Maradun LGA and Talata Mafara respectively. The villages covered during the field survey included Dankaiwa, Tungamare, Rini, Birini Tudu, Yarkofoji, Madochi, Dankadou, Jankarawa, Ware, Yaardal, and Gora. As documented in Enplan 2013:

#### *Household Livelihood:*

- Farming and agricultural practices is the major livelihood and source of employment for the resident communities in Bakolori;
- 98% of the population are engaged in different types of arable farming with secondary income also made from livestock (cattle, sheep and goat) rearing;
- Other secondary sources of income generation include fish farming, petty trading, shop keeping; some of the people are employee of the Local Governments while few artisans were also observed among the resident communities of Bakolori.

***Housing Characteristics:***

- 56% of households live in a mud house with a steel roof
- 19% live in cement brick house with steel roofs.
- 11% live in mud houses with thatched roofs.
- Vast majority of farmers either own (55%) or have inherited (40%) their houses.

***Assets:***

- The most common household and farm assets include bicycle (38%), motorcycle (47%), radio (41%), mobile phone (33%), stores (40%), water pumps (21%) and tube wells (19%).

***Farmland Ownership and Income Generation:***

- Sixty-five percent of households manage farms of less than 6.0 ha of which 29% were inherited, 47% purchased and 23% rented.
- The majority of farmland is upland and 56% of farmers manage less than 2 ha of fadama land.
- Many farmers operate land both within and outside the project area.
- 65% of farmers have over 15 years of experience and
- 45% made an average annual profit of over N 200,000 from farming.
- The main sources of income were crop sales (73%) and livestock sales (14%) while off-farm sources (e.g. wages, pensions and remittances) accounted for 13%.

- **Middle-Rima**

The pre-feasibility socio-economic assessment conducted in September 2013 by Enplan also visited 10 villages in the Zobe project area covering the three selected LGAs consisting of: Dutsin-Ma LGA, Safana LGA and Dan Musa LGA respectively. The villages covered during the field survey included: Wabi, Garki, Kunamawa, Ganuwa, Dongoruwa Dankwanbo, Kurechi Fulani, Kurechi Gieye, Dongoruwa, Baturkai and Shakafito. The housing characteristics, livelihood and assets observed in Zobe project area is as follows:



*Household Livelihood and Income generation:*

- 86% of households are engaged in arable farming with livestock rearing providing a secondary income (mainly cattle, sheep and goats).
- 89% of households live in mud houses with thatched roofs and
- Only 7% live in houses with a steel roof
- The majority of the farmers either own (65%) or have inherited (27%) their houses.
- The most common household and farm assets include bicycle (58%), motorcycle (32%), radio (70%), mobile phone (24%), stores, water pumps and tube wells.
- Sixty-five percent of farmers in Zobe managed farms of less than 4.0 ha of which 65% were purchased, 27% inherited and 2% rented.
- 87% of farmers have over 20 years of farming experience, and 55% made an average annual profit of less than N 50,000 with only 20% of farmers obtaining an average annual profit of more than N 200,000.
- The main sources of income were crop sales (77%) and livestock sales (17%) while off-farm sources accounted for 6% of total income

*Education, Health and Water Supply*

- **Bakolori**

*Education:*

- Literacy is very low (about 10% of the population are literate) and school attendance is poor;
- There are two systems of education: (i) western type government education and (ii) a traditional Koranic system;
- Most children attend Koranic schools while a few attend the government primary and secondary schools;
- Bakura LGA has 73 primary schools, 17 secondary schools and a tertiary institution (agricultural college);
- Maradun LGA has 46 primary schools, 5 post-primary schools and no tertiary institution;
- Talata Mafara LGA has 32 primary schools and 8 secondary schools as well as a polytechnic;

*Public Health and Health Care Facilities:*

- There is a general hospital located in each of the 3 LGA headquarters as well as primary health care centres in some of villages;
- The health problems include malaria, TB and diarrhoea but there have been no serious cases of water borne diseases reported in recent time;
- It is also estimated that 62% of children have received immunisation;

*Mode of Water Supply and Status of Environment Sanitation:*

- Most of the villages in the Bakolori project area have access to wells and boreholes;
- Environmental sanitation in all the villages is very poor;
- Most of the villages have blocked drains and are littered with waste.

*Roads Electricity and Communications*

**Roads and their Present Condition:**

- Road type prevalent in Sokoto-Rima River Basin consists of: access roads, service roads and field tracts.
- In Bakolori the access roads are along the supply and main canals with the greater part surface dressed and are generally in good condition.
- The service roads that run along the secondary canals are laterite graded some time ago and are now full of pot holes and require rehabilitation.
- The tracks that run along the channels are in poor condition due to lack of maintenance;
- The project roads within the schemes and access to and from the schemes are in bad conditions and have direct effect on the farmers through high cost of transportation of agro-inputs into the farm to aid production and in the evacuation of farm produce to markets.

*Electricity and Telecommunication:*

- Most of the villages are connected to the national grid and have electricity supply.
- The mobile telecommunication system is provided by MTN, GLO and Airtel and covers about 80% of the project area.

*Poverty and Gender issues*

- Men are dominant in all farming and trading activities and about 80% of land is allotted to men.
- All the field activities are carried out by males while females are mostly engaged in processing of farm produce and other domestic duties attributed to the religious and cultural beliefs of the resident communities;
- Women's education is not given priority and female literacy rate is very low.
- Women are mainly confined to the family compound and have no significant input into the household decision making process.
- In general women are restricted to domestic work, child rearing and winnowing (during harvesting).

*Disputes and Conflicts*

- Disputes and conflicts are resolved through family, community and the local authority's efforts as well as by the native courts.
- Land disputes often arise when farmers take over land from absentee land holders and the original land holder returns to claim back their land.
- Disputes between pastoralists and farmers are common especially during the dry season when pastoralists travel southwards in search of green pastures.
- In Bakolori a standing committee comprising local chiefs, RBDA officials, LGA officials and the police intervene in disputes thus the number of conflict incidence has greatly reduced.

*Land Tenure*

Land ownership has been observed as a major constraint to the viability of irrigation schemes in Nigeria. According to Enplan (2004), the Review of the Public Irrigation Sector in Nigeria (ROPISIN) revealed that in some cases land ownership issue contributed to the failure of some of the irrigation schemes in Nigeria. The land tenure practices across river basins in Nigeria are complex and vary from scheme to scheme and zone to zone. Significant variation in land tenure practices was observed even among neighbouring villages.

***Land Tenure Types in Northern Nigeria***

- There are different types of land tenure in Northern Nigeria Enplan (2013). Research work of Mortimore and Wilson (1965) around Kano, Hill (1972) in Batagarawa near Dutsin-ma in Katsina State and Goddard (1972) within the Sokoto and Zamfara axis appear to have a number of common tenure types which include: individual rights to ownership such as inheritance, purchase, hire, lease, pledge, gift and share cropping.
- The distinctions between some of these tenancy rights such as hire, loan and lease tenancy rights are not easy delineate;
- The implicit boundaries between these tenancy rights create problem for precise understanding of the prevalence of one particular type over another, thus resulting in a social problem and constraint in the proposed TRIMING project;.
- A proper understanding of the existing land tenure types in practice in the selected River Basins is highly essential for any meaningful transformation of agriculture in Nigeria in general, and at both the Bakolori and Zobe irrigation projects in North-western Nigeria in particular.
- Land tenure challenges has been asserted as one of the numerous reasons why irrigation schemes in Nigeria have not been able to bring about any significant increase in food security and sustainable development in communities within which they are located (Iliya, (1981).
- Customary Right of Occupancy: The power to grant the customary right of occupancy is vested in the Local Government chairman who deals with rural land issues and requires the State Government consent to give a CRO for an irrigation scheme (Agricultural Land) that is more than 500 hectares.(Enplan, 2004)
- All agricultural land in Nigeria is held under the CRO, and apart from the reasons of good cause, a CRO cannot be withdrawn. The traditional system is rapidly changing to a private ownership of land.
- Acquisition of Land: The most common mode of land acquisition in Nigeria is through inheritance, followed by leasing or purchase in some areas and pledging in others. Acquisition through gift is less common, and even less common is acquisition through marriage or borrowing particularly in the agricultural sector. In a typical Nigerian setting, the right to inherit land is the major form of social security.

- The various Customary Right of Occupancy tenure systems in practice at both the Bakolori and Zobe irrigation project areas are highlighted hereafter as follows:

✚ **Inheritance (Gado):** This is farmland acquired after the death of a family head (father or mother). Available farmlands are shared among the heirs of the deceased: male or female, young or old, and irrespective of where they live. Inheritance is usually a family affair but it is usually associated with controversies that may be settled within the family by the village or community head and at the extreme by the court. Inheritance more often than not leads to farmland fragmentation beyond sizes that are economically viable;

✚ **Purchase (Saye):** This is farm plot becoming a marketable commodity involving a buyer and a seller usually or presumably in the presence of a witness. The laws of supply and demand and invariably the quality of the land on sale, determines the price. Under most customary land tenure systems, land sales or purchase are not allowed as the farmer only has a usufructary right. Any time he or she ceases to use the land it reverts back to the community's pool and is available to anyone interested. The 1979 Land Use Act does not allow a farmer to forfeit his right of occupancy without the consent of the local government authority. However, the extent to which this is adhered to leaves a lot to be desired. Land sales are common features and appear to be on the increase.

✚ **Pledge (jinga):** This refers to land given out in exchange of money. The right to use the land is therefore temporarily defined by the money lender. Pledges could be for a season where farming is possible both during the dry and wet season but once if farming is once in a year. However, where the debtor is not able to redeem his pledge, the creditor will continue to use the land until he or she pays. Most farmers pledge rather than sell their land. Pledging procedures like sale are witnessed by a third party - the community or religious head in most cases.

✚ **Hire (Haya):** This like pledge refers to exchange of money for land but on a much shorter duration not exceeding a season. While a pledge is usually initiated by the

owner of the land, it is the person interested in the farm land that first makes the offer. The amount to be paid to the farmer is usually arrived at after some bargaining, unlike the case with pledge. Where the farmer asks for a specific amount and if the creditor agrees he transfers the right of use on receipt of the agreed amount.

✚ **Lease (Aro):** This is similar to hire as it involves the exchange of a sum of money for the use of a piece of land. Leases are more often than not for only one cropping season and are initiated by the person interested in the farmland.

✚ **Loan (Aro):** This is in most cases is similar to lease except that no money is paid when farmland is on loan. Loan transactions are more often than not contracted between acquaintances – husband and wife, father and his children, relations and friends. A traditional ruler can loan out his farm in anticipation of a favour either in the short or long term. Farms are loaned out usually when a farmer has more than he or she can use in a particular season or seasons and instead of leaving it idle he or she gives the farm out to somebody interested at no cost.

✚ **Gift (Kyauta):** Under this arrangement a farmer gives away a piece of land to a member of his family - son or daughter or any of his relations or friends at no cost. He or she forfeits his or her right of occupancy over the said land. Due to the intricacies usually associated with females' inheritance, gift to wives and daughters are very common amongst Hausa – Fulani. Once a piece of land is given out as a gift, no court of law can challenge it even after the death of the person that gave it out as it ceases to be part of inheritance. This is why gift are usually contracted in the presence of possible contenders and more often than not it is written and signed.

✚ **Share Cropping (Noma mu raba):** Under this arrangement one or more farmers can come together and cultivate a piece of land and later share the produce. The agreement could be between a poor farmer who owns the land but lacks the resources to invest on inputs and labour or a well-to-do who owns the land but

cannot easily access labour or to guard the produce from theft by the local community. In the later, she or he can go into share cropping with people in close proximity to the farm who provide the required labour and keep vigil over the farm. The sharing formula is usually agreed at the initial stage of the deal.

- **RBDA Land Tenure Arrangement:** Land tenure arrangement in the public irrigation sector vary from one RBDA to another but generally, two distinct land tenure systems observed prevalent at RBDA level are: Farmer Occupier and User Allocation System respectively. They are both a form of Statutory Right of Occupancy (Enplan, 2004);
- **Statutory Right of Occupancy:** This is a form of user allocation, farmer owner occupation and confiscated land best referred to as Statutory Rights of Occupancy (SRO). Statutory Right of Occupancy are mostly associated with development project such as irrigation farming, resettlement schemes, industrial outlays, construction of roads, schools, hospitals and recreational centres among others.
- ✚ **User Allocation:** This refers to state-owned land which is made available to a farmer based on an application for permission to use the said land. A certain amount is paid and the applicant is given permission to use the said land for a specified period, a year or a season. At the Bakolori Irrigation Project, the Sokoto Rima River Basin Development Authority (SRRBDA) on behalf of the Federal Government of Nigeria (FGN) allocates blocks of irrigable plots or blocks to interested farmers usually on seasonal or annual basis (Enplan 2004:16). This tenancy arrangement is on usufructuary basis and therefore does not confer any ownership right on the tenant. It may appear surprising that this tenancy arrangement operates in the Bakolori Irrigation Project that is supposed to be wholly farmer occupied. Field data reveals that many well-to-do farmers who were not the original owners of any land have been allocated land in what the Management of the Bakolori Irrigation Project (BIP) designate as Government Reserved Area.

- ✚ **Farmer Occupier:** SRRBDA on behalf of Federal Government of Nigeria (FGN) reallocates or returns to the original farmer his or her land after development about five percentage for the provision of basic infrastructure and services (Enplan 2004:15). Under the farmer occupier system, the farmer does not pay for any cost incurred when the land was developed but pays for a token of 5000 Naira per annum for the use of water. The farmer-occupier system is preferred because it guarantees farmers' investment in the land by keeping the soil productive through effective nutrient improvement and encourages operation and maintenance of the scheme's irrigation infrastructure. The Farmer Occupier land tenure system is practiced in Sokoto-Rima River Basin and Hadejia Jama'Are River Basin while User Allocation is the land tenure system in Upper Benue River Basin.

➤ **Women's Access to Farm Land**

- ✚ Within the Command Area women's access to grazing land, source of fuel wood and fishing sites which they enjoyed before the canalisation of the areas is no longer possible.
- ✚ There are no designated grazing areas and places they could easily go to source for fuel wood. The closest grazing area is within the Jankarawa area. Most others areas are over ten kilometres away from their household.

*Land Fragmentation (Enplan, 2013)*

- ✚ The prevalence of small farm sizes in Nigeria in general and the northwest region in particular are due to inheritance, where in the event the head of the family dies, all his possessions and farmland are shared among his heirs.
- ✚ Land fragmentation is on the increase as a result of some household heads have not been able to cultivate their land due to limited resources to pay for labour and acquire basic farm inputs.
- ✚ Household heads inability to meet a number of social and economic responsibilities such as marriage ceremonies, payment of children school fees and settling of medical bills force them either to sell, lease/hire portions of their farmland thus increasing the incidence of farm land fragmentation.



- ✚ Land fragmentation is also practiced outside the Command Area especially in the Jankarawa area. A total of 62.3% of farm plot owned fall within the less than 5.0 and 6-10 hectares farm holdings.
- ✚ The incidence of fragmentation in the Jankarawa area is less compared to the Command Area by almost 10%. This is possibly due to farmer expectations that the area would be developed in the future and that the more they hold onto big plots the more they would be paid as compensation or the more land they would be allocated in the future.

*Land Tenure Concerns or Constraints:*

- ✚ Government's past involvement in land acquisition, demarcation and allocation to potential farmer occupier and user allocation applicants has been filled with difficulties. Some communities refused to give up their land and compensation disputes often arise;
- ✚ Difficulties do often arise with re-distribution after the land has been developed. The original owners become tenants or landless as powerful outside interests are allocated large tracts of farm plots which they develop to a medium to large scale farmland as absentee farmers. This do create some degree of resentment and mistrust at some irrigation schemes where the user allocation system is practiced;
- ✚ The user allocation system does not encourage the development of the irrigable lands when the allocation is done on seasonal basis. The farmers show little commitment of the land and the irrigation infrastructure under this arrangement. The farmer is only interested in maximizing his farm produce without any investment in the soil fertility for they are not sure of access to the land the following planting season. There is not guarantee of access to the same plot of land which they have developed the previous season. Thus the user allocation system often leads to the abandonment of the irrigation project site when the condition is unfavourable to potential users.
- ✚ WUAs in irrigation schemes that practice user allocation land ownership arrangement are the weakest in development. In that arrangement, all users are tenants rather than holders of land such as was observed in: Tomas irrigation scheme, Kano State and Wurno Irrigation Project in Sokoto State. The user

allocation land tenure system engender insecurity of tenure, gives little incentive to investment in agricultural land development (such as investment in fertilizer application or growing nitrogen-fixing crops). The fact that a farmer does not have the guarantee that after the expenditure of time, labour and financial resources on farming and maintenance of irrigation canals, he will have to use the farmland and the maintained canal next season. This situation invariably does not encourage or motivate farmers to join the WUAs (En)plan 2004;

### ***Farmers' Organization and WUAs***

- ✚ Farmers are organized into some form of cooperatives or groups in the three selected River Basins.
- ✚ The formation of Water Users Association is encouraged by government to mobilize farmer group resources through farmer participation to achieve greater effectiveness and efficiency and higher productivity in the irrigation rehabilitation and expansion project/schemes;
- ✚ The partial withdrawal of RBDAs from aspects of irrigation scheme management requires WUAs to take-over the responsibility of scheme management which they are ill-prepared for and thus the need for capacity building for the formation of effective WUAs has to be initiated;
- ✚ The Federal Government of Nigeria need to put in place supportive policy and legal framework that would enable the WUAs to carry out their functions effectively after donor withdrawal;
- ✚ The formation of Water Users Associations (WUAs) is highly supported and encouraged in the three selected River Basins; At Bakolori Irrigation Project, a total of 88 intake and Unit WUAs have been registered under section 5 of the Nigerian Cooperative Societies Act and Regulations No 90 of 1993 with Zamfara State Ministry of Commerce, Industry and Cooperatives;
- ✚ At Zobe 35 WUAs and cooperatives societies were registered Bakolori Irrigation Project, a total of 88 intake and Unit WUAs have been registered under section 5 of the Nigerian Cooperative Societies Act and Regulations No 90 of 1993 (Enplan 2013);

### ***ESMF for Proposed TRIMING Project – Final***

- ✚ A federated WUA which is an umbrella association has also been registered with the Corporate Affairs Commission.
- ✚ Membership of WUAs is restricted to those who own land in the command areas or those who are landholders in the command area. The WUA members do not include fishermen or livestock herders, but they hope to include these users in due course;
- ✚ Most farmers are members of the WUA. A membership entry fee of NGN20 is charged to join the association this is followed by monthly fees of NGN50.
- ✚ Women are not owners of land and thus do not qualify as members of WUAs although the presence of at least five female membership has been observed in few WUAs in Bakolori (Enplan 2013).

### ***Access to Credit***

- ✚ Farmers of the various RBDAs lack sufficient funds to carry out farm operations hence, there is a great limitation to the extent they can expand their scope of operation. Generally, farmers' sources of funds are from personal savings or loans from friends and family.
- ✚ In river basins where there are farmers groups, credit is available through such cooperative organisations but at very high interest rates which invariably discourages farmers (Enplan 2004).
- ✚ Official sources of credit facilities to farmers include some Commercial Banks and nearly all the Community Banks operating under the Agricultural Credit Guarantee schemes of the Central Bank of Nigeria (CBN) as well as the Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB).
- ✚ To access the banks' loan facility, prospective farmers, individuals or groups would have to open and operate accounts committed with the banks which they rarely do because of the cumbersome procedures involved in securing the loans.

*Marketing*

*Crop Sales, Storage and Processing*

- ✚ Crop production is mainly carried out for subsistence purposes but a significant quantity of produce is sold particularly in the Bakolori project area.
- ✚ Majority of the farmers sell their produce immediately after harvest at very low prices resulting from the market glut created thereby;
- ✚ Storage is very poor because of the acute lack of modern storage facilities either on the farm or in the village markets.
- ✚ The common storage facility available is the rhombus (traditional, mud constructed stores) while the majority of the markets only have basic open sheds which have many limitations in terms of security, pest infestation and produce deterioration.
- ✚ The vast majority of farmers who sell produce store quantities ranging from 40kg to 200kg for a period of up to 30 days. Cereals (i.e. rice, maize, sorghum and millet) are the main crops sold in the project areas but other crops such as cowpea, cassava, potato, sugarcane and vegetables are also marketed.
- ✚ Processing activities, which add value to crop production, are very limited in the project areas. The most common processing facility is small, village mills (driven by a petrol engine) which are used for the de-husking of rice and the milling of crops, such as maize, sorghum and millet, into flour mainly for family consumption.
- ✚ Groundnuts are milled into pulp for further processing into groundnut oil and groundnut cake.
- ✚ About 95% of the farmers do not possess any processing unit and so over 90% sell their crops in an unprocessed form. The value and quality of the produce is restricted which, in turn, reduces revenue from crop production.

*Local Markets and Marketing Channels (Enplsn 2013)*

- ✚ The major markets for the Bakolori project are located in Talata Mafara and Bakura. These markets operate weekly on Tuesdays and Fridays respectively.
- ✚ There is also a daily market in Talata Mafara which deals mainly in agricultural commodities. The main means of transport to the markets are open trucks, cycles, donkeys and camels.

- ✚ The majority of market traders are retailers and receive their supplies of agricultural commodities from farmers while 25% of them received supplies from wholesalers.
- ✚ About 57% of the traders sell their supplies to consumers while 9% sell their commodities to the all market participants.
- ✚ The majority of the traders (about 60%) transport their produce for a distance of more than 3 km while about 7% transported for a distance of not more than 1km. These markets have become centres for agricultural marketing attracting buyers from various states in Nigeria and neighbouring countries on the major market days.

### *Marketing Constraints*

- ✚ Poor post-harvest handling, transport and storage deteriorates the quality of agricultural produce and result in a high proportion of wastage.
- ✚ Farmers are often forced to sell produce immediately after harvest when there is a surplus in the market. These factors result in low produce prices and consequently poor returns to crop production which, in turn, leads to reduced input use and lower crop productivity. This is one of the key concerns of farmers in the Bakolori project area.
- ✚ Lack of processing facilities is a major constraint to both market retailers and wholesalers.
- ✚ Poor storage facilities, non-standard units of measurement, inadequate credit facilities and transport problems are constraints to retailers,
- ✚ Poor storage and inadequate credit facilities are the major marketing problems confronting wholesalers.

