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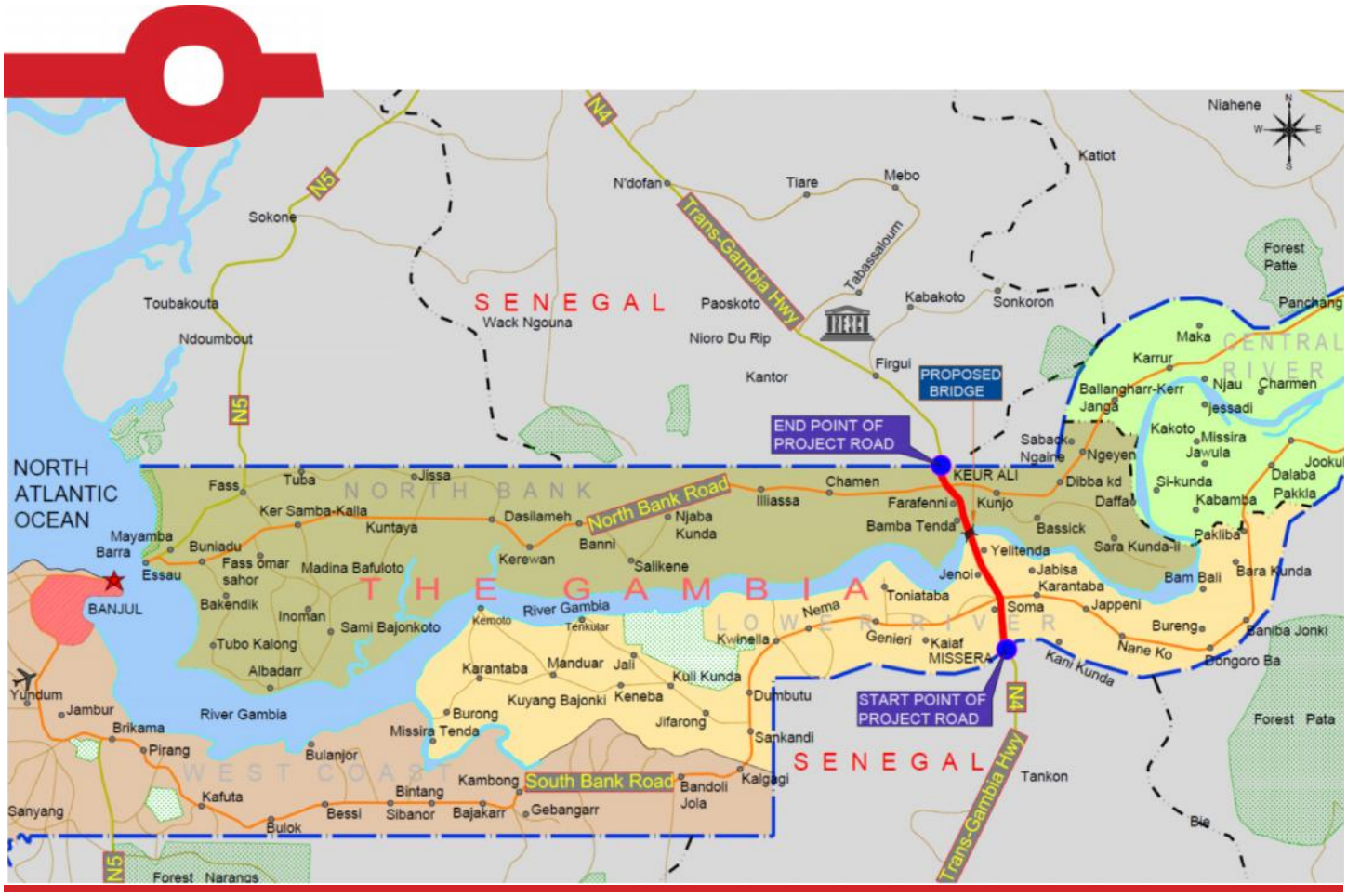
Ministry of Transport Works and Infrastructure
National Roads Authority

Feasibility & Detailed Studies and Toll Bridge Institutional Model Trans-Gambia Corridor Project Phase-II