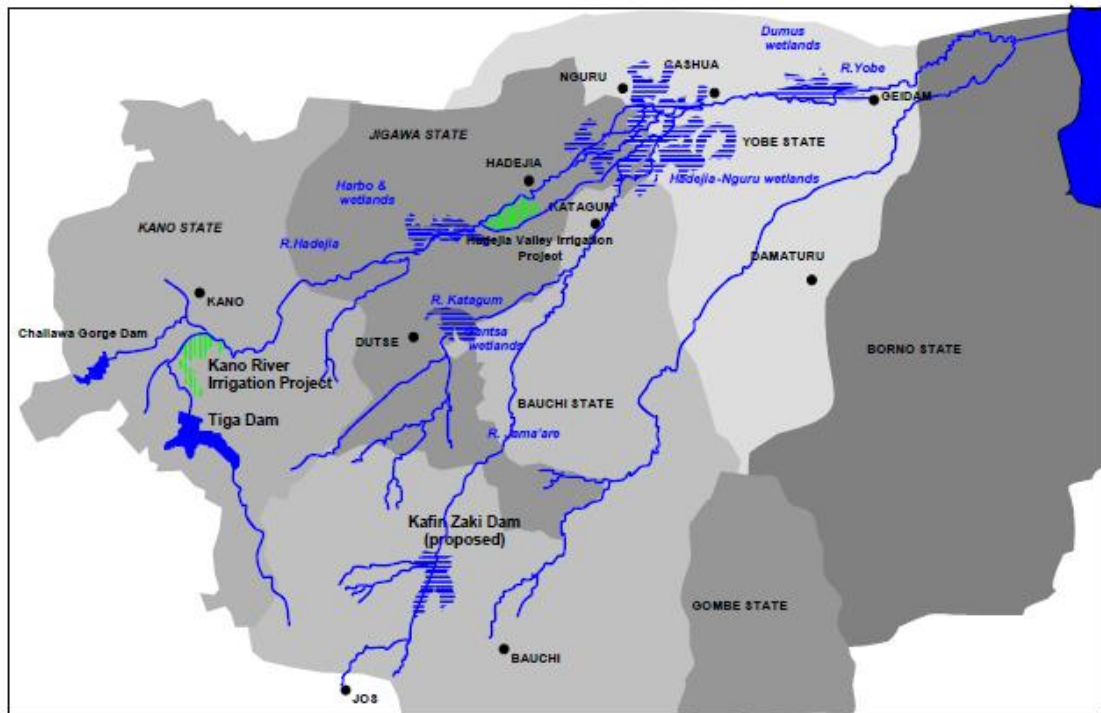
#### **2.2.1.2 Hadejia Jamaare basin with Kano River and Hadejia Valley irrigation schemes**

The Hadejia-Jama'are Komadugu-Yobe Basin (HJKYB) drains a catchment of approximately 84,000 km<sup>2</sup> in northeast Nigeria (Figure 2.3) before discharging into Lake Chad. Politically, it covers five northern states, (Kano, Jigawa, Bauchi, Yobe and Borno). Over 15 million people are supported by the basin through agriculture, fishing, livestock keeping and water supply. The two major rivers of the basin are the Hadejia and the Jama'are, which meet in the Hadejia-Nguru Wetlands (HNWs) to form the Yobe. The Hadejia river rises from the Kano highlands while the head-waters of the Jama'are river are in the Jos plateau. Within the Hadejia river

system the natural pattern of runoff has been modified by the construction of dams and associated large-scale irrigation schemes, most notably Tiga and Challawa dams.

The Hadejia-Nguru wetlands are on the List of Ramsar wetlands of international importance. Nguru Lake and the Marma Channel complex (58,100 ha) are designated a Ramsar Site. The wetlands are important for waterbirds, both for breeding species and for wintering and passage Palearctic waterbirds. The estimated waterbird population varies between 200,000 and 325,000. 377 bird species have been seen in the wetlands, including occasional sightings of the near-threatened Pallid Harrier and Great Snipe species.

The area supports about 1.5 million farmers, herders and fishermen. The wetlands support wet-season rice farming, flood-recession agriculture and dry-season farming using irrigation. Crops include peppers and wheat. The wetlands support fishermen, who often also farm, and provide fuel wood and leaves used for making mats and ropes. The lands are also grazed by Fulani cattle.



**Figure 2.3: The Hydrology of the Hadejia-Jama'are Basin**

## **Socio-economics**

- Hadejia Jama'Are River Basin (HJRB) has land mass that extends over an area of 45,000km<sup>2</sup> and cut across the whole of Kano and Jigawa States and about two-thirds of Bauchi State. The population of people in Hadejia Jama'Are River Basin is not less than 15million consisting of the population of people in Kano State (9,383,682), Jigawa State (4,348,549) and majority of the people in Bauchi State (4,676,465) respectively.
- Six major irrigation schemes exist within the HJRB established mainly to raise the standard of living of rural dwellers within the basins of the Hadejia and Jama'are Rivers through the development of irrigated agriculture. The six irrigation scheme identified in HJRB consisting of:
  - Kano River Irrigation Project I
  - Hadejia Valley Project
  - Jama'a are Valley Project
  - Katagum Valley Project
  - Galala Irrigation Project
  - Kano River Irrigation Project II
  - Irrigation System

### *Household Livelihood:*

- Farming and agricultural practices are the major livelihood and source of employment for the resident communities in close proximity to the Hadejia Valley Project;
- Other secondary sources of income generation include fish farming, petty trading, employment in RBDA, Civil Service and Local Government

**Marketing**

***Buying and Selling***

The HJRBDA opened up linkages between Agro-allied industries and farmers within the Hadejia Jama'Are River Basin. Farmers were encouraged by HJRBDA to individually organise their marketing outlet by themselves. Hence, the marketing of wheat to breweries and millers had encouraged increased production but the farmers compromise the quality of their produce causing the millers complaining of quality.

**Transportation**

The HJRBDA constructed 816 km service roads, to reach the various fields being serviced by the irrigation canals. Transportation is not an issue in the KRIP due to the network of service roads developed by the RBDA at inception. The fact that the project is situated on both sides of the Kano–Zaria road which is well connected to the service roads of the project. However, the perennial petroleum product distribution problem in Kano State creates transportation problems.

**Storage**

- HJRBDA does not play any role in the storage of products from the farms. The farmers store their products in rooms in their houses. But, often they sell to merchants who are then saddled with the storage responsibilities. There is need to educate the farmers on good storage techniques that will enable them to store properly and be able to sell at a better and higher price.

**Credit**

- HJRBDA does not get involved in the provision of credit to the farmers.
- Farmers, individually, organise their credit through commercial banks.
- Only few of the farmers could afford to take loans from commercial banks.
- The Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB) is supposed to come to the aid of the farmers but hitherto has shown no credit support to the farmers in the Hadejia Jama' Are river basin



- There is the need to educate the farmers on how to source loans from banks and also link the farmers to the banks. These are better achieved when the farmers are organised into virile groups, such as the WUAs. These groups should be empowered through training and linkages to relevant service providers such as commercial banks and NACRDB.

### **Income Generation**

The resident community members within the Hadejia Jama' Are river basin generate substantial income from sales of farm produce such as wheat nad millet to Agro-Allied Industries besides the sales of farm produce in the community markets operating on weekly or daily basis.

#### **2.2.1.3 Upper Benue Basin with Dadin Kowa Dam**

The **Benue Trough** is a major geological formation underlying a large part of Nigeria and extending about 1,000 km northeast from the Bight of Benin to Lake Chad. It is part of the broader Central African Rift System. The trough has its southern limit at the northern boundary of the Niger Delta, where it dips down and is overlaid with Tertiary and more recent sediments. It extends in a northeasterly direction to the Chad Basin, and is about 150 km wide. The trough is arbitrarily divided into lower, middle and upper regions, and the upper region is further divided into the Gongola and Yola arms. The Anambra basin in the west of the lower region is more recent than the rest of the trough, being formed during a later period of compression, but is considered part of the formation (Figure 2.4).



**Figure 2.4: The Central African Rift**

The **Gongola River** is in northeastern Nigeria, the principal tributary of the Benue River (Figure 2.5). The upper courses of the river, as well as most of its tributaries, are seasonal streams, but fill rapidly in August and September. The Gongola rises on the eastern slopes of the Jos Plateau and falls to the Gongola Basin, running northeasterly until Nafada. At one time, the Gongola continued from here in the northeast direction to Lake Chad. Today it turns south and then southeast until it joins the Hawal River, its main tributary. The Gongola then runs south to the Benue river, joining it opposite the town of Numan.

The lower reaches of the river are impounded by the Dadin Kowa Dam near Gombe, and lower down by the Kiri Dam. After the Kiri dam was constructed, downstream flood peaks dropped from 1,420 m<sup>3</sup>/second to 1,256 m<sup>3</sup>/second, while flows in dryer seasons increased from 5.7 m<sup>3</sup>/second to 21 m<sup>3</sup>/second. The river downstream from the dam also narrowed and become less winding, with fewer separate channels.

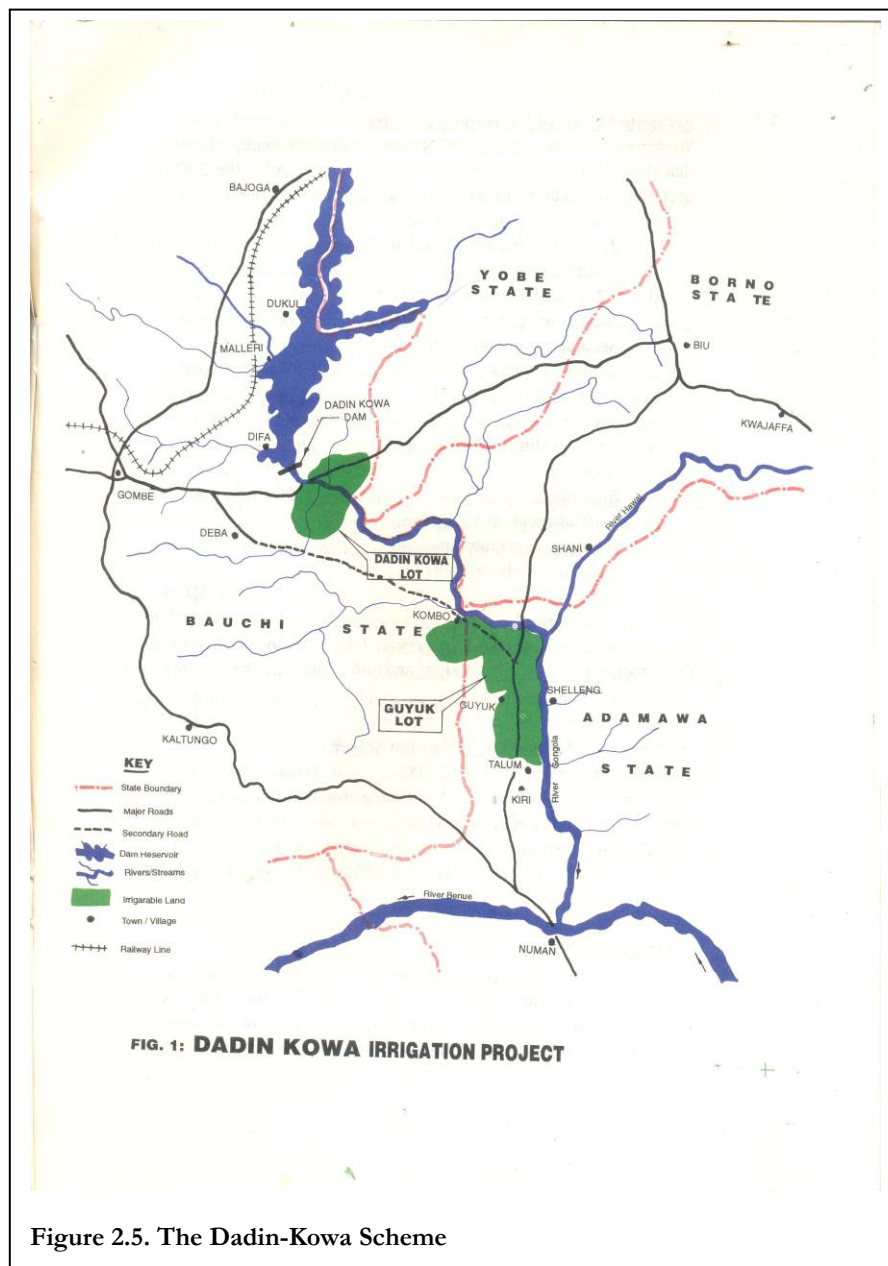


Figure 2.5. The Dadin-Kowa Scheme

The **Dadin Kowa Dam** is in Yamaltu local government area of Gombe State in the north east of Nigeria. The dam is located about 35 kilometers to the east of Gombe town, and provides drinking water for the town. The dam was completed by the federal government in 1984, with the goal of providing irrigation and electricity for the planned Gongola sugar plantation project. The reservoir has a capacity of 800 million cubic meters of water and a surface area of 300 square kilometers, and has potential as a source of fish. 26,000 people were displaced by the

reservoir, receiving little assistance for resettlement. The reservoir is suspected to be a major breeding site for black flies, which cause river blindness.

The water supply project was built at a cost of about N8.2billion by CGC Nigeria, a Chinese company, completed during the administration of Governor Mohammed Danjuma Goje. In 2010 it was providing about 30,000 cubic meters daily, treated at a plant three kilometers from the dam before being piped to storage reservoirs in Gombe while supplying communities along the road.

The **Kiri Dam** is in Guyuk local government area of Adamawa State in the north east of Nigeria, damming the Gongola River. It is a 1.2 km long, 20 m high zoned embankment with an internal clay blanket. The dam was mainly completed in 1982. The reservoir has a capacity of 615 million m<sup>3</sup>.

### **Socio-economics**

The Upper Benue River Basin's areas of coverage include the Adamawa, Taraba and Bauchi States. The schemes existing within the Upper Benue River Basin include:

- ✓ Lake Geriyo Irrigation Project;
- ✓ Dadin Kowa Irrigation Project;
- ✓ Cham Irrigation Project;
- ✓ Waya Irrigation Project and
- ✓ Lower Taraba Irrigation Project.

### **Credit**

- ✓ In the past the RBDA extended credit facilities to the farmers while the farmer provides only the labour.
- ✓ Agricultural machineries and support from the Upper Benue RBDA are no longer available to help farmers.
- ✓ The UBRBDA are not able to provide credit facilities to farmers again. In the past water charges, land lease charges and other credits extended to farmers were deducted after

they must have sold their products at harvest. The recovery rate is 100% as farmer could be sacked if they default.

- ✓ The only credit facility enjoyed by farmers is water pumps given out to farmers on loan basis.
- ✓ Interested and registered farmers of the RBDA apply with two guarantors with a deposit of N10,000. The major provider of credit facilities to farmers are the banks, but with stringent conditions.

## **Marketing**

### *Buying and Selling*

Farmers operate an open market system and sell at any market of their choice. There are no defined channels of marketing in the Upper Benue River Basin.

There is a standard measure of selling which is 100kg bags. The bag is not truly 100kg when used for the sale of paddy rice. The weight is most of the time between 80 – 85Kg. But the farmers and the buyers take it approximately to be 100kg. However, when used for maize the bag measure is 100kg. Other smaller standardized measures are available called “mudus”.

## **Transportation**

Transportation of goods to the markets is on fair network of roads. The service roads constructed by the RBDA are maintained periodically. The roads are mostly earth paved and require only periodic grading.

## **Storage**

Storage facilities are not available for farmers within the UBRB. The major commodity engaged in by the farmer is rice. The whole harvested rice is sold to merchants who mill the rice to sell or store it for some time before milling when it can command a higher price. The farmers thereby have no need for storage facilities.

**The RBDAs and Land Tenure:**

- ✚ Relevant section of the RBDA mandate that the RBDAs should “.... hand over all land to be cultivated on irrigation schemes to farmers”. The words “hand over” gives the impression that the RBDAs took over the land in the first instance, supposedly for the development of the irrigation scheme, and after the development the RBDAs are mandated by the establishing decree to hand back the land to farmers.
  
- ✚ All the RBDAs appropriate the lands for their schemes, pay compensation where necessary for crops, economic trees and buildings and after development, reallocate the land back to the owners less the proportion utilized for the provision of the scheme’s infrastructure, or hold-on ownership rights but lease out farm plots to interested farmers on a seasonal or annual basis.

## **3.0 TRIMING PROJECT DESCRIPTION**

### **3.1 Introduction**

The Federal Government of Nigeria (FGN) has requested World Bank assistance to prepare the Transforming Irrigation in Nigeria (TRIMING) Project. The proposed project seeks to improve performance of irrigated and water resources infrastructure and institutions for enhanced productivity in selected irrigation schemes.

### **3.2 The Proposed Project Components**

There are four (4) major components to the planned TRIMING project, each with sub-components. The key components are:

- Component 1: Water Resources Management and Dam Operation Improvement
- Component 2: Irrigation Development and Management
- Component 3: Enhancing Agricultural Productivity and Supply Chains
- Component 4: Institutional Development and Project Management

Detailed overview of these major components and the sub-components under each of these are described below.

#### **Component 1: Water Resources Management and Dam Operation Improvement**

This Component is part of the piloting support for the transformative water resources sector institutional reforms covering policies, enabling legislation, regulatory instruments and organizational restructuring currently being formulated for enactment by the FGN. It includes two subcomponents:

##### **Subcomponent 1.1: Support to Integrated Water Resources Management**

This subcomponent would support the piloting of anticipated provisions for separation of government regulatory and operational powers and responsibilities for integrated water resources management (IWRM) of river basin-wide water allocation, river flow control and channels maintenance needed for sustainable bulk water supply & drainage for large public irrigation scheme planning, development and operational management. Activity 1, 'Integrated

Basin Resources Planning and Monitoring Systems Improvement’, would support the following improvements: hydrological and meteorological data infrastructure in Hydrological Areas 1 and 8; meteorological network; hydrological monitoring; groundwater monitoring; institutional capability for sustainable water resources monitoring systems; and data archiving and access. Under Activity 2, ‘IWRM Bill/Act Implementation Support in Selected River Basins’, the project would support implementation actions in the following three basins: Sokoto-Rima Basin, Upper Benue Basin, and the Hadejia-Jama’are-Komadugu-Yobe Basin (HYKYB). Activity 3 would support investments in river channel works and maintenance in selected river basins.

### **Subcomponent 1.2: Dam Operations Improvement and Safety**

This includes two activities: (a) ensure the sustainable operational safety of large dams and ancillary headworks structures in selected RBDAs via remedial works, dam safety monitoring & assurance programs, adequate O&M funding, reservoir sedimentation surveys, a dam hydromet & inflow hydrology programme and publicly approved and practiced Emergency Preparedness and Action Plans (EAPs) for high spillway discharge & dam break contingencies. Dam operational improvement and safety management for selected dams and reservoirs include: Bakolori, Zobe, Goronyo, Tiga, Challawa Gorge, Ruwan Kanya operational reservoir, Hadejia Barrage and Dadin Kowa; and (b) strengthening of the FMWR Dams & Reservoir Operations Department’s capacity to ensure and guide the dam safety assurance of FMWR-owned dams operated by RBDAs and/or other entities. This support includes: (i) improving its archiving system for individual dam drawings, monitoring information and history; (ii) professional and field training of engineers in its Instrumentation and Dam Monitoring & Supervision Divisions; (iii) operational support for increased periodic dam safety inspections, and (iv) technical assistance for preparation of essential technical Guidelines for the operation and safety of large dams (inclusive of Emergency Preparedness and detailed Emergency Action Plans).

### **Component 2: Irrigation Development and Management**

The poor condition and inefficient performance of irrigation canal and drainage infrastructure are the major contributors to the poor water service delivery observed in most of the irrigation schemes in Nigeria. These schemes were developed 20 to 30 years ago and proposed for rehabilitation. Combined with poor agricultural services, market infrastructure and the



prevailing gaps in the policy environment, these problems have impeded the development of irrigated agriculture in the country.

To effectively make use of the sunk costs already invested on the existing schemes and the capacities built over the years, the project will focus on developing these schemes. To contribute to the efforts of addressing the root causes of the challenges faced by the irrigation sub-sector, the project will pilot new approaches based on accountability, financial sustainability and empowerment of water user associations. To ensure sustainability, in addition to other selection criteria, the project will favor schemes that can easily be irrigated by gravity.

As the project is aimed at transforming the irrigation sub-sector through demonstration of best practices of addressing the fundamental causes of poor performance and scheme deterioration, it is deliberately designed to complement with the other activities of the project focusing at policy reforms and support to improve the O&M capacity. Lessons learned from the pilot rehabilitation and expansion investments will be used by the FMWR to replicate similar efforts in other parts of the country step-by-step as described in subcomponent 2.3. This Component directly contributes towards the project development objective of improving access for farmers to water for irrigation and to strengthen institutional arrangements for integrated water resources management in targeted areas in northern Nigeria.

### **Subcomponent 2.1: Irrigation Infrastructure Investments**

This subcomponent represents the major investment, in the form of irrigation and drainage infrastructure civil works, machineries and equipment, which represent about X percent of the total project costs.

The project will support rehabilitation of 28,000 ha and expansion (new development) of 35,000 ha to improve the performance of a total of 60,000 ha irrigation area distributed in five existing schemes (see Table 1.1). The expansion areas are also determined to be located within existing irrigation schemes. The environmental and social impacts of these schemes were assessed in the context of basin-wide Integrated Water Resources Management (IWRM)

before a final decision will be made on the extent of improvements/rehabilitation and expansion investments.

**Table 3.1: Planned expansion of irrigated area under the Project and estimated number of beneficiaries**

Status and projection	Scheme					Total
	BIS	MRVIS	KRIS	HVIS	DKIS	
Present Irrigated area (ha)	6,000	4,000	12,000	5,000	500	27,500
Improved irrigated area by end of project (ha)	20,000	0	20,000	10,000	6,000	60,000
Farmers* (#)	46,667	15,000	48,720	16,588	14,000	140,975
Direct beneficiaries for agriculture (#)	373,333	120,000	389,760	182,468	140,000	1,205,561
* BIS: Bakolori Irrigation Scheme, MRIS: Middle-Rima Valley Irrigation Scheme, KRIS: Kano River Irrigation Scheme, HVIS: Hadeija Valley Irrigation Scheme, DKIS: Dadin Kowa Irrigation Scheme. Data source: FAO-ROPISIN report.						

The proposed actual interventions in terms of rehabilitation and new expansions for some of these projects are already available, including Bakolori and Zobe, and are presented in the PAD as well as other relevant project documents.

### **Subcomponent 2.2: Improving Irrigation Management**

The investments under this subcomponent would support the development of a detailed training strategy with associated learning materials to re-align existing WUAs and establish new WUAs to achieve a transformed institutional structure for effective water management. To achieve this, two main activities would be supported, the first being the *design of the training process* (activity 1) and associated learning materials and media, and the second being the *implementation of the WUA training process* (Activity 2) at field level over an extended timeline. Where PPP arrangement are established for part or full operational and maintenance responsibilities on a scheme, the WUA functions will be tailored according to specifics of the private sector enabling contracts and other local factors.

Activity (1) comprises specialist technical assistance to: (a) support the detailed design of an intensive WUA training programme and its implementation; (b) develop a communication strategy and related targeted media; and (c) develop a WUA Media toolkit. The investments in

Activity (2) would be the field-level implementation of the WUA training process developed under Activity (1) over an extended period.

Outputs from Activity 2 would be strengthened WUAs to manage, operate and maintain the irrigation and drainage systems at turnout and tertiary levels. Expected benefits include: (a) improved maintenance of canals; (b) improved water distribution; (c) increase in irrigated area; (d) increased level of water fee collection and revenue generation; and (e) enhanced transparency and accountability.

### **Component 3: Enhancing Agricultural Productivity and Supply Chains**

This subcomponent will provide resources to support strategic issues of value chain development, complementing the programs of Agricultural Transformation Agenda of the FGN. Where possible the Project will work closely with the other WB project in the agricultural sector, i.e. CADP, FADAMA, and SCPZ. This will include value chain management and capacity building for improved job opportunities to ensure inclusion of small and medium size local entrepreneurs. Promotion of e-extension services will be encouraged. Under this component technical assistance for value chain analysis and private sector development will be provided. Two main activities are foreseen.

#### **Component 3.1: Matching grants for improvement of productive water use in agricultural processing and mechanization.**

These grants will assist scaling up of the on-going Growth Enhancement Support (GES) Scheme to reach the farmers with technology and input support, mechanization, and storage and processing facilities in the project area. It will finance a matching grant facility for asset acquisition through WUAs, with specific targeting of women and youth. This will include primary processing, markets, aggregation centers, energy, water supply, and market information<sup>1</sup>; and

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<sup>1</sup> Technical assistance will also be considered, including for financing institutions to help them develop their agricultural portfolio. Other financing instruments could also be considered, such as leasing.

### **Component 3.2: Support Research & Development.**

Technical assistance would be provided for farmer water schools, applied research such as improving irrigation efficiency and monitoring of crop performance. Proposals will be invited from interested agencies to carry out such studies. Innovations from the project will be also identified and supported for technology transfer within and outside the country. Demonstrations and adaptive field trials will be carried out primarily focusing on direct water efficiency interventions and other water saving related technologies identified during the implementation of the project.

### **Component 4: Institutional Development and Project Management**

This component will enhance the efficiency of personnel through the provision of advanced IT based tools, performance-based systems for staff evaluation, modern survey and design techniques as well the overall management of the PCU and the Irrigation Department through administrative and managerial skills enhancements and tools (e.g. management information systems). Through this business process re-engineering and strengthened governance approach a more flexible, accountable, and responsive Department can be nurtured. Moreover, a strengthened role for Water Users Associations and the concomitant PCU/Irrigation Department role in this agenda will be critical. Enhancing these reforms and building greater farmer participation in water management are important for improving agricultural productivity and water-use efficiency.

#### **Subcomponent 4.1: Project Management and Monitoring & Evaluation**

This subcomponent will help strengthen the capacity of the Federal Ministry of Water Resources (FMWR), including that of the Project Coordinating Unit (PCU), to implement the project, including fiduciary aspects framework for Bank Projects (procurement, financial management, anti-corruption plan, environmental and social safeguards), M&E, computers, vehicles, training on contract management, WUA, PIM, etc. A simple but effective monitoring and evaluation system will be put in place. It will be appropriately decentralized in terms of data collection and use.

#### **Subcomponent 4.2: Institutional Development and Governance**

Capacity building will be supported at all levels (FMWR, project, RBDA, scheme): (i) Under the capacity building part numerous activities will be undertaken including: capacity needs assessments for RBDAs, training in contract management, project management, quality assurance; study tours; specific studies and workshops; communications; generation of information and policy notes, etc.; partnerships between national educational centers (such as National Water Resources Institute in Kaduna, the Kano Farm Mechanization Institute in Dambatta, the Kano Irrigation Training Institute in Kadawa, and the North West University in Kano) and universities (e.g. Wageningen Agricultural University, Utah State University) and research centers (e.g. International Water Management Institute, IWMI); (ii) Under the advocacy line of activities the overall reform agenda will be promoted to make O&M sustainable. The subcomponent will support for the development of a communications strategy and its implementation; studies, TA, on appropriate fee setting and collection, downsizing of RBDAs, enhancing participation in decision-making, etc.

Although specific details for most of these projects are still sketchy, concrete details have been finalized for one of the interventions: Bakolori. Details of the activities to be undertaken for the projects are presented as Attachment 1.

## **4.0 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK**

### **4.1 Introduction**

This section of the Initial Draft Report presents an overview of relevant regulations, treaties and conventions that apply directly or remotely to the proposed project activities. This presentation includes a brief summary of the relevant/applicable provisions of each guideline.

### **4.2 Legal and Administrative Framework**

#### **4.2.1 Administrative Structure for the Water Sector at the Federal Level**

##### **4.2.1.1 Federal Ministry of Water Resources (FMWR)**

The Federal Ministry of Water Resources (FMWR), initially created in 1976, is responsible for formulating and coordinating national water policies, management of water resources including allocations between states, and approving developmental projects. Specifically the functions of the FMWR include:

- Establishment and operation of National Water Quality Laboratories and Monitoring Network and water quality standards.
- Maintenance of database on water supply and sanitation facilities and performance.
- Mobilization of national and international funding and technical support. Promote and coordinate other collaborative activities by other government and Nongovernmental agencies in the sector.
- Provision of technical support and assistance to State and Local Government Water Supply and Sanitation Agencies and community water supply and sanitation committees.
- Creation of an enabling environment for meaningful private sector participation in the sector.
- Provision of a framework for regulation of private sector participation in water supply and sanitation. Under Decree 101, formulate laws for private initiatives in the water supply industry.
- Assistance to individual agencies, and be responsible for the maintenance of the hydrological primary network.

#### **4.2.1.2 River Basin Development Authority**

The River Basin Development Authorities (RBDA's), now 12 in total were also created in 1976 for planning and developing water resources, irrigation work and the collection of hydrological, hydrogeological and meteorological data. Their main involvement in potable water supply has been the provision of multipurpose dams and the supply of water in bulk, some to urban water systems.

#### **4.2.1.3 National Water Resources Institute (NWRI)**

The National Water Resources Institute (NWRI) was legally established in 1985 and is responsible to the FMAWR for engineering research functions related to major water resources projects and training sector professionals and technicians.

#### **4.2.1.4 Utilities Charges Commission (UCC)**

The Utilities Charges Commission (UCC) was established in 1992 to monitor and regulate utility tariffs, including those of State Water Agencies (SWA's).

### **4.2.2 Administrative Structures for Environmental Management at Federal Level**

With regards to management of the biophysical environment throughout Nigeria, the overall responsibility was held by the now defunct Federal Environmental Protection Agency (FEPA), which was absorbed into the Federal Ministry of Environment (FMEnv) in 1999.

#### **4.2.2.1 Federal Ministry of Environment (FMEnv)**

FMEnv's mandate includes the establishment of federal water quality standards and effluent limitations, protection of air and atmospheric quality, protection of the ozone layer, control and discharge of hazardous substances, inter alia and ensures that all major development projects in Nigeria are subject to mandatory Environmental Impact Assessment (EIA) pursuant to EIA Act. No. 86 (Decree No. 86) of 1992.

Within FMEnv, there is an Environmental Impact Assessment Division, headed by a Director, to take all responsibility for EIA related issues and within the EIA division in FMEnv is the Impact Mitigation Monitoring (IMM) branch, with a special responsibility for monitoring the implementation of Environmental Management Plans (EMP) contained in the approved EIAs.

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As contained in FEPA Acts 58 of 1988 and 59 of 1992. FMEnv has put in place statutory documents to aid the monitoring, control and abatement of industrial waste. The statutory documents currently in place include:

- i. National Policy on the Environment 1999
- ii. National Environmental Protection (Effluent Limitations) Regulations(S.1.8) 1991 ;
- iii. National Environmental Protection (Pollution Abatement in Industries and Facilities Generating Wastes) (S.1.9) 2004;
- iv. National Environmental Protection (Management of Solid and Hazardous Wastes) Regulations (S.1.15) 1991;
- v. Guidelines and Standards for Environmental Pollution Control in Nigeria 1991;
- vi. Sectoral Guidelines for EIA 1995
- vii. Harmful Wastes (Criminal Provisions) Decree No. 42, 1988;
- viii. National Policy on the Environment, 1989;
- ix. Environmental Impact Assessment Procedural Guidelines 1995;
- x. Environmental Impact Assessment (EIA) Act No. 86 of 1992; and
- xi. Environmental Impact Assessment (Amendments) Act 1999.
- xii. National Guidelines and Standards for Water Quality 1999
- xiii. National Guidelines on Environmental Management Systems (EMS) 1999
- xiv. National Guidelines on Environmental Audit in Nigeria 1999

These statutory documents clearly state the restrictions imposed on the release of toxic substances into the environment and the responsibilities of all industries whose operations are likely to pollute the environment. Such responsibilities include provision of antipollution equipment and adequate treatment of effluent before being discharged into the environment.

FMEnv also has put in place procedural and sectoral guidelines detailing the EIA process including a categorization of environmental projects into Categories I, II and III (referred to by the World Bank as categories A, B and C respectively). These guidelines require that a complete EIA be performed for category I projects. Category II projects may not require an EIA depending on the screening criteria, while Category III projects do not require an EIA.



The sectoral guidelines on infrastructural development apply to this project. This water supply expansion project is classified as a category II project.

In addition to the guidelines for EIA, Decree No. 86 contains provisions for the screening of projects according to impact potential, including listed activities<sup>3</sup> for which mandatory EIA preparation is required.

- a. Category I projects will require a full Environmental Impact Assessment (EIA).
- b. 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” (ESA) in which case a full EIA is required.
- c. Category III projects are considered to have “essentially beneficial impacts” on the environment, for which an Environmental Impact Statement (EIS) will be prepared by the FMEH.

EIA’s are then submitted to the EIA Division of the FMEnv for approval and monitoring of the project during implementation and operation based on an Environmental Management Plan (EMP) in the EIA.

#### **4.2.2.2 National Environmental Standards and Regulations Enforcement Agency (NESREA)**

NESREA Act 27 of 2007 established the National Environmental Standards and Regulations Enforcement Agency (NESREA). The Agency, which works under the Federal Ministry of Environment. NESREA is saddled with the responsibility of the protection and development of the environment, biodiversity conservation and sustainable development of Nigeria’s natural resources in general and environmental technology, including coordination and liaison with relevant stakeholders within and outside Nigeria on matters of enforcement of environmental standards, regulations, rules, laws, policies and guidelines. The functions of the Agency include:

- enforce compliance with laws, guidelines, policies and standards on environmental matters;
- coordinate and liaise with, stakeholders, within and outside Nigeria on matters of environmental standards, regulations and enforcement;

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- enforce compliance with the provisions of international agreements, protocols, conventions and treaties on the environment including climate change, biodiversity conservation, desertification, forestry, oil and gas, chemicals, hazardous wastes, ozone depletion, marine and wild life, pollution, sanitation and such other environmental agreements as may from time to time come into force;
- enforce compliance with policies, standards, , legislation and guidelines on water quality, Environmental Health and Sanitation, including pollution abatement;
- enforce compliance with guidelines, and legislation on sustainable management of the ecosystem, biodiversity conservation and the development of Nigeria's natural resources;
- enforce compliance with any legislation on sound chemical management, safe use of pesticides and disposal of spent packages thereof;
- enforce compliance with regulations on the importation, exportation, production, distribution, storage, sale, use, handling and disposal of hazardous chemicals and waste, other than in the oil and gas sector;
- enforce through compliance monitoring, the environmental regulations and standards on noise, air, land, seas, oceans and other water bodies other than in the oil and gas sector;
- ensure that environmental projects funded by donor organizations and external support agencies adhere to regulations in environmental safety and protection;
- enforce environmental control measures through registration, licensing and permitting Systems other than in the oil and gas sector;
- conduct environmental audit and establish data bank on regulatory and enforcement mechanisms of environmental standards other than in the oil and gas sector;
- create public awareness and provide environmental education on sustainable environmental management, promote private sector compliance with environmental regulations other than in the oil and gas sector and publish general scientific or other data resulting from the performance of its functions; and
- carry out such activities as are necessary or expedient for the performance of its functions.

#### **4.2.3 Administrative Structure for Agriculture at the Federal Level**

##### **4.2.3.1 Federal Ministry of Agriculture and Rural Development**

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 in the development of agriculture and food production; while creating an enabling technological environment for socio-economic development of the nation.

##### ***Agriculture Sector Policies***

Sector-specific agricultural policies were largely designed to facilitate agricultural marketing, reduce agricultural production cost and enhance agricultural product prices as incentives for increased agricultural production. Major policy instruments for this purpose included those targeted at agricultural commodity marketing and pricing, input supply and distribution, input price subsidy, land resource use, agricultural research, agricultural extension and technology transfer, agricultural mechanization, agricultural cooperatives and agricultural water resources and irrigation development

This report shall limit its review to aspects of this policy as it relates specifically to agricultural water resources and irrigation development.

##### ***The Agricultural Transformation Agenda***

The Agricultural Transformation Agenda (ATA) is focused on building stronger and more inclusive growth in the non-oil sector, employment generation and poverty reduction including economic diversification. The ATA is a direct implementation response by the agricultural sector to the current administration's Transformation Agenda (2011-2015) which derives from the vision 20:2020 and the 1st National Implementation Plan (NIP). Rather than trying to drive the entire agricultural sector forward at the same time as in many past strategy documents, the ATA focuses on a few key first moves - priority food staples and traditional export crops, and intends to develop these for growth and employment creation, with the expectation that the rest of the sector will subsequently follow.

Women play a prominent role in agriculture and women farmers are identified as a key target group in the ATA. Women are particularly active in trading and processing, which implies that the ATA's emphasis on value chain development has the potential to benefit women. Also, women are key to improving nutrition outcomes in the country. Reducing women's workloads through appropriate agricultural technologies, addressing their bargaining power within households by enabling policies that put more income directly into the hands of women, are, for example, some key pathways to improving nutrition outcomes that can be enabled through the agriculture sector.

Agricultural Transformation Agenda also focuses on:

- Deregulation of seed and fertilizer sectors
- Marketing reforms to structure markets
- Innovative financing for agriculture
- New agricultural investment framework.

#### **4.2.4 Other Relevant National Policies and Regulations**

##### **4.2.4.1 Water Resources Decree 101 of 1993**

This provision vests all water and water resources in the Federal Government of Nigeria and regulates the exploitation of water resources. It also vests in the Federal Government the rights and control of water in any water course affecting more than one state for the purpose, inter alia, of ensuring the application of appropriate standards and techniques for the investigation, use, control, protection, management and administration of water resources.

##### **4.2.4.2 National Water Policy**

National Water Supply and Sanitation Policy (NWSSP) was adopted in January 2000. The centrepiece of this policy is the provision of sufficient potable water and adequate sanitation to all Nigerians in an affordable and sustainable way through participatory investment by the three tiers of government, the private sector and the beneficiary.

The targets in the policy are;

- To meet the national economic target of improving service coverage from 40% to 60% by the year 2003.
- Extension of service coverage to 80% of the population by the year 2007.
- Extension of service coverage to 100% of the population in the year 2011.
- Sustain 100% full coverage of water supply and wastewater services for the growing population beyond the year 2011.

The Policy sets consumption standards for;

- Semi – urban (small towns) which represent settlements with populations between 5,000 – 20,000 with a fair measure of social infrastructure and some level of economic activity with minimum supply standard of 90 litres per capita per day with reticulation and limited or full house connections.
- Urban Water supply at 120 litres per capita per day for urban areas with population greater than 20,000 inhabitants to be served by full reticulation and consumer premises connection.
- Among the policy objectives is the requirement to guarantee free access for the poor to basic human needs, level of water supply and sanitation services.

The Policy Strategies are:

- Increase service coverage for water supply and sanitation nationwide to meet the level of the socioeconomic demand of the nation on the sector.
- Ensure good water quality standards are maintained by water supply undertakings. The WHO drinking water quality standards shall be the baseline for the national drinking water quality standard.
- Ensure affordability of water supply and sanitation services for the citizens.
- Guarantee free access for the poor to basic human need level of water supply and sanitation services.

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- Enhance national capacity in the operation and management of water supply and sanitation undertaking.
- Privatize water supply and wastewater services (where feasible) with adequate protection for the poor.
- Monitor the performance of the sector for sound policy adjustment through Legislation, Regulations, Standards and laws for water supply and sanitation.
- Reform of the water supply and sanitation sector to attain and maintain internationally acceptable standards.

#### **4.2.4.3 Natural Resources Conservation Council Act 286 of 1990**

This provision is aimed at establishing the Natural Resources conservation council to be responsible for the conservation of natural resources of Nigeria and to formulate national policy for natural resources conservation.

#### **4.2.4.4 The National Policy on the Environment 1989**

The National Policy on the Environment, 1989 outlines strategies for water resources management, along with the Water Resources Decree No. 101 of the FMAWR, and together they are concerned with:

- Environmental Impact of Water Resources development at the planning stages.
- Specification of water quality criteria for different users.
- Establishment of adequate control and enforcement procedures.
- Public health implications of water resources development projects.

#### **4.2.4.5 Nigerian Environmental Management Act**

This act was drafted following the amalgamation of the Federal Environmental Protection Agency in to the Ministry of Environment (see section 2.1.2) but was never ratified. It repeals the 1988 Federal Environmental Protection Agency Decree No.58 (amended No.59 and No.14) and establishes the FEPA as part of the Ministry with the Minister of Environment having primary responsibility for its implementation. It does not repeal any other environmentally related legislation. As well as the general environmental provisions, which include environmental sanitation and occupational health, it specifies the powers of authorized officers, penalties and fines. The Act gives the Minister the authority to grant

environmental permits for prescribed activities which includes sand mining but not any other mining activities.

#### **4.2.4.6 Land Use Act 1978**

The legal basis for land acquisition and resettlement in Nigeria is the Land Use Act 1978 and modified in 1990. The following are selected relevant sections:

Section 1: Subject to the provision 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.

Section 2: (a) All land in urban areas shall be under the control and management of the Governor of each State; and (d) all other land shall be under the control and management of the local government within the area of jurisdiction in which the land is situated. Therefore, according to the Land Use Act, all land in Nigeria is vested in the Governor of each State, and shall be held in trust for the use and common benefit of all people. The 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 nonurban land, which will be under the control and management of the Local Government. The Governor of each State will have 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.

The Acts gives the government the right to acquire land by revoking both statutory and customary rights of occupancy for the overriding public interest. In doing so, the Act specifies that the State or Local Government should pay compensation to the current holder or occupier with equal value.

#### **4.2.4.7 Legal Provisions for Water and Sanitation Supply**

At the Federal Level, there is a Decree for Water Resources, the Decree No. 101 that vests rights and control of water in the Federal Government which took effect from 23<sup>rd</sup> August 1993. There are also decrees establishing the River Basin Development Authorities and the National Water Resources Institute.

At the State Level, the various State Water Authorities/ Boards and the State Rural Water Supply and Sanitation Agencies have enabling Acts setting them up to supply potable water to inhabitants of their respective states.

At the Local Government Level, the various laws setting them up define rural water supply as one of their primary functions.

#### **4.2.5 International Regulatory Framework**

A number of international regulations apply to this project. Some of these regulations and guidelines include but not limited to the following:

##### **4.2.5.1 World Bank OP/BP 4.01: Environmental Assessment (EA)**

This is one of the 10+2 Environmental and Social Safeguard Policies of the World Bank. It is used in the Bank to examine the potential environmental risks and benefits associated with Bank lending operations. Under OP/BP 4.01, Bank lending operations are broadly defined to include investment lending, sector lending, rehabilitation, lending through financial intermediaries, and investment components of hybrid lending. Prototype Carbon Fund (PCF) and Global Environmental Facility (GEF) co-financed projects are also subject to the provisions of OP/BP 4.01.

Under this guideline, The Bank requires environmental assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making. EA evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive



impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation. The Bank favours preventive measures over mitigatory or compensatory measures, whenever feasible.

EA takes into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, and physical cultural resources); and trans-boundary and global environmental aspects. EA considers natural and social aspects in an integrated way. It also takes into account the variations in project and country conditions; the findings of country environmental studies; national environmental action plans; the country's overall policy framework, national legislation, and institutional capabilities related to the environment and social aspects; and obligations of the country, pertaining to project activities, under relevant international environmental treaties and agreements.

The Bank does not finance project activities that would contravene such country obligations, as identified during the EA. EA is initiated as early as possible in project processing and is integrated closely with the economic, financial, institutional, social, and technical analyses of a proposed project. The Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of EA. The Bank classifies the proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

**Category A:** A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EA for a Category A project examines the project's potential negative and positive environmental impacts, compares them with those of feasible alternatives (including the "without project" situation), and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. For a Category A project, the borrower is responsible for preparing a report, normally an EIA (or a suitably comprehensive regional or sectoral EA) that includes, as necessary, elements of the other

instruments referred to in paragraph. 7. The planned sub-projects under TRIMING are placed in Category A and therefore require full EA.

**Category B:** A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas--including wetlands, forests, grasslands, and other natural habitats--are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects. The scope of EA for a Category B project may vary from project to project, but it is narrower than that of Category A. Like Category A EA, it examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. The findings and results of Category B EA are described in the project documentation (Project Appraisal Document and Project Information Document).

**Category C:** A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.

**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.

For projects that require Banks funding, the borrower is responsible for carrying out the EA. For Category A projects, the borrower retains independent EA experts not affiliated with the project to carry out the EA. For Category A projects that are highly risky or contentious or that involve serious and multidimensional environmental concerns, the borrower should normally also engage an advisory panel of independent, internationally recognized environmental specialists to advise on all aspects of the project relevant to the EA. The role of the advisory panel depends on the degree to which project preparation has progressed, and on the extent and quality of any EA work completed, at the time the Bank begins to consider the project.