Environmental and Social Impact Assessment (ESIA/ESMP) Study Report



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SYSTRA GROUP

FEASIBILITY & DETAILED STUDIES AND TOLL BRIDGE INSTITUTIONAL MODEL TRANS-GAMBIA CORRIDOR PROJECT PHASE-II

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA/ESMP) STUDY REPORT

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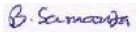
	Check	Samanta Brindabon	PD	15/06/2016		
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LIST OF ABBREVIATIONS & ACRONYMS

AfDB	African Development Bank
AIDS	Acquired Immune Deficiency Syndrome
ANR	Agriculture and Natural Resources
DOA	Department of Agriculture
DOF	Department of Forestry
DOH	Department of Health
DPWM	Department of Parks and Wildlife Management
DWR	Department of Water Resources
ECOWAS	Economical Community Of Western African States
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FGD	Focus Group Discussion
GEAP	Gambia Environmental Action Plan
GD	Geological Department
HIV	Human Immunodeficiency Virus
HSE	Health Safety Environment
HSP	Health and Safety Plan
KII	Key Informant Indicators
NBR	North Bank Region
LGA	Local Government Authority
LRR	Lower River Region
MKAC	Mansakonko Area Council
MDG	Millennium Development Goals
MOHSW	Ministry of Health and Social Welfare
MOWTI	Ministry of Works Transport and Infrastructure
NAS	National Aids Secretariat
NEA	National Environmental Agency
NEMA	National Environmental Management Act
NGOs	Non-Governmental Organizations
NRA	National Road Authority
PAGE	Programme for Accelerated Growth and Employment
PIZ	Project Influence Zone
PPE	Personal Protection Equipment
PRA	Participatory Rural Appraisal
RPO	Regional Programme officer for Environment
SEO	Site Environment Officer
STDs	Sexually Transmitted Diseases
SWMS	Soil and water Management Service
VDC	Village Development Committee

EXECUTIVE SUMMARY

The Trans-Gambia Corridor Project is an economic and strategic link connecting the northern and southern parts of both The Gambia and Southern Senegal, and by extension ECOWAS countries through the corridor between Dakar and Lagos. The objective of the project is to facilitate over land traffic flow between the northern and southern parts of the two sister countries and other ECOWAS Member States. The construction or upgrading of the Trans-Gambia Highway is an integral part of the Trans-Gambia Corridor Project. The expected outcomes include: (i) reduced transport cost, travel time and customs formalities time at the borders; and (ii) enhanced potential for trade thereby contributing to poverty reduction and social-economic empowerment of communities on the corridor and the West African Region as a whole.

In order to gather adequate information within the project intervention areas for the establishment of a baseline on environmental and social impacts for the project during implementation, both quantitative and qualitative methods of data collection were applied which as well involve field assessment of the area with respect to the environment and other ecosystem services during field work which initially started on the 6th and 7th of May 2016 and then follow by the eight days of detail visit which started on the 24th of May, 2016.. Furthermore, relevant information about sites was collected through and secondary data related to project activities as well field visits where necessary. Basically, the area of focus aimed at addressing the key environmental and social components of the project with respect to its implications on the environment during implementation. The result from this environmental ESIA /ESMP study reveals that project activities in terms of upgrading or strengthening of trans Gambia Hay way sites in Soma (LRR) and Farafenni (NBR) may not have major negative impacts on the environment and local communities during implementation.

However, upgrading of the highway or construction could potentially impacts on the environment as well as the social wellbeing of workers and local communities particular on air quality, some business activities along the highway, enhancing of erosion and emergency of STDs, injuries and related occupational health issues. The activities of the project shall have insignificant destruction of vegetative cover in intervention areas.

The overall negative environmental and social impacts that are anticipated during project implementation could be minimized and managed if the mitigation measures proposed are duly implemented during operation. Evidently, the activities of the project shall have insignificant destruction of vegetative cover in intervention areas.

1. INTRODUCTION

1.1 General Description

The proposed pavement strengthening of the Trans-Gambia Corridor road is to support and complement the Trans - Gambia Corridor Project (TGCP) funded by an AfDB Grant. The subject project build on the on-going AfDB financed phase I of the construction of the Tran-Gambia Bridge & One-Stop Border Posts in the Gambia & Senegal. It is believed that strengthening the road section between the northern and southern border crossings along the corridor road will ensure the sustainability of the previous investment of the road section, given the projected increase in traffic upon completion of the bridge.