Depending on the project, a range of instruments can be used to satisfy the Bank's EA requirement: environmental impact assessment (EIA), regional or sectoral EA, environmental audit, hazard or risk assessment, and environmental management plan (EMP). EA applies one or more of these instruments, or elements of them, as appropriate. When the project is likely to have sectoral or regional impacts, sectoral or regional EA is required.

#### **4.2.5.2 Natural Habitats (OP 4.04)**

Any project or sub-project 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).

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.

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 (SO<sub>2</sub>) 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.

During the planning phase, the TRIMING subprojects should include the following points 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.

#### **4.2.5.3 Physical and Cultural Resources (PCR) (OP 4.11)**

This policy is to assist countries to avoid or mitigate adverse impacts of development projects on physical cultural resources. For purposes of this policy, “physical cultural resources” are defined as movable or immovable objects, sites, structures, groups of structures, natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings, and may be above ground, underground, or underwater. The cultural interest may be at the local, provincial or national level, or within the international community. The proposed project is not expected to have negative impacts on any known physical cultural resources.

In the case of a chance find, cultural artifacts will be collected and secured. A chance find procedure has been included in this report see Attachment Six. In case a site with known PCR is identified, a PCR Management Plan will be developed by the project.

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.

#### **4.2.5.4 Safety of Dams (OP 4.37)**

The objectives of this policy are as follows:

- For new dams, to ensure that experienced and competent professionals design and supervise construction: the borrower adopts and implements dam safety measures for the dam and associated works.
- For existing dams, to ensure that any act that can influence the performance of the project is identified, a dam safety assessment is carried out, and necessary additional dam safety provided.

A dam safety assessment has been prepared for the Bakolori Dam.

#### **4.2.5.5 International Waterways (OP 7.50)**

The Bank attaches great importance to riparian because it recognizes the cooperation and goodwill of riparian as essential criteria for the efficient use and of protection of the waterway. The riparian must have made appropriate arrangements for these purposes for the entire waterway or any part thereof. It ensures that the international aspects of projects on an international waterway are dealt with at the earliest possible time. Since Nigeria is a member of the Niger Basin Authority and Lake Chad Basin Commission, riparian notifications were sent to Niger Basin Authority and Lake Chad Basin Commission.

#### **4.2.5.6. Other Policies**

Other Banks guidelines and procedures that were considered in this study include: Involuntary Resettlement (OP 4.12), which is addressed in the Resettlement Policy Framework for this project.

#### **4.2.5.7 International Conventions**

In her responsiveness and responsibility in regional and global efforts towards sustainable development particularly in the safeguard of the environment and natural resources, Nigeria has entered into a number of international treaties and conventions. Being signatory to the conventions, Nigeria pledges to uphold the principles of such conventions. Some of the conventions considered in this project are as follows:

##### **African Convention on the Conservation of Nature and Natural Resources, Algiers, 1968**

This convention came into force in Nigeria 7<sup>th</sup> May, 1974. The objectives of the convention is to encourage individual and joint action for the conservation, utilization and development of

soil, water flora and fauna for the present and future welfare of mankind, from an economic, nutritional, scientific, educational, cultural and aesthetic point of view.

**Convention on Wetland of International Importance, Especially as Water Fowl Habitat, Ramsar, Iran 1971**

This provision came into force in Nigeria on 2<sup>nd</sup> February, 2001 with the objective to stem the progressive encroachment on and loss of wetlands now and in the future, recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific, and recreational value.

**Convention on Biological Diversity, Rio de Janeiro, 1992**

This convention came into force in Nigeria on 27<sup>th</sup> November, 1994. The objectives are to conserve biological diversity, promote the sustainable use of its components and encourage equitable sharing of the benefit arising out of the utilization of genetic resources. Such equitable sharing includes appropriate access to genetic resources as well as appropriate transfer of technology, taking into account existing rights over such resources.

**Convention on International Trade in Endangered Species (CITES) of Wild Fauna and Flora, Washington, D.C., on 3 March 1973; Amended at Bonn, on 22 June 1979**

This convention identifies floral and/or faunal species that are threatened with extinction and in which trade and exportation may play a part in accelerating their extinction. It also places restrictions on trade in such species and stipulates measures to be taken by parties to the convention, which include penalties for trade in listed species and options for confiscation and/or return to original place the species were taken from.

## **5.0 ASSOCIATED AND POTENTIAL ENVIRONMENTAL AND SOCIAL ISSUES**

### **5.1 Introduction**

This section discusses the potential and associated environmental and social issues relating to the proposed projects in TRIMING. The chapter presents an overview of the basis for impact assessment as well as results of impact assessment.

### **5.2 Impact Assessment Methodology**

A key to successful Environmental Impact Assessment (EIA) is the use of appropriate impact identification and prediction methods. All good methods have certain elements in common, which are widely accepted as essential to EIAs. Any good and widely acceptable impact assessment method (or technique) should address, at least, the following:

- ***Comprehensiveness***
- ***Selectiveness***
- ***Exclusiveness***
- ***Confidence***
- ***Objectiveness***

As described earlier in this document, the key components of the TRIMING project will include:

- Component 1: Water Resources Management and Dam Operation Improvement
- Component 2: Irrigation Development and Management
- Component 3: Enhancing Agricultural Productivity and Supply Chains
- Component 4: Institutional Development and Project Management

Given the detailed description of the planned project components of the TRIMING project, as presented in Chapter 3 of this report, it is possible to undertake a general assessment of the potential impacts that may be associated with the planned interventions. Generally, there will be several types of activities involved in the TRIMING project and these will include:

- Dam rehabilitation and strengthening;
- Refurbishment of existing water distribution channels;
- Expansion of irrigation zones and facilities;
- Refurbishment and expansion of ancillary facilities such as access roads; administrative buildings, etc.

A detailed overview of the impact assessment method to be used for different project components in the TRIMING project is presented as Attachment 2.

Given the foregoing, an overview of the possible impacts of these activities is presented. It must be noted that this is only a framework and further work must be done in the course of project-specific environmental assessment (EA). The overview of these potential impacts are presented in the next sub-section of this report.

### **5.3 Overview of Associated and Potential Environmental and Social Impacts**

In this sub-section of the report, an overview of likely environmental and social issues that could attend the proposed projects is presented. For ease of comprehension, the issues are separated into environmental and social impacts. For each aspect, positive and negative issues are considered.

#### **5.3.1 Environmental Impacts**

As mentioned above, there will be several project components and each one will involve some level of construction activities as well as operations. Some of the typical impacts that could be associated with various phases of such activities as those anticipated during the TRIMING project are described below:

### **NEGATIVE IMPACTS**

#### **5.3.1.1 Pre-Construction Phase**

- There will be emission of noxious gases from the exhaust of trucks, automated cranes, etc. that will be moved to the site for the purpose of project activities and this may pose negative impacts on ambient air quality around the project site;



- Mobilisation of equipment, materials and men to site may further increase the ambient noise levels of the project area and its immediate surroundings.
- The movement of trucks and cranes to the site may constitute obstructions to normal traffic in the project area and thus exacerbate traffic build-up in the area.

#### **5.3.1.2 Construction Phase**

As described earlier, construction activities during the implementation of various sub-components of TRIMING will include mostly civil works. Specifics include site clearing and preparation, creation/rehabilitation of dams, construction of access roads, culverts, footbridges, rehabilitation and extension of canals. The basic environmental issues likely to be associated include:

- Dust raised from various construction activities will negatively affect ambient air quality;
- Emissions in the form of exhaust fumes and dust from vehicles and machines;
- Loss of vegetation caused by clearing of sites, installation of works, quarries and stock pile areas, and demand for fuelwood by labour force;
- Soil erosion resulting in siltation of nearby watercourses;
- Contamination of water sources caused by run-off of petroleum produce spillages, leakages from storage areas and improper disposal of fuels;
- Impact on cultural or archaeological findings due to excavation or from dust;
- Land acquisition and resettlement;
- Health and safety of workers (accidents, etc);
- Exacerbation of water-borne diseases such as malaria, filariasis, etc. in areas where irrigation canals are extended to
- Disease transmission (HIV/AIDs, STDs) to communities along route from construction workers.
- Waste generation and disposal challenges

#### **5.3.1.3 Operation and Maintenance Impacts**

Activities associated with this phase include operation and maintenance of dams, utilization of various facilities such as footbridges, culverts, access roads, etc. The issues expected to be associated with this phase are listed below:

**(a) Airborne pollution**

All processing plants and some horticultural operations that have steam boilers, heating systems or food smoking processes will produce smoke. All dry processing of agricultural products will produce dust. These will require smoke and dust control and air filtration to bring the air quality both inside and outside the plant within national standards. These include:

- Animal feed mills
- Drying towers for milk powder, egg powder etc.
- Grain handling, flour milling facilities and pasta production
- Meat smoking sheds
- Seed processing and packing
- Tea processing
- Tobacco industries
- Timber and board mills
- All other agro-industries involving dry powder processing plants.

**(b) Waste water treatment**

All wet processes for food and beverage production will require liquid wastewater treatment to bring the effluent strength down to national standards before discharge from the plant. This includes:

- Fruit processing; jams, pickles and juices
- Leather industries; skins, leather and leather goods processing
- Milk and milk products factories; cheese and ice-cream production
- Paper mills and pulp mills
- Slaughterhouses, meat and meat products
- Starch mills
- All other agro-industries involving wet processing or chemical cleaning of the processing plant.

***(c) Effluents and solid waste***

Most agriculture, livestock production, agro-industries, packaging and marketing operations produce solid wastes. All wet and dry processes (covered above) also produce solid wastes from their wastewater settling tanks and dust filtration systems. All plants and facilities with steam or hot water boilers or heating systems using solid fuels (coal, wood etc.) produce solid waste from ash and clinker. Fresh food and processed food markets produce solid wastes from their day-to-day operations. All livestock production units produce manure and other solid wastes, and most manufacturing and packaging processes produce solid waste.

The fruit and vegetable industry typically generates large volumes of effluents. The effluents contain high organic loads, cleansing and blanching agents, salt, and suspended solids such as fibers and soil particles. They may also contain pesticide residues washed from the raw materials. Odor problems can occur with poor management of solid wastes and effluents.

***(d) Noise pollution***

All processing and services equipment produce various levels of noise and will have to meet national and World Bank standards to be acceptable.

***(e) Use of chemicals***

Both farming and agro-processing use chemicals that are potentially hazardous. The subproject proponent must state the expected type of chemicals to be used and the strength and volumes of those chemicals.

***(f) Water use in agricultural production and agro-processing***

The sub-project proponent may need to extract groundwater or surface water or connect to local water supply networks to supply farms, orchards, nurseries or processing plants with water. Certain activities such as sugar cane processing requires large amount of water. Overuse of water can significantly impact groundwater levels and should be strictly controlled.

***(g) Eutrophication and natural ageing of channels and waterbodies***

With the use of fertilizers to optimize crop growth in various fields and farmlands within the project zones, residues of fertilizers will be carried by runoff into nearby waterbodies. This will enrich the waters and encourage algal blooms and natural ageing of the waterbodies, especially in areas downstream. This could cause clogging of canals, thereby reducing water carrying capacity, and effective water availability downstream. For natural waterbodies around, they will eventually become silted up and dry out if adequate mitigation measures are not applied.

***(h) Health and safety standards in processing industries***

Workers are at risk of accidents when working with operating machinery and pressure vessels and are exposed to dust and noise, chemicals and other toxic substances. Health and safety standards are integral to minimizing and avoiding accidents and health risks.

**5.3.1.4 Decommissioning/Closure**

Typically, decommissioning will involve removal of dam barriers and spillways; restoration of reservoir and dismantling of structures. A number of impacts can typically be associated with these types of activities, mostly similar to those recorded during construction. A highlight of these impacts is presented below:

- In the event that site restoration activities is not properly undertaken, there may be soil erosion and flooding downstream;
- Improper site reinstatement may also engender alteration of soil structure;
- Potential loss of jobs and income to various workers;
- Potential increase in solid waste
- Emissions from machinery and equipment used for decommissioning activities may emit noxious gases and lead to negative alterations in ambient air quality;
- Noise from decommissioning activities may lead to increase in ambient noise levels around the site, with the attendant effect on hearing of project workers.

**POSITIVE IMPACTS**

The basic and most critical positive impacts include the following:

1. One of the most significant positive impacts of proposed projects is improved access to water for irrigation, increase in agriculture productivity.
2. Another associated positive impact of the proposed projects is the fact that they will enhance agricultural productivity of the area, by providing the option for dry season farming, since irrigation water will be more readily available. Also, fisheries will be enhanced, since dams can be regularly cropped and harvested for fast growing fish species.
3. During operations, several positives will emanate from proposed projects. Among others, adequate intake water will be readily available to the water works located downstream, agricultural productivity will be boosted, and by extension, income will be boosted. With the availability of potable water associated with treatment facilities associated with water works, there will be increased availability of potable water to downstream communities. By extension, the availability of potable water will result in an overall diminution in the prevalence of waterborne diseases such as cholera and typhoid fever.
4. Generally, the introduction of improved technology will enhance energy-efficient use of water resources, as well as general conservation of water resources in the area. This is an environment-friendly option

### **5.3.2 Social Impacts**

There are several social impacts that may emanate from the implementation of various component projects of TRIMING. The most important ones are itemized below:

The provision of employment opportunities for various categories of workers and cash injections into the local economies of the project area is a key positive impact expected to accompany the various projects. During various phases of the sub-component projects, employment opportunities will arise. For instance, in the process of clearing and preparing the site, constructing pile foundations, refurbishing existing dams, replacement of obsolete facilities, construction of footbridges, culverts, access roads, etc., menial labour will be required and quite rationally, will be employed from the immediate vicinity of the project site. This will no doubt lead to economic benefits for the local communities. In addition, during

various stages of construction, materials such as sharp sand, gravel, iron rods, and other routine construction materials will be locally sourced. This, again, will result in cash injections into the local economies. Similarly, food vendors and dealers in various domestic/household products will receive increased patronage from construction workers, while owners of landed property in the neighbourhood may be able to rent out their houses at attractive prices. In all, there will be increased economic activities and boosted cash injections.

Still along the lines above, upon completion of the projects, employment opportunities will arise for various categories of workers, including security guards, maintenance workers, engineers, fisheries experts, etc. Apart from reducing unemployment in the vicinity, within reasonable limits, it would also contribute to improving income earning capabilities of the people in the general vicinity of the project area.

Expansion of commercial farmland and increased output may also result in:

- Changes to existing land uses (legal and illegal);
- Displacement or involuntary resettlement of people due to land acquisition;
- Impacts on community water management practices and relationships;
- Conflicting demands on surface or groundwater supplies;
- Impact on human health from fertilizer and pesticide use.

Investment in small-scale agriculture and commercial farming projects would likely involve strengthening or extending existing practices, and could give rise to the following activities:

- land clearing and preparation, perhaps of marginal lands;
- introduction of and/ changes to fertilizer and pesticide use and fumigants for crop storage;
- moving from shifting to settled agriculture and/or from subsistence to cash crops;
- introduction of unfamiliar/exotic crops;
- crop diversification programmes with new farming systems or system components;
- crop intensification programmes;

- introduction of mechanised farming;
- irrigation and water supply and management systems;
- livestock farming

Agricultural development that avoids environmental degradation should integrate soil and water conservation practices for long-term sustainability. Attention to building soil productivity is vital, including the proper use of fertilizers and pesticides.

#### **5.4 Mitigation Options**

In order to avoid or minimize impacts associated with activities to be funded under the Projects, mitigation measures must be implemented as part of the subproject construction and operations to ensure compliance with local and international environmental and social guidelines and standards. A summary of standard associated impacts, as listed above, and appropriate mitigation measures are presented in Table 5.1

A set of monitoring indicators will be used to verify compliance with local and international standards and to identify correction actions for subprojects failing to meet these standards. These indicators will be applied when undertaking annual monitoring reports.

In order to cope with these adverse impacts, the environmental and social screening process proposed in the ESMF will be carried out in such a way as to ensure that potential negative impacts are comprehensively identified and mitigated appropriately. It is recommended that Environmental Guidelines for Contractors are used to ensure that the construction and rehabilitation activities are carried out in compliance with the mitigation measures proposed in the ESMF. These guidelines can be written into contractual agreements and form the basis for monitoring compliance.

**Table 5.1: Summary of Key Impacts and Mitigation Measures for TRIMING Projects**

Upon completion of the project screening form, which would have identified potential sub-project negative environmental and social impacts, the PCU 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	<p>Flood control:</p> <p>(i) Rehabilitate anti-flooding infrastructure such as, micro-basins, micro dams, hill side terracing, soil bunds etc.</p> <p>(iii) Construct new anti-flooding infrastructure.</p> <p>(iv) Introduce crop rotation management, use of fertilizers, tree planting and soil drainage</p> <p>(v) Control bush burning and fires.</p> <p>vi) Protection of roadsides by planting of vegetation.</p> <p>vii) Protection of outlet of drainage canals and culverts to avoid clogging of river drains.</p> <p>viii) Prepare an effective and sustainable maintenance plan.</p>	<p>i) Promote potable water and sanitation sub projects.</p> <p>ii) Promote environmental health measures and public health education.</p> <p>iii) Improve management of household and solid waste, including infrastructure for collection and treatment of liquid waste and waste water.</p> <p>iv) Review, update and enforce pollution control legislation.</p> <p>v) Strengthen enforcement capacity.</p> <p>vi) Develop and implement rural water supply and sanitation policy.</p> <p>vii) Locate sub projects at far/safe distances from water points and sources.</p> <p>viii) Increase public awareness.</p>	<p>i) Consideration of alternative locations/siting of sub projects.</p> <p>ii) Reduce biomass use through provision of alternative energy sources and construction materials (cooking stoves, photovoltaics).</p> <p>iii) Strengthen natural resource management capacities</p> <p>iv) Develop alternatives to slash and burning clearing, decrease overgrazing.</p> <p>v) Promote agro forestry.</p> <p>vi) Wetlands management and small irrigation development.</p> <p>vii) Protect sensitive ecosystems such as forests and wetlands, prevent further encroachment in protected areas.</p> <p>viii) Enforce existing laws.</p> <p>ix) Locate sub projects appropriately.</p> <p>x) Training of communities of sustainable uses of resources.</p> <p>xi) Identify certain species of trees and animals that must be protected.</p> <p>xii) Exclude ecosystems that provided and important habitat for protected species.</p> <p>xiii) Establish buffer zones around protected parks and wetlands</p>	<p>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.</p> <p>ii) Provide social services in areas of</p> <p>Primary education</p> <p>Primary health care</p> <p>Water supply</p> <p>Micro-finance</p> <p>Feeder roads</p> <p>Soil conservation and natural resources management.</p> <p>Basic and required training at State and local community levels.</p> <p>Ensure that these services are equitably distributed throughout the districts and that access is open to all ethnic groups irrespective of status.</p> <p>iii) Ensure that vulnerable groups in sub project areas are included in project activities and benefit from decision-making and implementation.</p> <p>iv) Provide employment opportunities during contracting of Civil works e.t.c</p>



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	Land Degradation	Water	Bio-diversity, Natural Habitats and Wetlands	People
Construction	<ul style="list-style-type: none"> <li>• Construction in dry season. Protection of soil surfaces during construction.</li> <li>• Adequate protection from livestock entry by fencing the site perimeters.</li> <li>• Employ all unskilled labour from local community and semi-skilled labour first from local community when available there in.</li> <li>• Source goods and services from local districts first, when available.</li> <li>• Control and daily cleaning at construction sites.</li> <li>• Provision of adequate waste disposal services including proper disposal of chemicals and other hazardous materials.</li> <li>• Dust control by water, appropriate design and siting, restrict construction to certain times.</li> <li>• Appropriate and suitable storage of building materials on site.</li> <li>• Siting of Latrines at safe distances from wells and other water points and using closed systems for sewage drainage.</li> <li>• Restrict construction to certain hours</li> <li>• Minimize loss of natural vegetation during construction; alternative sites; various special measures for sensitive species</li> <li>• Restoration of vegetation; cleanup of construction sites.</li> <li>• Safety designs (signage)</li> <li>• Ensure availability of clean potable water for use in latrines, canteens and for drinking.</li> <li>• Use of appropriate building materials. No asbestos etc</li> </ul>			
Day to Day Operations	<ul style="list-style-type: none"> <li>• Use facilities/infrastructure as designed and as intended.</li> <li>• Employ trained staff to man and secure facilities.</li> <li>• Log and report any damages done and repairs needed.</li> <li>• Perform periodic monitoring of all aspects as contained in the sub project Environmental and Social Monitoring Plan.</li> </ul>			
Maintenance	<ul style="list-style-type: none"> <li>• Prepare and adopt suitable maintenance plan.</li> <li>• Maintain appropriate budget necessary to implement maintenance plan.</li> <li>• 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.</li> <li>• Have suitably trained staff to carry out maintenance and access to materials/goods/equipment.</li> </ul>			

**Table 5.2 Generic Potential Impacts and Mitigation Measures**

ASSOCIATED/POTENTIAL IMPACT	MITIGATION MEASURES
ENVIRONMENTAL ISSUES	
PRE-CONSTRUCTION PHASE	
<ul style="list-style-type: none"> <li>There will be emission of noxious gases from the exhaust of trucks, automated cranes, etc. that will be moved to the site for the purpose of project activities and this may pose negative impacts on ambient air quality around the project site;</li> <li>Mobilisation of equipment, materials and men to site may further increase the ambient noise levels of the project area and its immediate surroundings.</li> <li>The movement of trucks and cranes to the site may constitute obstructions to normal traffic in the project area and thus exacerbate traffic build-up in the area.</li> </ul>	<p>All project related vehicles and machinery shall be maintained in perfect working conditions. They shall comply with international emission standards</p> <p>As much as possible, all project vehicles and equipment/machinery shall comply with international noise standards.</p> <p>Mobilization/movement of project related transport shall be timed to coincide with traffic ebb periods in the project areas, to avoid undue interference with local traffic</p>
CONSTRUCTION PHASE	
<ul style="list-style-type: none"> <li>Dust raised from various construction activities will negatively affect ambient air quality;</li> <li>Emissions in the form of exhaust fumes and dust from vehicles and machines;</li> <li>Loss of vegetation caused by clearing of sites, installation of works, quarries and stock pile areas, and demand for fuelwood by labour force;</li> <li>Soil erosion resulting in siltation of nearby watercourses;</li> <li>Contamination of water sources caused by run-off of petroleum produce spillages, leakages from storage areas and improper disposal of fuels;</li> <li>Impact on cultural or archaeological findings due to excavation or from dust;</li> <li>Land acquisition and resettlement;</li> <li>Health and safety of workers (accidents, etc);</li> <li>Exacerbation of water-borne diseases such as malaria, filariasis, etc. in areas where irrigation canals are extended to</li> <li>Disease transmission (HIV/AIDs, STDs) to communities along route from construction workers.</li> <li>Waste generation and disposal challenges</li> </ul>	<p>Dust control activities shall be undertaken during construction activities. This will include regular wetting of open surfaces and proper containment of stockpiles</p> <p>All project related vehicles and machinery shall be maintained in perfect working conditions. They shall comply with international emission standards</p> <p>Clearing of vegetation shall be limited to required areas only. Cleared but unused areas shall be revegetated using native species. Alternative options for fuel shall be provided to the labour force.</p> <p>Runoff from site (especially stockpile areas) shall pass through settlement area, to reduce suspended materials load into nearby waterbodies</p> <p>Bund walls shall be provided around storage areas for fuel, to prevent runoff into waterbodies</p> <p>Adequate care shall be taken to avoid damage to cultural heritage.</p> <p>The World Bank OP 4.12 on involuntary resettlement shall be applied to all project requiring land acquisition and/or resettlement. If a RAP is to be developed for the project site, it must be fully implemented before commencement of civil works on the site.</p> <p>Adequate PPEs shall be provided for all project workers and their use enforced on site at all times</p> <p>Health care facilities shall be provided and adequate enlightenment carried out</p> <p>Enlightenment and disease control/prevention shall be undertaken.</p> <p>Detailed and comprehensive waste management plans shall be provided for various project components.</p>

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ASSOCIATED/POTENTIAL IMPACT	MITIGATION MEASURES
OPERATION AND MAINTENANCE IMPACTS	
<p>Airborne pollution from different activities such as:</p> <ul style="list-style-type: none"> <li>• Animal feed mills</li> <li>• Drying towers for milk powder, egg powder etc.</li> <li>• Grain handling, flour milling facilities and pasta production</li> <li>• Meat smoking sheds</li> <li>• Seed processing and packing</li> <li>• Tea processing</li> <li>• Tobacco industries</li> <li>• Timber and board mills</li> <li>• All other agro-industries involving dry powder processing plants.</li> </ul> <p>Waste water from industries such as:</p> <ul style="list-style-type: none"> <li>• Fruit processing; jams, pickles and juices</li> <li>• Leather industries; skins, leather and leather goods processing</li> <li>• Milk and milk products factories; cheese and ice-cream production</li> <li>• Paper mills and pulp mills</li> <li>• Slaughterhouses, meat and meat products</li> <li>• Starch mills</li> <li>• All other agro-industries involving wet processing or chemical cleaning of the processing plant.</li> </ul> <p>Effluents and solid waste from different activities</p> <p>Noise pollution</p> <p>Use of chemicals</p> <p>Water use in agricultural production and agro-processing</p> <p>Eutrophication and natural ageing of channels and waterbodies</p> <p>Health and safety standards in processing industries</p>	<p>Adequate dust control shall be incorporated into project activities. These shall include regular sprinkling with water, use of bag filters, and depending on the magnitude of the project, possibly installation of electrostatic precipitators</p> <p>Adequate wastewater treatment facilities shall be built into projects. Such facilities shall be targeted at complying with local and international wastewater standards before discharge</p> <p>MOU or other agreements to be established with licensed waste operators to remove solid and hazardous waste from sites during project operation.</p> <p>Effluent treatment facilities shall be provided for all industries within the TRIMING project</p> <p>Noise attenuation shall be provided. Hearing protection such as ear plugs shall be provided for project workers, especially those in high noise areas. Work must be conducted during normal working hours to avoid disturbance to local population.</p> <p>Adequate training and enlightenment shall be provided on safe chemical handling and usage</p> <p>Regular maintenance of waterways to prevent silting up. Utilization of silt trap zones and equipment. Also sparing use of fertilizers shall be encouraged.</p> <p>Regular training and awareness programs to ensure the project stakeholders are fully aware of the required processing standards.</p>
DECOMMISSIONING IMPACTS	
<ul style="list-style-type: none"> <li>• In the event that site restoration activities is not properly undertaken, there may be soil erosion and flooding downstream;</li> </ul>	<p>Adequate planning and implementation of decommissioning activities to minimize erosion and flooding impacts</p>

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ASSOCIATED/POTENTIAL IMPACT	MITIGATION MEASURES
<ul style="list-style-type: none"> <li>• Improper site reinstatement may also engender alteration of soil structure;</li> <li>• Potential loss of jobs and income to various workers;</li> <li>• Potential increase in solid waste</li> <li>• Emissions from machinery and equipment used for decommissioning activities may emit noxious gases and lead to negative alterations in ambient air quality;</li> <li>• Noise from decommissioning activities may lead to increase in ambient noise levels around the site, with the attendant effect on hearing of project workers.</li> </ul>	<p>Proper reinstatement of affected soils and areas to be facilitated  Provision of adequate pension schemes for project workers  Detailed and comprehensive waste management plans to be incorporated into decommissioning activities  All project related vehicles and machinery shall be maintained in perfect working conditions. They shall comply with international emission standards</p> <p>As much as possible, all project vehicles and equipment/machinery shall comply with international noise standards.</p>
SOCIAL ISSUES	
<p>Expansion of commercial farmland and increased output may also result in:</p> <ul style="list-style-type: none"> <li>• Changes to existing land uses (legal and illegal);</li> <li>• Displacement or involuntary resettlement of people due to land acquisition;</li> <li>• Impacts on community water management practices and relationships;</li> <li>• Conflicting demands on surface or groundwater supplies;</li> <li>• Impact on human health from fertilizer and pesticide use.</li> </ul> <p>Investment in small-scale agriculture and commercial farming projects would likely involve strengthening or extending existing practices, and could give rise to the following activities:</p> <ul style="list-style-type: none"> <li>• land clearing and preparation, perhaps of marginal lands;</li> <li>• introduction of and/ changes to fertilizer and pesticide use and fumigants for crop storage;</li> <li>• moving from shifting to settled agriculture and/or from subsistence to cash crops;</li> <li>• introduction of unfamiliar/exotic crops;</li> <li>• crop diversification programmes with new farming systems or system components;</li> <li>• crop intensification programmes;</li> <li>• introduction of mechanised farming;</li> <li>• irrigation and water supply and management systems;</li> <li>• livestock farming</li> </ul>	<p>OP 4.12 to be appropriately applied to all issues relating to land acquisition and involuntary resettlement</p> <p>Optimal water use management to be assured</p> <p>Fertilizer and pesticide use to be properly managed (detailed PMP provided in a separate document)</p> <p>Adequate enlightenment will minimize the impacts of new innovations in the areas</p> <p>Proper planning and implementation of various activities will minimize impacts on socio-economics</p>

## **6.0 ANALYSIS OF ALTERNATIVES**

### **6.1 Introduction**

Analysis of alternatives is done to establish the preferred or most environmentally sound, financially feasible option for achieving project objectives. This requires a systematic comparison of proposed investment design in terms of site, technology, processes and timing in terms of their impacts and feasibility of their mitigation, capital, recurrent costs, suitability under local conditions and institutional, training and monitoring requirements. For each alternative, the environmental cost should be quantified to the extent possible and economic values attached where feasible, and the basic for selected alternative stated. The analysis of alternative should include a NO ACTION alternative.

For the current TRIMING project, the alternatives considered include:

- No Project Alternative;
- Delayed Project alternative;
- Alternative sites/technology

Summary of these various alternatives are discussed below.

### **6.2 Alternatives Considered**

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

The “No Project” alternative assumes that there will be no alteration to the existing status quo. By extension, it means that the current state of disuse and sub-optimal capacity utilization that exists in several of the planned intervention sites will remain. Apart from the fact that the investments that have gone into the planned interventions so far, including the costs of initial studies and appraisals; preparation of safeguard instruments such as this ESMF, etc., will be wasted. In addition, the expected gains, especially in terms of improved agricultural productivity will not be realized.

This is an inferior alternative and is therefore not accepted as the optimal one.

### **6.2.2 Delayed Project Alternative**

Sometimes, the implementation of a project is delayed, either because the economics do not add up, or there is general apathy to the project by stakeholders. In addition, inclement conditions, such as war or general uprising may warrant the delay of the projects. For the current project, the national environment is favourably disposed to the implementation of the project, both for the purpose of agricultural development and alternative to the petroleum industry in terms of revenue generation. In addition, the general climate and the attitude of stakeholders are positive for the project. Also, a delay at this point will substantially escalate the cost of the project, given the current inflation rate in Nigeria.

Thus, the delayed project alternative is considered inferior and is not taken on board for the purpose of this project

### **6.2.3 Alternative Sites/Technology**

A comprehensive survey of possible alternatives in terms of technology and project sites was also undertaken. However, the general overview reveals that other alternatives will cost more. For instance, using pump systems and sprinklers, rather than the mostly gravity based flow would involve substantially more financial outlays. Besides, the cost of maintenance of such facilities and even the technological know-how, may not be readily available and this may ultimately defeat the purpose of the project.

While it is accepted that there will be negative impacts associated with the planned project, it is also believed that the implementation of basic mitigation measures can substantially ameliorate the negative impacts such that overall, when juxtaposed with the positive impacts, there will be a net positive effect, thus justifying the project, in spite of the anticipated negatives.

Therefore, the current project plan, using the recommended sites and technology options, is the most optimal and is therefore recommended for implementation.

## **7.0 INSTITUTIONAL ASSESSMENT AND FRAMEWORK FOR ENVIRONMENTAL AND SOCIAL MANAGEMENT**

### **7.1 Institutional Roles and Responsibilities**

The main institutions with key responsibilities in the implementation of this ESMF are:

#### **7.1.1 TRIMING-PCU**

The PCU will co-ordinate all TRIMING project administrative and technical activities. It will be responsible for subproject screening, organizing and implementing capacity building programs, implementation of site specific ESIAs, ESMP and other safeguards instruments, procurement of commodities, consultants, regular monitoring and project management. The PCU will establish a communication system between stakeholders and responsible for project success on behalf of the FMWR. PCU will employ full time staff responsible for environmental and social issues within TRIMING project.

#### **7.1.2 The Federal Ministry of Environment (FMEnv)**

One of the primary responsibilities of the Federal Ministry of Environment is to ensure that all major development projects in Nigeria are subject to mandatory Environmental Impact Assessment (EIA) pursuant to EIA Act. No. 86 (Decree No. 86) of 1992. The FMEnv reviews and approves EA documents for category A projects; especially the complex and more risky ones. For the proposed projects, the respective State Environmental Protection Agency or Authority (SEPA) will be empowered to handle the reviews and approvals.

The role FMEnv will play in this project is one of monitoring, to ensure

- i. that the SEPAs are reviewing the EA documents and clearing them according to Federal Guidelines, State Laws and World Bank Safeguards policies,
- ii. that the SEPAs are monitoring the activities of the State Commercial Agriculture Development Offices (SCADOs), Water Users' Associations, Farmers' Associations, Women Groups, etc. during construction and post-construction (i.e. operations stage) at all locations in coverage areas of TRIMING.

### **7.1.3 The State Environment Protection Agencies (SEPA's)**

The State Environmental Protection Agencies or Authorities (SEPA's) are responsible;

- i. to ensure the activities planned under the TRIMING project comply with their state's environmental laws and requirements, and that of the Federal Government and the World Bank's triggered Safeguards Policies,
- ii. for receiving, review, commenting, requiring revisions where necessary and clearing and approving the EA document details of various component projects, and
- iii. to perform regular and intrusive monitoring regime of the construction, operations and maintenance stages of the activities,
- iv. for preparing periodic monitoring reports on the activities at all stages of operations and to send these reports on a regular basis to the FMEnv
- v. to comply with (consistent with state laws/edicts) the directives of the FMEnv

### **7.1.4 The State Commercial Agriculture Development Offices (SCADOs)**

The SCADOs will be responsible for:

- i. for complying with all Federal, State and Local Laws regarding the environment and with all social/poverty guidelines, parameters and targets set by the project, and of all triggered World Bank Safeguards policies,
- ii. ensuring that CADAs and CIGs prepare an EMP report for their planned investments under this project and to submit the EMP to the SEPAs for clearance,
- iii. to implement all appropriate mitigation measures identified in the EMP into the project planning cycle, technical and engineering designs and drawings, and contracts,
- iv. to ensure that these mitigation measures are complied with during construction and post construction (i.e. operations ) stages of their activities, by self-monitoring of their activities and by periodically reporting to the SEPAs and the FMEnv, and
- v. to comply with any directives that may be issued from time to time from the SEPAs and FMEnv.

### **7.1.5 River Basin Development Authorities**

These are the parties with the greatest economic interest in various projects. The team of facilitators and other specialists will be deployed to provide related and necessary technical assistance and training support. The RBDAs will use participatory planning process and establish a management committee, consisting of a chairperson, secretary, treasurer,



commercial agriculture development officer (including disadvantaged groups, especially women). They will play a major role in applying the environmental and social checklist to screen sub-projects.

#### **7.1.6 The World Bank**

The World Bank has overall responsibility to ensure that its Safeguard Policies are complied with. The Bank will also provide regular implementation support to the PCU to assist in implementation of the ESMF and other safeguards instruments. The responsibility for preparing the TORs for ESIAs/EMPs resides with the SFCOs.

### **7.2 Capacity Assessment to Perform Attributed Institutional Roles.**

#### **7.2.1 Federal Ministry of Environment**

The role of the FMEEnv in this project will be that of monitoring. Although the staffing levels at the EIA division of the FMEEnv and the Impact Mitigation and Monitoring (IMM) Branch of the EIA division are sufficient with adequate experience to carry out these roles, there is a need for further capacity strengthening.

#### **7.2.2 River Basin Development Authority (RBDA)**

All technical assistance, institutional building, and productive investment sub-projects will be managed and supervised by the RBDAs. The RBDA will be headed by a Project Coordinator who will manage an inter-disciplinary staff that will also include an environmental officer.

The designated environment specialist will be responsible for day to day monitoring and reporting feedback throughout the life of the project, specifically

- i. ensuring that the subprojects were screened using the environmental and social screening mechanism contained in this ESMF;
- ii. overseeing the implementation of the EMPs/ESIA and RAPs (if applicable); and
- iii. monitoring of environmental issues during operations

### **7.2.3 State Environmental Protection Agencies/Authorities (SEPAs).**

The SEPAs will perform the following key roles in this project:

- Reviews terms of reference (TOR) for EMPs or ESIAs
- Ensure adherence to EMP/ESIA requirements
- Ensure implementation of EMPs/ESIAs in communities
- Monitor compliance of EMPs for micro-projects
- Enforce state laws.
- Report to the FMEnv

## **8.0 ENVIRONMENTAL AND SOCIAL PLANNING, REVIEW AND CLEARING PROCESS AND PROCEDURES FOR SUB-PROJECTS.**

### **8.1 Introduction**

As already stated in the earlier chapters, the current projects were conceptualized, without actual identification of the various sub-projects. Consequently, specific information on numbers of sub-projects, site locations, land requirements, local communities, geo-physical land features, nature, type and use of equipment/plant etc. are not available, except for Bakolori, details of which have been presented as Attachment 1. This document, referred to as the Environment and Social Management Framework (ESMF), is prepared to establish mechanism to determine and assess future potential adverse environmental and social impacts of sub-projects that are to be identified and cleared based on a community demand driven process, and then to set out mitigation, monitoring and institutional measures to be taken during implementation and operation of the sub-projects to eliminate adverse environmental and social impacts, offset them or reduce them to acceptable levels.

This section of the report therefore, identifies and illustrates the specific steps involved in environmental and social assessment process leading towards the clearance and approval of the EA process for sub-projects. The steps incorporate both relevant Nigerian guidelines/requirements and the Bank's policy OP 4.01 Environmental Assessment.

### **8.2 Environmental Screening Process**

The purpose of the screening process is to determine whether sub projects are likely to have potential negative environmental and social impacts; to determine appropriate mitigation measures for activities with adverse impacts; to incorporate mitigation measures into the sub project design; to review and approve sub project proposals and to monitor environmental parameters during implementation. The extent of environmental and social work that might be required for the sub project prior to implementation will depend on the outcome of the screening process. A checklist for environmental and social screening will first be applied. A generic checklist that can be used for this purpose, for various sub-projects is presented as Attachment Two. The screening checklist must be submitted to the PCU's environment officer, who will make a decision on further steps: develop a full or partial EIA, any additional

management plans (such as Wetlands/Natural Habitat Management Plan, Physical Cultural Resources Management Plan, etc.).

For situations where the environmental and social screening process identifies land acquisition needs that would trigger OP 4.12 Involuntary Resettlement, then the provisions of the Resettlement Policy Framework (RPF), which is being prepared as a separate and stand-alone document would apply. Any sub projects that land acquisition issues will not be resolved amicably will be ineligible for funding.

### **8.3 Categorization of subprojects for Environment Assessment**

As a general rule, all projects regardless of their size are supposed to be screened. Screening provides information which is the basis for classification of projects into categories A, B, or C depending on the nature, type, scale, location, sensitivity and magnitude of the potential/envisaged environmental impact of the project or sub-project.

The groups are as follows:

**Category A project** is the one that is likely to have significant adverse environmental impacts that is sensitive, diverse or unprecedented. They must be subjected to a full EIA.

**Category B project** is the one whose potential adverse environmental impacts are less adverse than those of Category A, and are few, site specific and in most cases have mitigatory measures can be designed readily. Category B projects/subprojects require Limited Environmental Impact Assessment (LEA).

**Category C project** is that one that is likely to have minimal or no adverse environmental impacts. Apart from registration and screening no further EA action is required.

In light of the above categorization, and given the fact that the prime objective of the proposed projects is to enhance agricultural production, processing, and marketed outputs among participating small and medium scale commercial farms and agro-processors, then project-funded sub projects will fall under categories A and B according to World Bank Operational

Manual and Environment Policy OP 4.01 and Category 1 and 2 of the Nigerian EIA Procedures and Guidelines.

#### **8.4 Assigning appropriate environmental category**

The screening process will lead to four possible safeguard outcomes:

1. No further action if the sub project has no impacts on the environment.
2. Carry out simple Environmental Review if sub project may create a few minor and easily mitigated environmental problems.
3. Carry out Limited Environmental Review if sub project may create minor environmental problems that require frequent site visits or construction modifications to minimize or eliminate impact.
4. Carry out full EIA if sub project will result into potentially significant direct or indirect adverse impact.

#### **8.5 Conduct ER, LEA or EIA**

After reviewing the filled Environmental Social Screening Form and the sub-project environmental checklist (Attachment 2), the various project teams will determine the extent of the environmental and social work required, i.e. whether the application of mitigation measures outlined in the environmental checklist will suffice or not. Some design modifications can be incorporated at this stage in order to minimize or avoid environmental impacts. The screening forms must be submitted to TRIMING PCU Environmental Officer.

Depending on the magnitude of the environmental impact identified, then the designated TRIMING environmental Officer will carry out Environmental Review or Limited Environmental Assessment.

In some cases, the results of the environmental and social screening process may indicate the need to carry out a full EIA or ESIA. In this case, the more complex environmental procedures shall be followed. The EIA/ESIA will be prepared by an independent party. Such full-fledged EIA/ESIA requires inputs from teams of specialists/consultants as well as from other stakeholders. In such a situation, a detailed impact assessment/analyses method will be

applied. A standard impact assessment procedure recommended for such assessments is presented as Attachment 3. This methodology has already been successfully applied to the ESIA for Bakolori Irrigation Scheme.

#### **8.6 Review and Approval**

Under the guidance of the TRIMING PCU Environmental specialist, the projects teams will review the Environmental and Social Screening Form as well as the Environmental Checklists that were completed in the course of sub-project preparation to ensure that all environmental and social impacts have been identified and successfully mitigated. If the application has satisfactorily addressed these issues, the TRIMING PCU will then clear the sub-project and recommends for approval and subsequent funding.

If the PCU finds that the submitted design is not consistent with the requirements of the environmental screening form and the environmental checklist, then the sub-project implementer would be requested to re-design (e.g. make additional modifications and/or choose other sites) and re-screen the project until it is consistent and then re-submit it for review. On sub-projects that entails civil works like feeder/access roads, canal refurbishment/expansions, culverts and small bridges, etc., it is expected that the environmental guidelines for contractors be included in the bidding document/contract agreements.

Any proposed sub-projects that do not comply with the requirements of Nigeria and the World Bank safeguard policies will not be cleared for approval.

#### **8.7 Environmental and Social Management Plan (ESMP):**

Sub-project proposals must contain as part of the proposal, an ESMP that will consist of a set of mitigation measures, monitoring and institutional measures to be taken during the implementation and operation of the sub-projects to eliminate adverse environmental and social impacts, offset them or reduce them to acceptable levels. The ESMP should also include the actions needed to implement these measures, including the following features:

**Mitigation:** Based on the environmental and social impacts identified from the use of the checklists, the ESMP should describe with technical details each mitigation measures, together with designs, equipment descriptions and operating procedures as appropriate. The ESMP should provide responsibility for implementation of each of the mitigation measures and an indicative budget.

**Monitoring:** Environmental and social monitoring during the implementation of the sub-projects, in order to measure the success of the mitigation measures. The ESMP should include monitoring objectives that specify the type of monitoring activities that will be linked to the mitigation measures. Specifically, the monitoring section of the EMP provides:

- i. A specific description and technical details of monitoring measures that include the parameters to be measured, the methods to be used, sampling locations, frequency of measurements, detection limits (where appropriate), and definition of thresholds that will signal the need for corrective actions, e.g. the need for on-site construction supervision.
- ii. Monitoring and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures and to furnish information on the progress and results of mitigation, e.g. by annual audits and surveys to monitor overall effectiveness of this ESMF. A summary of an environmental audit is provided in Attachment Seven.

The ESMP should also provide a specific description of institutional arrangements, i.e. who is responsible for carrying out the mitigating and monitoring measures (for operation, supervision, enforcement, monitoring of implementation, remedial action, financing, reporting and staff training).

It should be noted that an ESMP must be developed for each sub-project. As a rule, each sub-project should not be considered or approved for funding without documenting an implementable and fundable ESMP.