Improving and modernising transport infrastructure is recognised as one of the main strategies underpinning economic growth and employment generation in the Gambia's development blueprint. The Trans-Gambia Corridor is an economic link that strategically connects the northern and southern part of both the Gambia and Senegal. In recognition of the significance of the link to the Gambia's local and regional economy, the link has benefitted from consistent investment. It was rehabilitated in 2010 with funding from the EDF.

However, traffic along the corridor is expected to increase significantly upon completion of the bridge and is envisaged that the road will need strengthening to ensure that it able to carry the increased traffic.

This project will enable to reduce travel time, strengthen the trade and improve cohesion between communities that were isolated from each other. The project will facilitate the transport of agricultural products to markets, which will enable to reduce crop losses after harvest and promote socio-economic activities.

1.2 Trans-Gambia Corridor Background

The Trans-Gambian Corridor (Kaolack-Trans Gambian Highway-Zinguinchor) having a length of 24 km is a part of the Cairo-Dakar-Lagos corridor. The Trans-Gambia Road Transport Corridor is an economic and strategic link connecting the northern and southern parts of both The Gambia and Senegal, and by extension ECOWAS countries through the corridor between Dakar and Lagos. The sector goal of the project is to support economic growth of the countries on the Trans-Gambian Corridor (Kaolack-Trans- Gambian Highway-Ziguinchor), considered part of the Trans-West African Highway (from Dakar to Lagos Corridor) and ECOWAS at large by fostering integration through reliable, efficient and seamless transport infrastructure that will increase the competitiveness of the region. The proposed pavement strengthening of the Trans-Gambia corridor road is to support and complement the Trans-Gambia Corridor Project (TGCP) funded by African Development Bank (AfDB) grant.

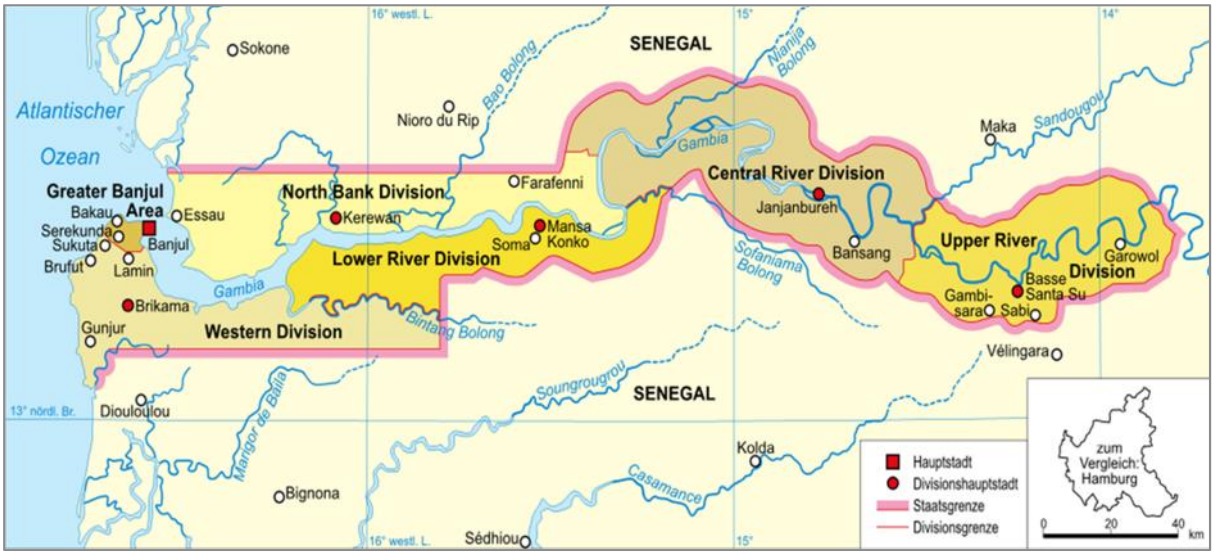
1.3 Project Location

1.3.1 The Gambia

The Republic of the Gambia is located on the Atlantic coast of Africa, between latitudes 13°N and 14°N and Longitude 14°W and 17°W. Occupying a total area of 11,420 sq. km, the Gambia consists of two narrow strips of land from 6 to 26 km wide, extending to over 450 km east along the banks of the River Gambia. The Republic of Senegal is the Gambia's only neighbour. Occupying an area 20 times the size of the Gambia, Senegal surrounds the Gambia on the north, east and south.