Additionally, the ESMP should include an estimate of the costs of the measures and activities recommended so that the PCU can budget the necessary funds. The mitigation and monitoring

measures recommended in the ESMP should be developed in consultation with all affected groups to incorporate their concerns and views in the design of the ESMP.

#### **8.7.1 Review and Approval of ESMPs**

The ESMPs for sub-projects are part and parcel of the Environmental Reports i.e. ER, LEA or the ESIA reports as the case may be. In summary the review and approval process will follow any of the three procedures:

- The respective Project Coordinator will prepare the ER report. It will be reviewed and approved by the respective State Environmental Protection Agency or Authority.
- The LEA report will be prepared by a consultant commissioned by the PCU and will be submitted to the PCU and SEPA for review and approval.
- For those projects which require a full ESIA, it will trigger an ESIA process which involves hiring an independent ESIA consultant to undertake the ESIA study as stipulated in the *National EIA Procedure and Guidelines* and World Bank's Environmental Assessment Policy OP 4.01.

#### **8.8 Public Consultations**

Public consultations are critical in preparing an effective and sustainable sub-project. The first step is to hold public consultations with the local communities and all other interested/affected parties. These consultations should identify key issues and determine how the concerns of all parties will be addressed in the terms of reference of the design of sub-projects activities.

The consultations should also include vulnerable groups within the community, specifically the poorest of the poor, elderly, widows and widowers, and women. To facilitate meaningful consultations, the local governments and the RBDAs will provide all relevant materials and information concerning the sub-projects in a timely manner prior to the consultation, in a form and language that are understandable and accessible to the groups consulted.

Depending on the public interest in the potential impacts of the sub-projects, a public hearing may be requested to better convey concerns. Once the sub-project has been reviewed and cleared, the implementers will inform the public about the results of the review. This approach



would be consistent with Bank's OP 4.01 as well as Nigeria's efforts to enhance its participatory planning process.

For Category A sub-projects, public consultations are conducted twice during ESIA preparation: during the scoping stage a TOR is shared with stakeholders. The second time consultations are conducted, when a draft ESIA is developed. The ESIA is reviewed, based on the consultations, and the design of the project is adjusted accordingly.

### **8.9 Monitoring and Evaluation**

Sub Project Monitoring; Monitoring is a systematic measurement of how a sub project is performing; it is part of the overall supervision of a sub project. From environmental point of view, it is of interest to determine that mitigation measures are being properly implemented, that environmental contractual measures are being respected, that construction is proceeding in accordance with the agreed design standards, and that no unforeseen negative impacts are occurring as the result of sub project execution.

#### **8.9.1 Monitoring**

Environmental monitoring needs to be carried out during the construction as well as operation and maintenance of the sub-projects. The responsibilities for monitoring and evaluation of the mitigation measures adopted under the sub-projects would be assigned as follows:

RBDA's in collaboration with PCU's environment officer will be responsible for the day to day monitoring and reporting of feedback throughout the life of the sub-project, specifically the monitoring of:

- i. the environmental and social assessment work to be carried out on its behalf by consultants;
- ii. overseeing the implementation of the Resettlement Action Plans;
- iii. monitoring of environmental issues and the supervision of the civil works contractor during the construction process
- iv. monitoring of environmental issues during operations and during maintenance of the infrastructure and facilities;
- v. Submission of monitoring reports to the RBDA and the respective SEPA.

The monitoring and reporting will be done by members of the respective RBDAs and the environmental officer (or official responsible for environmental issues) at the local government councils who will be trained.

### **8.9.2 Monitoring Indicators**

The objectives for monitoring are:

- i. to alert project authorities and to provide timely information about the success or otherwise of the EIA process as outlined in the ESMF in such a manner that changes to the system can be made, if required;
- ii. to make a final evaluation in order to determine whether the mitigation measures designed into the subprojects have been successful in such a way that the pre-subproject environmental and social condition has been restored, improved upon or worse than before.

A number of indicators would be used in order to determine the status of affected people and their environment (land being used compared to before, standard of house compared to before, level of participation in project activities compared to before, how many kids in school compared to before, health standard, how many clean water sources than before, how many people employed than before etc).

Therefore, the sub-project EA reports (i.e. either the ER Report, LEA Report, EIA reports/EIS) will set 3 major social-economic goals by which to evaluate.

- Affected individuals, households, and communities are able to maintain their pre-project standard of living, and even improve on it;
- Has the pre-subproject environmental state of natural resources, bio-diversity and flora and fauna, been maintained or improved upon, and
- The local communities remain supportive of the project.

In order to assess whether these goals are met, the sub-projects will indicate parameters to be monitored, institute monitoring milestones and provide resources necessary to carry out the

monitoring activities. The following parameter and verifiable indicators will be used to measure the process, mitigation plans and performance.

For the safeguard screening environmental and social process the following monitoring indicators are proposed:

- **Number of sub-projects** which have adopted the safeguard screening process as required by TRIMING, evaluate the rate of adoption;
- How has the adoption of the safeguard requirements improved the environmental health and bio-physical state of the communities using/affected by the sub-projects;
- What are the main **benefits** that member derive from the use of the **safeguard process**?

Economic benefits: (i) increase in achievement of sub-projects adoption of safeguard screening guidelines (ii) increase in revenue for local councils resulting from adoption of safeguard guidelines, compared with conventional practices.

Social benefits: Expected benefits from likely micro-projects e.g. increased enrolment in schools etc.

Environment benefits; (i) improvement in the sustainable use of Nigerian's natural resources;

- Efficiency of sub-projects maintenance and operation performance;
- **Number of environmental resource persons on RBDAs and local government teams** and who have successfully received ESIA training in screening methods etc.; evaluate the training content, methodology and trainee response to training through feedback;
- **Numbers of women trained**; assess understanding of the need for the EIA process as a tool for sustainable development;

***ESMF for Proposed TRIMING Project – Final***

- Overall assessment of (i) activities that are going well (ii) activities that need improvements and (iii) remedial actions required;
- Is the **screening process** identified in this ESMF working well;
- Based on the performance of the sub-project performance review, what, if any, changes to the ESMF, and additional training capacity building, are required to improve the performance of the framework's implementation.

## **9.0 CAPACITY BUILDING AND TRAINING REQUIREMENTS FOR ENVIRONMENTAL AND SOCIAL MANAGEMENT**

In order to ensure proper implementation of environmental and social screening and mitigation measures, as well as effective community development, the TRIMING Project will undertake an intensive programme of environmental training and institutional capacity building spread out over the life cycle of the project.

### **9.1 Environmental Training and Sensitization**

Training and sensitization will be required at the levels of the RBDAs, and WUAs. The environmental specialist at the local government council and the PCU's environment and social officers will be responsible for providing the required specialists to deliver a range of technical training on environmental and social issues to these groups.

For each group, training will be provided to bring them to a different level of expertise in different areas, and would include:

- In-depth training to a level that allows trainees to go on to train others, including technical procedures where relevant;
- Sensitization, in which the trainees become familiar with the issues to a sufficient extent that it allows them to demand precise requirement for further technical assistance; and
- Awareness-raising in which the participants acknowledge the significance or relevance of the issues, but are not required to have technical or in-depth knowledge of the issues.

The objectives of the training/capacity building efforts under TRIMING project will be to:

- Support WUAs and the RBDAs to mainstream environmental and social issues in their sub-projects; and
- Strengthen the capacity of local NGOs and other services providers to provide technical support to communities in environmental and social aspects of the sub-projects.

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The target audience for training, sensitization and capacity building, will inter-alia include the following:

- RBDA Project Coordinators
- WUA Teams
- LGAs Staff involved in environmental and social concerns
- Environment specialist at the PCU
- NGO's/CBOs
- Local Service Providers

An overview of various training components of the proposed Institutional Strengthening is presented in Table 9.1 below. This overview assumes that there will be people traveling to a central location from other states, each time, and they will thus require travel allowances and per diem (to cover accommodation, feeding and communication). In addition, although local participants at the training venue will not qualify for accommodation and/or travel allowances, they will nonetheless, draw per diem allowances.

**Table 9.1: Overview of Training Requirements (Content and Duration) and Estimated Costs**

S/N	Target Audience	Description	Application	Duration	Estimated Cost (US\$)
1	RBDA staff, WUAs and CIGs	General environmental awareness seminar that will include ecological and social science principles, legal responsibilities, consequences of non-sustainable development, costs of poor environmental decisions, and introduction to the EIA process and the use of the environment and social screening mechanism.	Personnel require appreciation of WB's, Federal/State environmental policies, as well as, an appreciation for the need to support environmentally sustainable development.	3-day seminar/workshop	50,000.00
2	RBDA Environmental specialist, officials of SEPAs and LGA environmental and social specialists	An in-depth comprehensive course on environmental management including legal requirements, EIA methodology, Impact determination (methods) and mitigation analysis, public involvement methods, ESMP preparation, monitoring techniques, preparation of EIAs, TORs, and other. Course will include field visits and classroom exercises.	<p>The target audience will be responsible for EA review at the State level and for preparing TORs for EIA consultants as well as monitoring consultants' work and final approval of EIAs.</p> <p>Target audience will also be responsible for conducting environmental audits on selected sub-projects and for periodic monitoring of sub-project implementation to ensure compliance.</p>	7 day training workshop	175,000.00
3	CBOs/NGOs, other local government staff	General environmental awareness seminar that will include ecological and social science principles, legal responsibilities, consequences of non-sustainable development, costs of poor environmental decisions, and introduction to the EIA process.	Local Government level staff requires an appreciation for the WB's and Nigerian environmental requirements, as well as, an appreciation for the need to support sustainable development.	2 day seminar	100,000.00
<b>Total Estimated Costs</b>					<b>325,000.00</b>

## **10.0 CONSULTATIONS**

For the purpose of completeness, and in order to incorporate stakeholder views and perspectives into the project, consultations were held with relevant stakeholders in the course of this project. At this level, the consultations were limited to RBDA officials and representatives of WUAs as well as some traditional rulers.

In addition to the public consultations on the ESMF, as detailed below, the ESMF TOR was shared with the project stakeholders prior to development. For each ESIA for TRIMING projects, the public consultations will also be conducted in a similar manner.

Consultations were held in three different locations as indicated in Table 10.1. The consultations took place between the Period January 20-20, 2014.

**Table 10.1: Overview of River Basins where Consultations Took Place**

S/N	RIVER BASIN DEVELOPMENT AUTHORITY	IRRIGATION SCHEMES REPRESENTED	DATE OF CONSULTATION
1	Sokoto-Rima River Basin Development Authority	Bakolori and Middle Rima in Goronyo	January 20, 2014
2.	Hadeija-Jama'are River Basin Development Authority	Kano River Valley Irrigation Scheme and Hadeija river Valley irrigation Scheme	January 21, 2014
3	Upper Benue River Basin Development Authority	Dadin-Kowa Irrigation Scheme	January 23, 2014

A summary of the issues that emanated from the consultation activities are presented in Table 10.2, while pictorial representation of the consultation processes and attendance sheets during the consultations is presented as attachment 4.



**Table 10.2: Summary of Information Obtained from Consultation Activities across Selected RBDAs**

S/N	ISSUES	RESPONSES		
		BAKOLORI	GORONYO	ZOBE
1.	What types of crops are farmed in the area?	Within irrigation zone, Rice is mainly cropped, but outside, they also crop (with rain-fed agric) Guinea corn and millet. Vegetables such as pepper and tomatoes also farmed	Within irrigation zone, Rice is mainly cropped, but outside, they also crop (with rainfed agric) Guinea corn, cowpea and millet. Vegetables include onions, ginger, pepper and tomatoes	Crops are similar, but they grow more of vegetables (irrigated), during the dry season: tomatoes, pepper, onions, garlic and ginger.
2.	Interactions between farmers and cattle rearers	Cattle damage irrigation structures and sometimes damage crops in people's farms  Interactions are not so well coordinated and as such conflicts occur periodically	Cattle damage irrigation structures and sometimes damage crops in people's farms  Interactions are well organized and regulated. If cattle damage irrigation structures, the cattle herdsman are responsible for the repairs	Cattle damage irrigation structures and sometimes damage crops in people's farms  Conflicts occur from time to time as this is not as well organized as in Goronyo
3.	Land ownership	95% owned by people and 5 % by government.  Land lease issues are required to have the involvement of the traditional rulers	95% owned by people and 5 % by government  Land lease issues can be arranged between individuals without recourse to the traditional rulers	95% owned by people and 5 % by government  Land lease issues can be arranged between individuals without recourse to the traditional rulers
4.	Pests	Main pests are Insects and Birds: Insects include Aphids. Locust is not common. Birds are primarily quail birds, but weavers also occur. They also have some nematode pests, especially the root knot nematode	Rodents, especially the multi-mammate rats, the spotted grass rats and the harsh-furred rat, in addition to insects and some birds	Main pests are Insects and Birds: Insects include Aphids. Locust is not common. Birds are primarily quail birds, but weavers also occur. They also have some nematode pests, especially the root knot nematode
5.	What are your perspectives on the planned intervention and what issues do you want addressed?	1. Sometimes, interventions are intercepted by middlemen 2. Interventions on pest controls are sometimes late. For instance, quail control is done sometimes after the birds have already damaged rice crops 3. The women claim to be marginalized in distribution of inputs such as fertilizers and pesticides 4. The people would like to have a veterinary centre to help them handle animal diseases such as accidental poisoning by pesticides	1. Sometimes, interventions are intercepted by middlemen 2. Interventions on pest controls are sometimes late. For instance, quail control is done sometimes after the birds have already damaged rice crops 3. The women claim to be marginalized in distribution of inputs such as fertilizers and pesticides 4. The people would like to have a veterinary centre to help them handle animal diseases such as accidental poisoning by pesticides	1. Sometimes, interventions are intercepted by middlemen 2. Interventions on pest controls are sometimes late. For instance, quail control is done sometimes after the birds have already damaged rice crops 3. The women claim to be marginalized in distribution of inputs such as fertilizers and pesticides 4. The people would like to have a veterinary centre to help them handle animal diseases such as accidental poisoning by pesticides

Table 10.2 Cont'd

S/N	ISSUES	RESPONSES	
		KANO RIVER	HADEJIA
1.	Main Occupation	The people are predominantly farmers (more than 90%), and even those who have salaried employment still engage in part time farming Fishing is also very important and assures improved nutrition (animal protein availability), apart from the economic viability of fishing in the Kano River valley	The people are predominantly farmers (more than 90%), and even those who have salaried employment still engage in part time farming  Fishermen have a sort of symbiotic relationship with the farmers, since the fishermen usually clear the channels of aquatic weeds which normally obstruct water flow and reduce water holding capacity of the canals
2.	What types of crops are farmed in the area?	Within irrigation zone, Rice, wheat and maize, along with vegetables (pepper, tomatoes, carrots, cabbage, cucumber, etc) are mainly cropped, but outside, they also crop (with rainfed agric) guinea corn, millet, groundnuts, cowpea, soy beans, sesame, and some tuber crops like Irish potatoes, sweet potatoes and yams Vegetables such as pepper and tomatoes, Hibiscus species also farmed	Within irrigation zone, Rice, wheat and maize, along with vegetables (pepper, tomatoes, carrots, cabbage, cucumber, etc) are mainly cropped, but outside, they also crop (with rainfed agric) guinea corn, millet, groundnuts, cowpea, soy beans, sesame, and some tuber crops like Irish potatoes, sweet potatoes and yams. Vegetables include onions, ginger, pepper and tomatoes  They also do a bit of poultry farming particularly the women groups
3.	Interactions between farmers and cattle rearers	Cattle damage irrigation structures and sometimes damage crops in people's farms  Interactions are not so well coordinated and as such conflicts occur periodically	Cattle damage irrigation structures and sometimes damage crops in people's farms  Interactions are not so well coordinated and as such conflicts occur periodically
4.	Land ownership	More than 90% owned by people and the remainder by government. Land lease issues are handled by traditional councils. Lease goes for between N15-20k per planting season/ha.	95% owned by people and 5 % by government
5.	Pests	Main pests are Insects and Birds: Insects include Aphids, stem borers and crickets. Locust is not common. Birds are primarily quail birds, which attack rice and wheat, but weavers also occur and damage maize and millet. Rice blast is also a major issue in irrigated areas They also have some nematode pests, especially the root knot nematode Control of quail is primarily by exclusion. Fishing nets are spread over the entire area of rice fields and this keeps the birds out. Sometimes, the Ministry of Agric organizes aerial spraying to reduce quail population	Rodents, especially the multi-mammate rats, the spotted grass rats and the harsh-furred rat, in addition to insects and some birds.  Main pests are Insects and Birds: Insects include Aphids, stem borers and crickets. Locust is not common. Birds are primarily quail birds, which attack rice and wheat, but weavers also occur and damage maize and millet. Rice blast is also a major issue in irrigated areas
5.	What are your perspectives on the planned intervention and what issues do you want addressed?	1. Repair waterways and clear weeds that currently block the canals and reduce water holding capacity and flow 2. Capacity building for farmers and institutional linkages. Provide mobile training options (vans with video clips and instructors. Improve extension services 3. Provide machinery and equipment for tilling 4. Provide farm inputs in the right quantity and quality (given cases of expired and/or adulterated pesticides and fertilizers) 5. Provide high yielding seedlings 6. Establish agro processing industries that can create value-added to products	1. Dam safety issues need to be examined. Many dams appear to be weakening and could be cause for concern in the near future 2. Maintenance of irrigation structures, especially canals and sprinklers 3. Create feeder roads into various farm holdings to facilitate ease of going and coming 4. Clear silt and aquatic weeds in primary and secondary canals 5. Farmer education, especially with adequate extension services 6. Improve marketing options and alternatives

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S/N	ISSUES	RESPONSES	
		KANO RIVER	HADEJIA
		7. Government to promulgate policy and laws that ban or place premium charges on importation of locally available food, especially rice and wheat 8. Establish rules that prosecute and deal with those who destroy irrigation structures 9. Watering points should be provided for cattle, to prevent them going into farms and destroying irrigation structures 10. Provide grazing land for cattle 11. Enlighten nomads on gazetted cattle routes	
6	WUA	WUAs exist and they are currently responsible for organization and collection of water use charges. The organization is based on a federated union at the apex, followed by the Sectoral WUAs, which consist of several blocks. Each block has leaders, who liaises with the sectoral WUAs	WUAs exist and they are currently responsible for organization and collection of water use charges. The organization is based on a federated union at the apex, followed by the Sectoral WUAs, which consist of several blocks. Each block has leaders, who liaises with the sectoral WUAs

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**Table 10.2 Cont'd**

S/N	ISSUES	RESPONSES
		DADIN-KOWA
1.	Main Occupation	Farming is the main occupation. But they also have livestock activities
2.	What types of crops are farmed in the area?	Within irrigation zone, Rice, maize and vegetables are mainly cropped, but outside, they also crop (with rainfed agric) guinea corn, maize, millet, groundnuts, cowpea, soy beans, sesame, and some tuber crops like Irish potatoes, sweet potatoes and yams Vegetables such as pepper and tomatoes,
3.	Interactions between farmers and cattle rearers	Cattle damage irrigation structures and sometimes damage crops in people's farms. This is particularly so for nomads who bring cattle from North East (Borno area) going down south during the dry season. Although traditional systems exist to address these issues, many of them are not so effective, as there are recorded cases of violence between nomads and resident farmers
4.	Land ownership	100% of land is owned by the people, except for the areas designated as pilot scheme for the irrigation activities by the Upper Benue RBA. This consists of 100ha as pilot scheme for rice.
5.	Pests	<p>Main pests are blast for rice, Nematodes for tomatoes, Insects and Birds: Insects include Aphids, stem borers and crickets. Locust is a pest but not too serious.</p> <p>Control of quail includes exclusion. Fishing nets are spread over the entire area of rice fields and this keeps the birds out. However, children are kept on the farms to keep moving and thus scare the birds away. This presumes that the children may not go to school during cropping periods.</p> <p>There is an injunction which excludes herds from irrigation zones and the herdsmen (represented at the meeting) are okay with this.</p>
5.	What are your perspectives on the planned intervention and what issues do you want addressed?	<ol style="list-style-type: none"> <li>1. Want the primary and secondary canals completed and extended, to prevent the need for use of pumps to lift water for irrigation</li> <li>2. Repair waterways and clear weeds that currently block the canals and reduce water holding capacity and flow</li> <li>3.Capacity building for farmers and institutional linkages. Provide mobile training options (vans with video clips and instructors. Improve extension services</li> <li>4.Provide machinery and equipment for tilling</li> <li>5.Provide farm inputs in the right quantity and quality (given cases of expired and/or adulterated pesticides and fertilizers)</li> </ol>
6	WUA	WUAs exist and they are currently responsible for organization and collection of water use charges. The organization is based on an executive board, which oversees the different wards. Ward leaders are required to collect water usage fees, which are used for maintenance of channels and structures. The people will be willing to pay charges for improvement and maintenance.
7	Women Issues	<p>Women own land for farms too, but this is minimal. However, the women believe that agric input distribution is skewed in favour of men.</p> <p>They also requested extension services for training on issues such as pest control</p> <p>A major issue raised by the women is regular incursion into their farms by grazing cattle. They also indicated that sometimes, these herdsmen grow violent when accosted about the damage caused by their cattle, thus, they are not able to control them. Unfortunately, even the police is not able to do much about this.</p>

## **11.0 DISCLOSURE REQUIREMENTS**

The sharing of information is essential for sustainable development. It stimulates public debate on, and broadens understanding of development issues, and enhances transparency and accountability in the development process. It also strengthens public support for efforts to improve the lives of people in developing countries, facilitates collaboration among the many parties involved in development, and improves the quality of assistance projects and programs.

On April 3, 2013 the World Bank's Board approved revisions to the Policy on Access to Information. The new [World Bank Policy on Access to Information](#), effective July 1, 2013, supersedes the World Bank Policy on Access to Information (AI) dated July 1, 2010. The changes to the AI policy are clearly aligned with the World Bank Group's commitment to greater transparency, accountability and access to information.

The AI Policy endeavors to strike an appropriate balance. It is based on the following five principles:

1. Maximizing access to information;
2. Setting out a clear list of exceptions;
3. Safeguarding the deliberative process;
4. Providing clear procedures for making information available;
5. Recognizing requesters' right to an appeals process.

The ESMF has been prepared in consultation with the Federal level PCU, Federal and State MDAs, CBOs/NGOs, WUA and other relevant stakeholders. 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 ESIAs/ESMPs will be prepared for each sub-project based on the guidelines and procedures highlighted in this ESMF and would be disclosed in like manner.

### **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 is to be translated into the major language(s) in the sub-projects area (Hausa).

## **12.0 CONCLUSION**

In this ESMF, an overview of regulatory issues, environmental impacts and mitigation measures have been presented. In addition, requirements for environmental management and monitoring as well as institutional strengthening have been highlighted.

It is believed that if these provisions are appropriately applied to the proposed TRIMING projects, they will assure that all project sub-components are implemented in such a way that they assure sustainable development.

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## **ATTACHMENTS**

## **ATTACHMENT ONE: DETAILS OF INTERVENTIONS IN BAKOLORI**

## **DESCRIPTION OF PROPOSED INTERVENTIONS FOR THE BAKOLORI IRRIGATION SCHEME**

### **Introduction**

There is a need to understand the current situation of the Bakolori Irrigation Scheme before identifying all the various rehabilitation and civil works that will be carried out.

### **General Overview of the Bakolori Irrigation Scheme and Components**

The Bakolori irrigation scheme was commissioned in 1979, and construction of a major portion of the scheme was completed by 1983. In total, 23,000 hectares were developed, of which 15,000 ha were planned for sprinkler irrigation and 8,000 ha for surface irrigation by gravity. The sprinkler systems installed in the area developed for pump irrigation are no longer operational. The area with functioning irrigation is therefore limited to 7,500 ha, irrigated by gravity. Irrigation water is supplied from the Bakolori dam across the Sokoto River and water supply is sufficient for the area currently cultivated. The site hosts approximately 22,000 farmers (USAID 2010). Recent information indicates that there are a total number of 38,400 farmers across the three local governments of Maradun, Bakura and Talata Mafara. Current crops cultivated include rice, maize, cowpea, sweet potato, groundnut, vegetables, sugarcane, millet, and guinea corn. Fishery activities are ongoing in the project area.

The Bakolori Irrigation Scheme has depreciated badly primarily due to a lack of maintenance over several years. Agricultural produce extensively cultivated within the scheme, are not adequately exploited due to lack of market, lack of access roads to the farms, lack of storage or processing facilities and ineffective Water User Associations (WUAs) which have been established in the Bakolori irrigation area, but which appear to be weak and thus do not fulfill their intended purposes.

There are multiple failures with the infrastructures within the system. The Bakolori dam located at Talata Mafara on River Sokoto was designed to function as a multi-purpose dam for irrigation, water supply, fisheries, livestock development, and hydropower generation, flow regulation and flood protection. However, since completion there has been a general lack of maintenance resulting in the loss of the hydropower generating capacity, probable silting of the dam, silting of the primary, secondary and tertiary canal systems, breakdown of parts of the lined primary canal and secondary canals, weeds growth in the canals, silting and weeds growth with resultant blockage of the drainage canals, reduction in the area of land irrigated, and pests infestation of the project command area (especially qualla birds, rabbits and termites).

At the dam site, a large colony of bats roost in the service gallery at the base of the dam. There are coarse vegetation (shrubs and tall grasses) growing in the rip-rap in several parts. The crest is overgrown with a shrubs, bushes, trees and grasses. Parts of the dam system are broken down with ant and termite nests in several places. Erosion (human animal and water) has eaten off parts of the edges of the crests. The concrete structures on the finger drains of the dam are generally sound but owing to lack of regular maintenance, vegetation has engulfed the chambers. The access covers have been lost / stolen on all but one of the chambers. There is no safe means of access into the chambers. Rocks from the toe drain and other debris have accumulated inside the chambers and there is a risk that there could be snakes trapped inside. Many of the chambers are flooded suggesting a blockage of the outlets. Generally, the mechanical equipment appears to be substantial but all electrical equipment (meters,

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panels, notches) have deteriorated and the installed hydroelectric turbines and electricity generating sets are not functional.

Other components of the scheme such as the supply canals, irrigation networks, drainage systems have significantly shown tremendous damage over the years.

The command is serviced by a 15km long and concrete lined supply canal which is crossed by 35 No culverts, foot and vehicular bridges. It has a reported carrying capacity of 30m<sup>3</sup>/sec and at the end of the supply canal there is a spillway and automatic siphons to prevent overloading. The two main canals (IL and IR) take off at this point. The culvert outlets across the supply canal that convey surface water from the high left side of the right hand side and down to the river are silted and do not have aprons and wing walls.

The drainage network was designed to dispose of storm water runoff and irrigation surplus water. It consists of the main, secondary, tertiary and field drains with total lengths estimated to be above 1,000km.



**Plate 1: Drainage channels overgrown with grass**

Runoff from the field were originally intended to be collected by the tertiary and field drains and passed into the secondary and main drains. Most of these drains however, are heavily silted and quite a number are overgrown with *Typha* grasses (see Plate 1) and therefore, does not perform its function.

The irrigation network consists of the main canal, secondary canal and tertiary canal. The two main canals, Irrigation Left (IL) and Irrigation Right (IR) take off at the end of the supply canal. The IL (15km) and IR (15km) were seen to have cracks and bulges at the concrete panels during field visits. Approximately 30% of the entire lengths of both embankments (left and right) of the canals are eroded below the concrete linings. The inverts of these canals are heavily silted with the attendant growth of grasses. It was also observed that while some farmers make use of their private pumps to siphon water for irrigation from the canals, other members of the community use the water from the canal for domestic purposes. Some members of the community were seen bathing/swimming, and washing in the canals. In spite of this, others still fetch water for both household and livestock use from it.

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There are several secondary canals (some concrete lined and others unlined) spanning over 200 km. The problems associated with the concrete lined secondary canals include cracks, sliding, bulging, uplifting of the slabs and grasses growing through the cracks and joints and silting at some locations (*plate 2*).



**Plate 2: Showing various stages of siltation and erosion damages on the canal**

With the earthen canals the problems are severe as most of the canal embankments have been eroded or are seeping water profusely. Their carrying capacity has been reduced as a result of siltation and infestation with weeds and shrubs and farmers in many locations have also breached them. The tertiary canal system extends to more than 400 km.



**Plate 3: Showing various erosion spots on the access roads**

The access roads (Plate 3) run along the routes of the main supply canals with the greater part surface dressed. The major problems along the surface dressed length are pot-holes and cavitation. The service roads are laterite constructed and run along the secondary canals. The problems common with this class of roads are pot-holes, gully erosion, waterlogging and total wash out in some cases.

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The Jankarawa Irrigation Area is made up of 5 pumping stations (JAS, JBS, JCS, JDS and JES) each of which has reservoirs with attached piezometric tower except JCS and JDS that share one tower and reservoir. JES is the last of the Pumping Stations in the area and does not have a piezometric tower. JAS pumping station has a dilapidated building and a functional reservoir with rusted pump-pipes some of which are perforated at different points. Sand deposit was visible at the sides of the reservoir, which may have been deposited from wind or human activity on the neck of the reservoir. This pumping station was initially meant to serve the sprinkler irrigation system in the Jankarawa irrigation area. However, members of the Maradun LGA obtain water for their domestic use from the JAS reservoir due to inadequate water supply. Water vendors also siphon water from this reservoir with Water tankers and plastic cans on hand pushed trucks. JBS – JES pumping stations are abandoned with dilapidated buildings, broken louvers and cracked reservoirs and are overgrown with weeds. Portions of the JBS reservoir are covered with rainwater and *algae* toads inhabit it, while the rest of the stations are highly silted.

There were no functional generators at the pumping stations and the electric power line running all the way down the length of the irrigation areas as well as the transformers have been vandalized. The flow pipes connecting the individual pumping stations were observed to be broken at some sections while some of the flow control points now serve as mosquitoes breeding sites especially after the rains.

The surroundings of these pumping stations have been covered by vegetation thereby limiting accessibility to the stations. These pumping stations lack sanitary facilities (toilets) and potable water. It was also observed that farmers are planting crops inside of the JBS reservoir since it has been abandoned.

#### **Other pumping stations**

These span the rest of the areas and covers mainly Talata Mafara and Bakura LGAs (*Designated; G-Left & Right, F-Left, LS-Left, LS-20 & 21, AS, BS, DS*). The pumping stations were all non-functional and some of the reservoirs were flooded. The flooded reservoirs were observed to be as a result of failed attached pumping stations, which were unable to pump out water sent in.

The sprinkler irrigation systems in these areas were converted to surface irrigation. However, the system is not optimized to full capacity because the canals are heavily silted. The control gates and drainages were also silted. One of the main drains was silted and a section destroyed by erosion thereby cutting off completely a section of the access road. The electric power lines, sprinkler pipes, parts of the gate control were vandalized.

Buildings in this area including the maintenance stations and staff quarters are all dilapidated.

Within the project area, River Sokoto, River Bobo and the Gora River tributary all have shallow depths with flood plains along both sides of their banks. These rivers often overflow their banks during the rainy season hence a series of dykes were constructed along the flood prone locations to protect the irrigation areas. Five different flood protection dykes were built along both banks of these rivers in the project area so as to protect the irrigation area. They have a total length of about 63.04km. The embankments of these dykes have suffered serious erosion for much of their length. At several locations along the embankments washouts and breaches have occurred.



### **Proposed Rehabilitation Works**

Some of the proposed rehabilitation works that will be carried out for the Bakolori Irrigation Scheme are highlighted in the section below.

#### **Proposed rehabilitation works for the Hydroelectric Power plant**

The dam safety report prepared by the Feasibility Studies consultant has proposed the following works to be carried out for the Hydroelectric Power Plant

- Replacement of the turbines;
- Replacement of the electrical components including the generators, 7 x 6.6kV switch gear panels and a remote control system with SCADA;
- Refurbishment of other components including transformers, 33kV indoor switchgear panel and 33kV outdoor switch yard;
- Refurbishment of the outlet works gates and valves.

Other remedial works recommended by the feasibility includes:

- The bats be excluded from all elements of the dam and associated equipment;
- The crest be cleared of vegetation;
- The ant and termite infestation be removed
- The edge of the crest of the embankment sections be rebuilt and the stone protection be replaced where damaged;
- The crest of the dam repaired, particularly on the left hand side;
- The finger drain collection chambers be cleared of all debris and kept clear;
- The chambers be supplied with covers and safe access be provided;
- All gates, valves and penstocks be made to operate;
- All electrical controls and operating mechanisms be repaired/replaced;
- All seals will be replaced.
- Operation and maintenance manuals be written;
- All valves, penstocks and gates be operated over their full range at least at 6 monthly intervals and a record be made of their operation;
- A series of crest leveling points be installed into the core;
- All mechanical gates and valves and penstocks be inspected and repaired/repainted/refurbished as required;
- The gate and its operating facilities be examined, refurbished and made to operate;
- An appropriate instrumentation array be designed under the control of a dam engineer to include leakage, measurement, crest leveling, foundation pressures, inclination of the dam;
- The stop logs be cleaned and repainted.

**Proposed rehabilitation works for the Irrigation Network (Main Canals, Secondary and Tertiary canals)**

- De-siltation of canals
- The concrete panels of the canals be removed and replaced
- Minor canals on the panels be sealed
- Removal of grasses, weeds and shrubs from the canals
- The gates and some sections of the secondary canals to be rehabilitated.
- Repair of cracks, bulging, sliding and uplifting of the slabs for the lined secondary canals.
- Reinforcement of embankment for the tertiary canal carried out.

**Proposed rehabilitation works for the Drainage Networks (Main drain, secondary, Tertiary and field drain)**

- De-siltation of the entire drainage network.
- Repair of cracks on the entire drainage network.
- Construction of a new main drain within the sprinkler system irrigation area.
- Flood drains from farms.
- The drains to be cleared of silt, debris, vegetation, weeds, trees to avoid blockage.
- Construction of walls for the secondary and tertiary drains.
- All spoils to be conveyed to borrow pits.

**Proposed rehabilitation works for the Road Networks**

***Access Road***

- Removal of vegetation from the access roads.
- Removal of weak surface dressing on the roads.
- Grading and backfilling of the roads with laterite.
- Compacting and surface dressing of the access roads
- Construction of drainages along the access roads

***Service Road***

- Erosion management
- Road stabilization.

***Field Track***

- Weed management
- Drain management

**Proposed rehabilitation works for the Flood dykes**

- The flood dykes will have to be rehabilitated to maintain a design height as well as to prevent the ingress of floodwater from the rivers within the project area.

**Proposed rehabilitation works for the Standard Structures**

These include the gates on the main canals, outlet structures, gates and weirs on the secondary canals, delivery structures, wastewater structures and crossing structures. The crossing structures include bridges, culverts and gates. Proposed rehabilitation works will include:

- Mechanical works
- Civil works

## **ATTACHMENT TWO: GENERIC CHECKLIST FOR ENVIRONMENTAL AND SOCIAL SCREENING**

# Generic Environmental and Social Screening Checklist

No	Item	Details				
<b>INTRODUCTION</b>						
1	Name of the State					
2	City					
3	Local Government					
4	Brief description of the project					
5	Does the site /project require any;					
		Yes	No	If yes give the extent (in ha)		
	Reclamation of land, wetlands					
	Clearing of forest					
	Felling of trees					
6	Minimum land area required for the proposed development (ha)					
7	Available total land area within the identified location (ha)					
8	Expected construction period					
9	Responsible contact person with contact Information					
10	Present Land Ownership	State	Private	Other (specify)		
11	Source of Funding					
12	Total Cost of the Project					
13	Anticipated Date of Completion					
<b>DESCRIPTION OF THE ENVIRONMENT</b>						
<b>PHYSICAL</b>						
14	Topography & Landforms (map)	Attach an extract from relevant 1: 50,000 topographic sheet/ if detailed maps are available provide them				
15	Relief (difference in elevation)	Low <20m	Medium 20-40m	High 40-60	>60m	
16	Slope	Low <30%	Medium 30-40 %	High 40-60 %	Very High > 60%	
17	Position on Slope	Bottom	Mid-slope	Upper-slope		
18	Soil					
19	Soil Depth	Shallow < 20cm	Moderate 20 – 100 cm	Deep >100cm		
20	Soil Erosion	Low	Medium	High		
21	Climate	Wet Zone	Intermediate Zone	Dry Zone/ Semi Arid Zone		
22	Annual dry period					
23	Source of fresh Surface Water	Spring/canal	Tank/Reservoir	Perennial Stream	Seasonal Stream	None
24	Surface Water Use	Domestic	Washing/Bathing	Irrigation	Animal use	
25	Surface Water Quality	Poor	Moderate	Good		
26	Ground Water Availability	Dug Well	Tube Well	Other (specify)		
27	Ground Water Use	Domestic	Washing/Bathing	Irrigation	Animal use	
28	Ground Water Quality	Poor	Moderate	Good		
29	Incidence of Natural Disasters	Floods	Prolonged droughts	Cyclones/tidal waves	Other	
30	Geological Hazards	Landslides	Rock falls	Subsidence	Other	
<b>ECOLOGICAL</b>						
31	Habitat Types in the Project Site (indicate the % of each habitat type)	Natural forest ( %), degraded forest( %), natural scrubland( %), degraded scrubland( %), riverine forest, grassland( %), abandoned agricultural land( %), marsh( %), lagoon( %), estuary( %), coastal				

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No	Item	Details				
		scrub( %), mangrove( %), salt marsh( %), home-gardens( %), Other ( %) (List)				
32	Habitat types within 250m radius from the site periphery (indicate the % of each habitat type)	Natural forest ( %), degraded forest( %), natural scrubland( %), degraded scrubland( %), riverine forest, grassland( %), abandoned agricultural land( %), marsh( %), lagoon( %), estuary( %), coastal scrub( %), mangrove( %), salt marsh( %), home-gardens( %), Other ( %) (List)				
33	Habitat types within 500m radius from the site periphery (indicate the % of each habitat type)	Natural forest ( %), degraded forest( %), natural scrubland( %), degraded scrubland( %), riverine forest, grassland( %), abandoned agricultural land( %), marsh( %), lagoon( %), estuary( %), coastal scrub( %), mangrove( %), salt marsh( %), home-gardens( %), Other ( %) (List)				
34	Are there any environmentally and culturally sensitive areas within 250m?	Protected Areas	Migratory pathways of animals	Archeological sites	Wetlands	Mangroves strands
35	Are there any plants of conservation importance within 250m (endemic and threatened species)? If yes, encouraged to provide a list					
36	Are there any animals of conservation importance within 250m (endemic and threatened species)? If yes, encouraged to provide a list					
<b>ENVIRONMENTAL SENSITIVITY</b>						
37	Does the project wholly or partly fall within any of the following areas?					
	<b>Area</b>	<b>Yes</b>	<b>No</b>	<b>Unaware</b>		
	100m from the boundaries of or within any area					
	100m from the boundaries of or within any area					
	Coastal zone					
	Any erodible area					
	Any Flood Area					
	Any flood protection area					
	60 meters from the bank of a public stream					
	Any reservations beyond the full supply level of a reservoir					
	Any archaeological reserve, ancient or protected monument					
	<i>Within a distance of one mile of the boundary of a <u>National Reserve</u></i>					
<b>ENVIRONMENTAL IMPACT AND MITIGATION / ENHANCEMENT DURING CONSTRUCTION PERIOD</b>						
	<b>IMPACT</b>					<b>MITIGATION/ ENHANCEMENT</b>
		H	M	L	N/A	
38	Soil erosion					
39	Water pollution					
40	Noise pollution					
41	Solid waste generation					
42	Loss of vegetation cover					
43	Habitat loss or fragmentation					
44	General disturbance to animal behavior					
45	Interference with normal movement of animals					
46	Irreversible/irreparable environmental change					
<b>ENVIRONMENTAL IMPACT AND MITIGATION / ENHANCEMENT DURING OPERATION PERIOD</b>						
47	Sewerage Disposal	Cess Pool				Sewage Pond
		Septic Tank				Other
48	Solid Waste Disposal					

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No	Item	Details			
49	Drinking Water Supply	Common Dug Well	Yes / No	Individual dug well	Yes / No
		Common Tube Well	Yes / No	Town supply – pipe	Yes / No
		Spring	Yes / No	Town supply – Stand post	Yes / No
50	Alteration to storm water drainage pattern	No changes	No major Changes	Major changes	
<b>CONTACT DETAILS OF OFFICIALS AND RECOMMENDATIONS</b>					
51	Name of the officer completed the form (From the Developer)				
52	Designation and contact Information				
53	List of team members				
55	Overall observation and recommendation				
55	Signature and date				
56	Name and Contact Information of the officer who checked this form (Environmental Officer)				
57	Remarks				
58	Signature and Date				

# Screening Questions to Determine the Need and Possible Extent of Further Environmental and Social Review and Management

SCREENING QUESTIONS TO DETERMINE THE NEED AND POSSIBLE EXTENT OF FURTHER ENVIRONMENTAL AND SOCIAL REVIEW AND MANAGEMENT		
1.	Biodiversity and <a href="#">Natural</a> Resources	Answer (Yes/No/ Not Applicable)
1.1	Would the proposed project result in the conversion or degradation of <a href="#">modified habitat</a> , <a href="#">natural habitat</a> or <a href="#">critical habitat</a> ?	
1.2	Are any development activities proposed within a legally protected area (e.g. natural reserve, national park) for the protection or conservation of biodiversity?	
1.3	Would the proposed project pose a risk of introducing invasive alien species?	
1.4	Does the project involve natural forest harvesting or plantation development without an independent forest certification system for sustainable forest management (e.g. PEFC, the Forest Stewardship Council certification systems, or processes established or accepted by the relevant National Environmental Authority)?	
1.5	Does the project involve the production and harvesting of fish populations or other aquatic species without an accepted system of independent certification to ensure sustainability (e.g. the Marine Stewardship Council certification system, or certifications, standards, or processes established or accepted by the relevant National Environmental Authority)?	
1.6	Does the project involve significant extraction, diversion or containment of surface or ground water? <i>For example, construction of dams, reservoirs, river basin developments, groundwater extraction.</i>	
1.7	Does the project pose a risk of degrading soils?	
2.	Pollution	Answer (Yes/No/ Not Applicable)
2.1	Would the proposed project result in the release of pollutants to the environment due to routine or non-routine circumstances with the potential for negative local, regional, and transboundary impacts?	
2.2	Would the proposed project result in the generation of waste that cannot be recovered, reused, or disposed of in an environmentally and socially sound manner?	
2.3	Will the proposed project involve the manufacture, trade, release, and/or use of chemicals and hazardous materials subject to international action bans or phase-outs? <i>For example, DDT, PCBs and other chemicals listed in international conventions such as the Stockholm Convention on Persistent Organic Pollutants, or the Montreal Protocol.</i>	
2.4	Is there a potential for the release, in the environment, of hazardous materials resulting from their production, transportation, handling, storage and use for project activities?	
2.5	Will the proposed project involve the application of pesticides that have a known negative effect on the environment or human health?	
3.	Climate Change	
3.1	Will the proposed project result in significant <sup>2</sup> greenhouse gas emissions? <i>Annex E provides additional guidance for answering this question.</i>	
3.2	Is the proposed project likely to directly or indirectly increase environmental and social vulnerability to climate change now or in the future (also known as maladaptive practices)? <i>For example, a project that would involve indirectly removing mangroves from coastal zones or</i>	