The geomorphology of the Gambia is dominated by the River Gambia, which divides the country into two strips of land no wider than 30 km. The Gambia is generally low-lying, with nowhere above 60 m. Over 48% of the total land area of the Gambia is below 20 m high with nearly one-third of the country, at or below 10 m above sea level. Only four percent of the country's land area is above 50 m. From the River outwards one can identify three topographic regions, the valley bottom, dissected plateau, and sandstone plateau. The Map of the Gambia showing Administrative Regions is shown in **Figure 1**.

Figure 1 : Map of the Gambia showing Administrative Regions



1.3.2 Project Road

The project road is located in the Central part of The Gambia, running through North Bank and Lower River Division and part of the Trans-Gambia highway corridor. The Trans-Gambia Highway is the most important road in The Gambia, running across the centre of the nation in a north-south direction. The road is also economically important for Senegal, in which it is designated as the N4 road. The Key plan of the project road is shown in **Figure 2**. Rehabilitation of the project road between Keur Ali and Misera having total length of 24 km, to serve existing as well as the future traffic arising after completion of river bridge. Currently there is no bridge over river Gambia and tolls are collected by the ferry operations (Gambia Ports Authority) on behalf of government as national revenue under the authority of the Ministry of Transport, Works and Infrastructure.

The project road has been recently received maintenance in 2010, it is anticipated that traffic on the corridor is expected to increase significantly upon completion of the bridge and it is envisaged that the road will require strengthening ensure that it continues to carry the load due to increased traffic without damage. After the bridge is constructed, the ferry services at the site will be discontinued.

Project road starts at Misera near southern border between The Gambia and Senegal the end point is at Keur Ali near northern border between The Gambia and Senegal.

Figure 2 : Key Plan

1.4 Objective of this Assignment

The Government of the Republic of The Gambia is arranging financing from the African Development Bank (AfDB) grant, for development of second phase of Trans Gambia Corridor Project (TGCP). Under the portion of funding for Phase II of TGCP, Ministry of Transport Works and Infrastructure (MoTWI) through National Roads Authority (NRA) has entrusted the Consultancy Services for **Feasibility and Detailed Studies and Toll Bridge Institutional Model for Trans Gambia Corridor Project Phase II** (Approximate length 24 km) to SAI Consulting Engineers Pvt. Ltd.

The main objective of the assignment is:

- To perform necessary engineering, economic and environmental studies and identification of optimal, cost-effective and economically justified standards of the options for the required project road rehabilitation between Misera and Keur Ali having approximate length of 24 km (excluding The River Gambia Bridge section and it's approaches), arising from increased traffic after bridge completion.
- To assess the options for and propose the best institutional model for tolling the bridge.

This project will enable to reduce travel time, strengthen the trade and improve cohesion between communities that were isolated from each other. The project will facilitate the transport of agricultural products to markets, which will enable to reduce crop losses after harvest and promote socio-economic activities as well create market for products produced and overall improve trade within the ECOWAS region and beyond.

1.5 Objective of the ESIA Report

The environment and Socio Economic studies are integral part of any meaningful economic development project and especially those that are related to infrastructural works. Such studies ideally help in establishing the likely socio economic and environmental impacts and as well identifying benchmarks for results measurement and mitigation during implementation.

The study report would therefore set the base for comparing the effectiveness of Project Road either in the short or the long term. In recognition of this importance, and in line with the national environmental policies and legislations, this kind of assessment is required to guide the implementation of this project in line with the following objectives:

- Assessing how the project will contribute to better access to social services
- Document expected grievances that may happen as a result of the project
- Beneficiary overall perception on the project
- Establishing baseline for selected socioeconomic indicators in relation to the project

As part of the preparation and implementation of the ESIA, the following objectives shall guide our actions:

- Ensure that the project management is committed in the environmental requirements of the project;
- Ensure that all our activities are in compliance with national environmental regulations;
- Ensure that the works are designed and performed as much as possible to have best environmental performance as planned;

- Ensure that the external demands are met such as grievance or suggestions from PAPs concerns have been taken into account during implementation

Specific objectives, and target of the ESIA report is shown in the **Table 1**.