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SCREENING QUESTIONS TO DETERMINE THE NEED AND POSSIBLE EXTENT OF FURTHER ENVIRONMENTAL AND SOCIAL REVIEW AND MANAGEMENT		
	<i>encouraging land use plans that would suggest building houses on floodplains could increase the surrounding population's vulnerability to climate change, specifically flooding.</i>	
4.	Social Equity and Equality	Answer (Yes/No/ Not Applicable)
4.1	Would the proposed project have environmental and social impacts that could affect vulnerable groups?	
4.2	Is the project likely to significantly impact gender equality and women's empowerment?	
4.3	Is the proposed project likely to directly or indirectly increase social inequalities now or in the future?	
4.4	Will the proposed project have variable impacts on women and men, different ethnic groups, social classes?	
4.5	Have there been challenges in engaging women and other certain key groups of stakeholders in the project design process?	
4.6	Will the project have specific human rights implications for vulnerable groups?	
5.	Demographics	Answer (Yes/No/ Not Applicable)
5.1	Is the project likely to result in a substantial influx of people into the affected community(ies)?	
5.2	Would the proposed project result in substantial voluntary or involuntary resettlement of populations? <i>For example, projects with environmental and social benefits (e.g. protected areas, climate change adaptation) that impact human settlements, and certain disadvantaged groups within these settlements in particular.</i>	
5.3	Would the proposed project lead to significant population density increase which could affect the environmental and social sustainability of the project? <i>For example, a project aiming at financing tourism infrastructure in a specific area (e.g. coastal zone, mountain) could lead to significant population density increase which could have serious environmental and social impacts (e.g. destruction of the area's ecology, noise pollution, waste management problems, greater work burden on women).</i>	
6.	Culture	Answer (Yes/No/ Not Applicable)
6.1	Is the project likely to significantly affect the cultural traditions of affected communities, including gender-based roles?	
6.2	Will the proposed project result in physical interventions (during construction or implementation) that would affect areas that have known physical or cultural significance to indigenous groups and other communities with settled recognized cultural claims?	
6.3	Would the proposed project produce a physical "splintering" of a community? <i>For example, through the construction of a road, powerline, or dam that divides a community.</i>	
7.	Health and Safety	Answer (Yes/No/ Not Applicable)
7.1	Would the proposed project be susceptible to or lead to increased vulnerability to earthquakes, subsidence, landslides, erosion, flooding or extreme climatic conditions? <i>For example, development projects located within a floodplain or landslide prone area.</i>	
7.2	Will the project result in increased health risks as a result of a change in living and working conditions? In particular, will it have the potential to lead to an increase in HIV/AIDS infection?	
7.3	Will the proposed project require additional health services including testing?	
8.	Socio-Economics	Answer

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SCREENING QUESTIONS TO DETERMINE THE NEED AND POSSIBLE EXTENT OF FURTHER ENVIRONMENTAL AND SOCIAL REVIEW AND MANAGEMENT	
	(Yes/No/Not Applicable)
8.1 Is the proposed project likely to have impacts that could affect women's and men's ability to use, develop and protect natural resources and other natural capital assets? <i>For example, activities that could lead to natural resources degradation or depletion in communities who depend on these resources for their development, livelihoods, and well-being?</i>	
8.2 Is the proposed project likely to significantly affect land tenure arrangements and/or traditional cultural ownership patterns?	
8.3 Is the proposed project likely to negatively affect the income levels or employment opportunities of vulnerable groups?	
9. Cumulative and/or Secondary Impacts	Answer (Yes/No/Not Applicable)
9.1 Is the proposed project location subject to currently approved land use plans (e.g. roads, settlements) which could affect the environmental and social sustainability of the project? <i>For example, future plans for urban growth, industrial development, transportation infrastructure, etc.</i>	
9.2 Would the proposed project result in secondary or consequential development which could lead to environmental and social effects, or would it have potential to generate cumulative impacts with other known existing or planned activities in the area? <i>For example, a new road through forested land will generate direct environmental and social impacts through the cutting of forest and earthworks associated with construction and potential relocation of inhabitants. These are direct impacts. In addition, however, the new road would likely also bring new commercial and domestic development (houses, shops, businesses). In turn, these will generate indirect impacts. (Sometimes these are termed "secondary" or "consequential" impacts). Or if there are similar developments planned in the same forested area then cumulative impacts need to be considered.</i>	

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**Is the proposed project likely to increase environmental and/or social vulnerability to climate change now or in the future?**

	YES	NO
i Does the project involve any of the following activities?		
o Changes in land use		
o Agricultural expansion or intensification		
o Intensification of water use		
o Development in areas that are under existential threat ( <i>e.g. low-lying coastal areas</i> ), or the longer-term habitability of which is in question ( <i>e.g. areas at risk of extreme desertification or extreme disaster risk</i> )		
o Other economic/livelihood development based on climate-sensitive resources ( <i>e.g. exploitation of rangelands, forests, fisheries, rivers, lakes; natural resource-based tourism; etc</i> )		
o Activities in areas with existing conflicts over natural resources		
o Pricing of basic commodities ( <i>e.g. water</i> )		
o Privatization of, or formalisation of rights over, natural resources		
o Resettlement ( <i>e.g. facilitated or incentivised voluntary resettlement</i> )		
ii Does the project have the potential to have negative impacts on any marginalized or already vulnerable groups, particularly those dependent on climate-sensitive resources, such as:		
o Pastoralists		
o Hunter-gatherers		
o Forest dwellers		
o Subsistence farmers or fisher folk		
o Indigenous peoples (or other peoples) living outside of the mainstream economy		
o Women and minority groups		
iii Are project activities/outcomes predicated on assumptions (implicit or explicit) that future climatic and environmental conditions will resemble those of the present day? ( <i>e.g. require persistence of current rainfall regimes, surface runoff, extremes frequency/severity, natural resource abundance, ecological conditions, etc</i> ).		

**ATTACHMENT THREE: IMPACT ASSESSMENT METHODOLOGY FOR  
PROJECT SUB-COMPONENTS REQUIRING DETAILED  
ENVIRONMENTAL AND SOCIAL ASSESSMENT**

## IMPACT ASSESSMENT METHODOLOGY TO BE USED FOR DETAILED ASSESSMENT OF IMPACTS OF VARIOUS PROJECT SUB-COMPONENTS

For the identification and rating of key issues and impacts that are likely to occur during the implementation of various project sub-components, a 5-step Tool” will be used. Figure 1 below describes the process, while summary description of each step is provided thereafter.

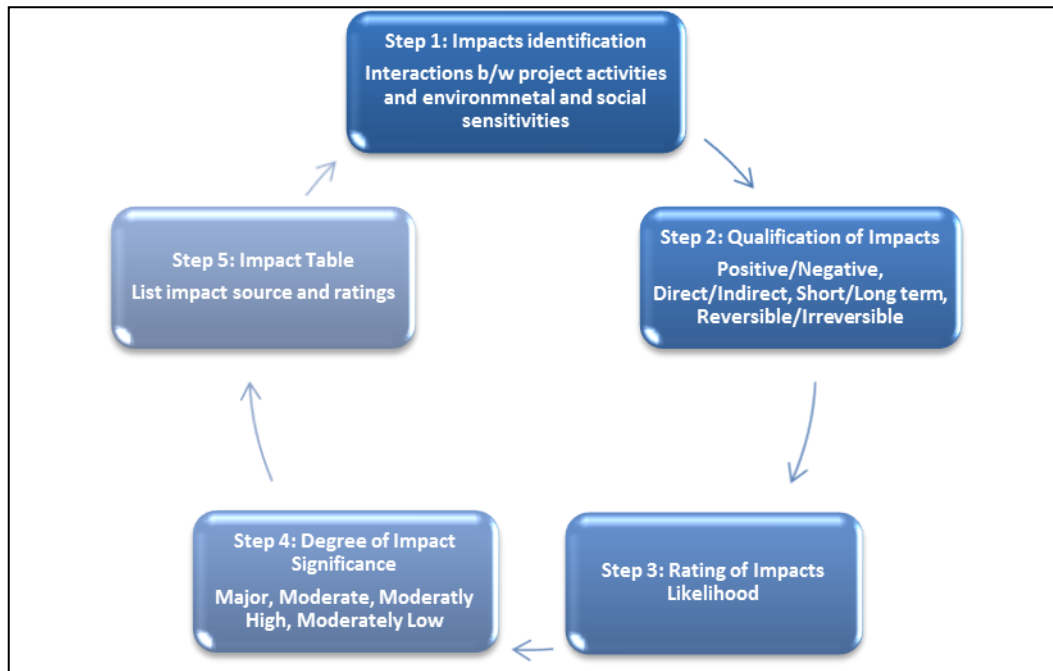


Figure 6.0 Impact Rating Tool

### Step 1: Identification of Potential Impacts

Expected impacts were determined based on anticipated interactions between project activities and major environmental and social sensitivities. The environmental and social sensitivities likely to be affected by project activities include the following:

**Environmental Components**

- ✓ Air (physical and chemical properties)
- ✓ Noise - vibrations, sound waves etc.
- ✓ Surface Water
- ✓ Ground Water and Hydro-geology
- ✓ Soil
- ✓ Topography and Landscape
- ✓ Climate Change

**Social Components**

- ✓ Air (odour)
- ✓ Noise – nuisance
- ✓ Visual Sensitivity
- ✓ Economic Activities
- ✓ Employment
- ✓ Public Health
- ✓ Occupational Health and Safety
- ✓ Education
- ✓ Land Use
- ✓ Property Rights
- ✓ Transport and Traffic
- ✓ Religious Activities
- ✓ Leisure and social activities
- ✓ Community Affairs and Grievance Redress

**Step 2 and 3: Qualification of Impacts**

Qualification of impacts will based two assessment characteristics:

*Step 2: Likelihood of occurrence* – This is an assessment of the probability of the effect occurring.

*Step 3: Potential consequence* – This is the actual result and scale that an effect might have. The application of each of the two characteristics is described below.

**Table 1: Likelihood of Occurrence of Impact**

Impact Probability	Likelihood	Frequency
High probability (80-100%)	A very likely impact	Very frequent impacts
Medium high probability (60-80%)	A likely impact	Frequent impacts
Medium probability (40-60%)	A possible impact	Occasional impacts
Medium low probability (20-40%)	An unlikely impact	Few impacts
Low probability (0-20%)	A very unlikely impact	Rare impacts

The magnitude of the potential changes to the physical and social environment caused by the impact of an activity or hazard, and the level of sensitivity of the receiving environment determine the potential impact of the activity. This is shown below:

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Table 2 Potential Consequences Classification Matrix

	Magnitude of Effect		
Receptor Sensitivity	Low change	Medium change	High change
Low receptor sensitivity	Trivial effect	Slight effect	Substantial effect
Medium receptor sensitivity	Slight effect	Substantial effect	Big effect
High receptor sensitivity	Substantial effect	Big effect	Massive effect

The rating of the potential consequences of an impact and its effects are shown below:

Table 3 Potential Consequences

Potential Consequence	Effect
Extreme consequence	A massive effect
Great consequence	A big effect
Considerable consequence	A substantial effect
Little consequence	A slight effect
Hardly any consequence	A trivial effect

### Step 4: Degree of Significance

The table below shows the impact significance with associated impact ratings.

Table 4 Degree of Impact Significance

Impact Significance	Impact Ratings
Major significance	Major Impact
Moderate Significance	Moderate Impact
Minor Significance	Minor Impact
Negligible Significance	Negligible Impact

### Step 5: Impact Assessment Matrix

Table 5 Impact Assessment Matrixes

		Potential consequences				
Likelihood	Positive	Negative				
		Hardly any	Little	Considerable	Great	Extreme
High		Moderate	Moderate	Major	Major	Major
Medium		Minor	Moderate	Moderate	Major	Major
Medium		Minor	Minor	Moderate	Moderate	Major
Medium		Negligible	Minor	Minor	Moderate	Moderate
Low		Negligible	Negligible	Minor	Minor	Moderate

After the rating of each impact, the determination of mitigation measures followed (*refer to section on ESMP*). Only moderate and major impacts were considered for impact mitigation. Continuous improvement practices will address low impacts. The positive impacts shall be monitored and enhanced when expedient.

## **ATTACHMENT FOUR: ATTENDANCE SHEETS AND PICTORIAL OVERVIEW OF CONSULTATION ACTIVITIES**



## ATTENDANCE SHEETS AT BAKOLORI IRRIGATION SCHEME

S/N	NAME	ORGANISATION	POSITION	PHONE NUMBER	LOCATION
1	Mh. Medu Tunani	B. I. P. T. Magoni	Field Officer	07062196715	
2	Adani Guga	B. I. P. T. Magoni	Farmer	08066391803	
3	Mh. Soni Ladi	B. I. P. T. Magoni		07034481418	
4	Mohamed Isah Othman	B. I. P. T. Magoni			
5	Sa'adu Gadi	Mohammed			
6	Ubaidullah Othman	R. I. I.	Chairman		
7	Soni D. Kadi				
8	Tunani Soni	T. I. P. T. Magoni		09030510169	
9	Abubakar G. Hudu			08108262105	
10	Abdullahi D. Gbure				
11	Mu Magaji				
12	Mu Gaji		Chairman	05037378678	
13	Bu'ari Soni			08182881999	
14	Haji Y. Y. Y. Y. Y.			07066286920	
15	Mh. Bala Mada			081847380156	
16	Umaro Magaji			07014549120	
17	Zeke Umar				
18	Lawdi G.				

S/N	Name	Org.	Position	Phone No.	Location
1	Usman Ngabatsami	MRIIP	Village Head Rep.	08031852171	Goronyo Dam Proj
2	Ah. Sule Talakuma	✓	WUAS leader	08165417553	✓
3	Salisu Haribu	✓	Field Staff	08081904701	✓
4	S. Fulani Ibrahim	✓	Hardman leader	08053013147	✓
5	Shitu Magam	✓	Farmer	0806708968172	✓

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S/N	NAME	INSTITUTION	DESIGNATION	PHONE NUMBER/ EMAIL CONTACT DETAIL
1	Dr. Obi Anagorosa	Hospitalia Consultants	ESA Consultant	08033114814
2	Professor M.A. Inya	Abenader/Alikin	Consultant	0803587662
3	Sufiyanu Muhi	BIP	As Pm	08027381208
4	Saidi Haruna	BIP	APM (S)	08064981566
5	ALIYU Y. Mofok	BIP	See B. W. W. A	08060731714
6	Malam Isah	BIP	Field staff	
7	Adamu Guga	Farmer		
8	Mh. Sani Ladan	Farmer		
9	Adeolu Ojo	ESMF Consultant	Consultant	08056637836
10	Alao Olajire	ESMF Consultant	Consultant	08058821508
11	Lawal Muhi Mofok	Pm GDP Curonyo	Project Manager	08065401927
12	Muhammad A. Mofok	GDP Curonyo	Asst. Project Manager	08066953389

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ATTENDANCE SHEETS AT HADEIJA-JAMA'ARE RIVER BASIN DEVELOPMENT AUTHORITY

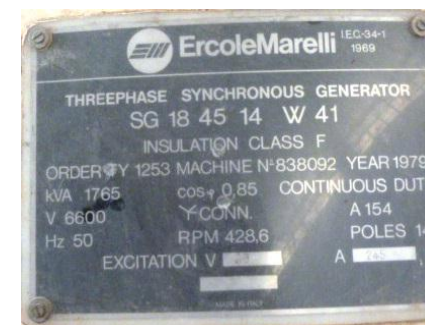
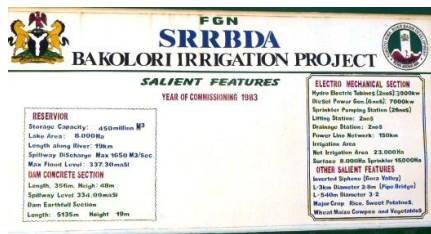
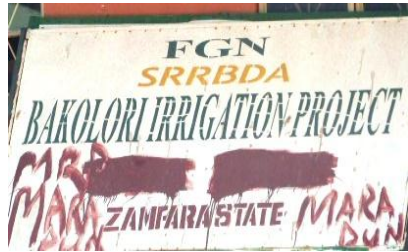
S/N	NAME	ORGANIZATION	POSITION	PHONE	SIGN	S/N	NAME	ORGANIZATION	POSITION	PHONE	SIGN
1.	Muhammadu Adamu	APEX KURA	Secretary	07036986015		1.	ABDU DATTARU	HJBDA - KANO	MD	08081168069	
2.	Lawan Umar Kura	APEX WUA	chairman	01034734616		2.	RABU YAHAYA	✓ ✓ ✓	E.B. A/F	08031520845	
3.	Ado A. Duke	Project Manager	P.M KRIPI	08069592277		3.	Engr. B.M. Chinade	✓ ✓ ✓	ED (E)	08035946697	
4.	Lawan JAHUN	Project Manager	~ H.V.P.	08085882872		4.	Muhammad U Kura	✓ ✓ ✓	DD (R)	08034639859	
5.	Engr. Umar I. Langa	H-JEBDA	CCE o/m H&S	080-39330679		5.	Engr. Muhd. I. Abubakar	✓ ✓ ✓	CCE (P+D)	08037030079	
6.	Kaila Adamu Dugo	Dugo Village Head	Dugo Village Head	07065462495		6.	Alav A. Olajire	Consultant	Socio-economic Consultant	08058821508	
7.	Musa Adamu	Transmanar V/Head	Transmanar Village	08065407819		7.	Engr. Baba U. Muso	FAMOR	ACIE	08024524085	
8.	BALA Isah	KADAKA	N-HEAD KADAKA	08033492605		8.					
9.	Kabir Muhammad	Chairman	U/HEAD CHIRMAN	08060244052		9.					
10.	GARBA SULEMAN	FEDERATED WATER USERS	CHAIRMAN (FNUA-HUB)	08020964563		10.					
11.	ASDAS HAYATU	DALI KURA	DALI KURA	07011746878							
12.	Alh. Musa	Dakili HADE	KURA L. & R	08031869897							
13.	Gamba Osman Adala	Federated water	Secretary	0803789955							
14.	ASBA Akinola	K.I.P. WEST	HOD SERVICES	08065282868							
15.	Amah SHUMBU	Agric Magazine	Sub-editor	08036030382							



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**PICTORIAL PRESENTATION OF CONSULTATION ACTIVITIES AT THE SOKOTO-RIMA RIVER BASIN DEVELOPMENT AUTHORITY HELD AT THE PREMISES OF THE BAKOLORI IRRIGATION SCHEME (JANUARY 20, 2014)**





**PICTORIAL PRESENTATION OF CONSULTATION ACTIVITIES AT THE HADEIJA-JAMA'ARE RIVER BASIN DEVELOPMENT AUTHORITY HELD AT THE PREMISES OF HADEIJA-JAMA'ARE RIVER BASIN DEVELOPMENT AUTHORITY (JANUARY 21, 2014)**





**PICTORIAL PRESENTATION OF CONSULTATION ACTIVITIES AT THE UPPER BENUE RIVER BASIN DEVELOPMENT AUTHORITY HELD AT THE PREMISES OF UPPER BENUERIVER BASIN DEVELOPMENT AUTHORITY (JANUARY 23, 2014)**



**ATTACHMENT FIVE: SUMMARY OF COMMENTS AND ACTIONS TAKEN  
TO ADDRESS THEM IN THE REPORT**



## SUMMARY OF COMMENTS AND ACTIONS TAKEN ON THEM

S/N	COMMENT	ACTION TAKEN	LOCATION IN CURRENT REPORT
<b>A. TRACK CHANGES COMMENTS</b>			
1	Change date on report from January to February	Change accepted	Cover page
2	Page on list of contributors to the report: This is not necessary. It should be removed from the report	Entire page deleted	N/A
3.	FMEnv, NESREA, FMWR, FMARD: These acronyms should be spelt out.	The full meanings of the acronyms have been provided	Executive Summary, 4.0
4	Land tenure and resettlement: This should be captured in the RPF. Otherwise, indicate a reference to the RPF.	Reference has been made to the RPF in this section	Executive Summary, Page 12
5.	All other minor track changes comments, including spellings and some other typos have been rectified		
<b>B. SPECIFIC COMMENTS</b>			
1.	The consultant should provide more information on the section on consultation including a summary of issues raised and responses. Also a list of stakeholders and persons consulted should be included in the annex.	A comprehensive overview of issues arising from the various consultation for a held has been presented in Section 9 of the report. In addition, pictures from consultations and attendance sheets are presented in Attachment 4	Section 9, Table 9.1 and Attachment 4
2.	In view of the realization that consultation is key to project outcome, therefore, the report should reflect that the consultation that has started through the preparation of this ESMF should continue throughout the project phases.	Noted and reflected in Section 9	Section 9
3.	<b>Complementarity:</b> The Consultant should coordinate with his colleague working on the RPF and ensure that both documents are cross referenced	Appropriate reference has been made to the RPF, where land tenure and resettlement issues are concerned	Section 2 (Baseline)
4.	A header title should be inserted in the report.	A header has been inserted in the report	
	All acronyms in the report should be clearly spelt out and updated in the list of acronyms in the preliminary pages	List of Acronyms has been updated	
	What are the alternatives considered? The consultant should include a section on analysis of alternatives both in the Executive summary and main text	A new chapter on project alternatives has been inserted.	Chapter 6
	In the forward (page 9), it was stated that five (5) safeguard policies were triggered whereas in the main report, seven (7) are listed. There is need to revise these.	This has been regularized	
	All aspects meant to address resettlement issues with regards to land take and displacement should be captured in the RPF document. Thus, these aspects in the ESMF should be removed referenced. The ESMF consultant should review the RPF document and address these aspects.	Cross referencing has been done across the report	
	Please describe in detail the requirements for disclosure	A new chapter on disclosure requirements has been inserted	Section 11
	In preparing this report, it would be useful for the consultant to review similar ESMFs for example the recently completed ESMf for the Ibadan Urban Flood Managemetn Project (IUFMP) and the ESMF for NEWMAP	Available recently completed ESMFs have been reviewed and components therefrom taken into cognizance.	Chapters 6 and 11.
	<b>Chapter 1:</b> The introductory chapter should include a study approach or methodology, literature review and a summary of the field visits undertaken.	This has been incorporated.	

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S/N	COMMENT	ACTION TAKEN	LOCATION IN CURRENT REPORT
	<b>Chapter 4:</b> Relevant National policy, regulatory and administrative guidelines should be discussed before the international frameworks.	This has been done	Chapter 4
	<b>Chapter 5:</b> There is mention of dam rehabilitation and strengthening as part of the proposed civil works but the safety of dam operational policy is not triggered in the entire report. Please review.  There is also no discussion on the potential adverse social impacts of proposed civil works to be undertaken in the project. This should be incorporated	This has been covered  Incorporated in the Impacts section	Chapter 4  Chapter 5
	<b>Chapter 6:</b> The capacity assessment/roles and responsibilities of the PCU and especially the environmental and social unit were not discussed. This should be included	This has been incorporated in the institutional section	Now Chapter 7

## **ATTACHMENT SIX: CHANCE FIND PROCEDURES**

## **PROCEDURE FOR CHANCE FINDS**

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

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.

## **ATTACHMENT SEVEN: ENVIRONMENTAL AUDIT**

## **ENVIRONMENTAL AUDITING**

Auditing refers to the examination and assessment of a certain type of performance. In the case of the TRIMING, an audit will assess the actual environmental and social impacts of sub-projects, the accuracy of prediction of EAs undertaken for the projects, the effectiveness of impact mitigation measures recommended by the EA, and the functioning of monitoring mechanisms. The audit should be undertaken once a subproject has been 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 TRIMING 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.

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 subproject 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.