Table 1: Specifics Objectives, Indicators and Target of the ESIA Report

Objective	Indicators	Target
Mitigate the impact on the landscape and soils quality	Comply with the regulation	100 % of tree cutting authorized by DOF/SWMS – DoA
	Reforest the equivalent of the cut trees	Number of trees cut down = Number of trees planted
	Place the excavated material thoughtfully	No single complaint from local population
Minimize air pollution	Use vehicles and machines in good condition and sprinkle water on roads	Used of pollution free vehicles that are in good condition and control dust emissions
Preserve the socio economic status	Avoid encroachment on property as much as possible	No use of property without the owner authorization
	Ensure the passage of the herds	No litigation with farmers about that issue
Preserve Health and safety of the personal and the population	1. Application of health and safety measures by personal 2. Prevention against STIs & HIV/AIDS	- SOPs to be complied - Community beneficiaries
Ensure safety during work	Limit the noise and no work at night	Number of complaints of inhabitants , regarding the noise
	Prevention against accidental pollutions	No grave leak of hazardous material, burnt oil etc.
Local development and gender integration	Promote local hiring when available provision of employment of skilled and un skilled employees	Number of skilled and un skilled employees coming from villages concerned by this project work

1.6 Rationale for an Environmental and Social Impact Assessment (ESIA)

An Environmental and Social Impact Assessment (ESIA) is a clear plan of actions, stipulating what specific activities will need to be implemented to ensure mitigation measures are duly acted up; in a essence, it aims to identify potential problems and opportunities of the activity for the enhancement of the latter's purpose.

The general framework for the assessment and management of environmental and social safeguards of developments/projects in the Gambia is provided in the National Environment Management Act (NEMA), 1994, and the EIA Guidelines and Procedures 1999, and EIA Regulations 2014.

It is mandatory that all development activities that could have potentially significant impacts on the environment and the society be subjected to an Environmental & Social Impact Assessment (ESIA) with a view to fully establish impacts of the activity on the environment and society in general; such impacts are defined for the entire life cycle of the activity.

The rationale for preparing an ESIA for this component of the trans Gambia Corridor is essentially to evaluate the project's potential environmental and social risks and impacts in the areas and sites selected for its implementation. The process of ESIA will examine ways of improving project site selection, planning, design, and implementation; it also attempts to prevent, minimize, mitigate, or compensate for adverse environmental impacts, and to enhance positive impacts throughout project implementation. Whenever feasible, preventive measures are favoured over mitigation or compensatory measures.

The capacity of NEA and other collaborating partner institutions in the country in the EIA process was built by the World Bank through a capacity building environmental project and consequently the Gambia's Guidelines and procedures are essentially tailored during the Bank's support but with modifications to suit the national context. However, where policy discrepancy exists, the national policies will override any other policies and regulations.

In that regard, the Trans Gambia Corridor being funded by the AfDB would require the adoption of the environmental safeguard policies which require the preparation of an Environmental and Social Impact Assessment / Environmental and Social Management Plan as this project is categorized under category 2 which make an ESIA/ESMP the appropriate requirement under the Bank's OP/BP 4.01

2. METHODOLOGY

The key activities of the ESIA/ESMP are the following:

- Assessment Of Baseline Environmental & Socioeconomic Conditions,
- Public Health and safety,
- impact prediction and definition of mitigation and enhancement
- formulation of the ESMP;

These are all preceded by data collection and analysis as well as relevant literature review. Consultations were also held with the beneficiaries; the aforementioned processes are described below

2.1 Baseline Survey

2.1.1 Collection of Socioeconomic data Information

The baseline socioeconomic data/information focused on means of income generation, asset possessions, access to public health and education. This information was collected through focused-group discussion and administration of questionnaires.

2.1.2 Analysis of Socioeconomic Data

The socioeconomic data and information was both quantitative and qualitative; the qualitative data was quantified using codes such that the entire data was comparatively analysed using tables, charts and graphs with Microsoft Excel.

2.1.3 Collection of Environmental Data and Information

Baseline data and information focused on land-use and land-cover with focus on forestry, nature conservation, fisheries, quarrying among other environmental indicators. The biophysical factors looked at water supply and availability, grasslands, wildlife, soil appearance, farmlands, livestock among others. The last aspect of baseline environmental data/information collection was ecologically-related with focus on wetlands, thick forests and mangroves ecosystem.

This baseline is best described by knowing the maximum limit of environmental influence on the project site, which was defined through watershed catchment delineation.

2.1.4 Analysis of Environment Data

The catchment definition helped us determine the maximum boundary to look for the various environmental components given above. The analysis of the baseline environmental data/information was largely dependent on land areas occupied by the various environmental components; possibility of the land area occupied by each environmental component and how this could be impacted by the project activities during implementation both construction and operational phases.

2.1.5 Impact Prediction and Assessment

The impact prediction resulted to a set of impacts that are determined, through largely expert opinion, to be possible consequences of the activity's construction process and operations; the assessment on the other hand determined the significance of these impacts whether they are positive or negative again through expert opinion. The impacts were predicted through

the use of a simple matrix that, among others, determines for each environmental and social factor the possible source of impacts and how these could ramify.

2.1.6 Definition of the Mitigation & Enhancement Measures

Mitigation measures relate to the amelioration of possible negative environmental and social impacts as a result of the construction and operations of the planned activity. The enhancement measures relate to the further advancement of positive environmental and social positive impacts. In both cases, these were determined through brainstorming on various expert opinion and consulting similar activities in similar environments.

2.1.7 Formulation of the ESIA/ESMP

The first steps in defining the ESMP is an institutional/stakeholder analysis that determines the key institutions (local, national and non-state) that are crucial to the implementation of the plan; the definition of an implementation plan for the MEMs and a monitoring strategy, among others, then follows. In all cases the ESMP was finalized through brainstorming and expert opinion and comparison with similar activities in similar environments.

2.1.8 Public Participation & Consultation

The consultation of the beneficiaries was central throughout the ESMP/ESIA process and this was extensively done during the baseline environmental and social data/information collection process as well as the public related issues with respect to the project activities.

In order to gather adequate information from project intervention sites of beneficiaries for the establishment of a baseline on environmental and social impacts for the project, both quantitative and qualitative methods of data collection were employed during field work

The socio-economic survey applied a mixed method approach; using various research techniques and supporting tools. Specifically, Participatory Rural Appraisal tools and household questionnaires were the main survey instruments. The application of which resulted to generation of accurate and reliable information as manifested in this report. Given the need to triangulate survey findings, several documents were also reviewed to ascertain validity of the data collected thus building confidence on the scope and degree to which the information could be used as baseline for future similar project.

On a more precise description, the Participatory Rural Appraisal tools used in the qualitative part of the exercise were Focus Group Discussion (FGD), Income and Expenditure Matrix, Wealth Ranking and Key Informant Interviews (KII). Prior to this a scoping mission was carried out to consult and discuss with representatives of all the seven (7) villages along the trans-Gambia Highway.

After the Scoping mission, four villages were identified for in-depth survey. These villages were randomly selected and interviewed households subsequently selected through a stratified sampling procedure using the criterion of their proximity to the road. After the stratification process, households within each stratum were randomly selected with a 10% proportionate target of the number of households within the selected villages. With this sampling frame, thirty questionnaires were administered from within the following four villages: Sare Biran / Misera Village, Soma Town, Breto Village and Farafenni Town

The report is thus compiled taking into consideration of all gathered information from questionnaires, PRAs and desk reviews.

The first attempt was a courtesy call to the village head (Alkalo) who introduced the survey team to the Village Development Committee (VDC). Representatives of the FGD sessions were carefully selected and comprised; Men women, youth and the Elderly. All of them were informed about the purpose of the study and solicited their active participation.

Each participant was given the opportunities to express his/her views on the issues that may result during the pavement strengthening in view of the effect it will cause(impact)either positive or negative gains. A total of seventy one (71) FGD members participated from the

The ESIA/ESMP report will enhance the development of indicators that would be applied for monitoring of project activities and ensuring compliance with set of environmental requirements and standards during implementation of project activities.

Nonetheless, the ESIA/ESMP was conducted with the understanding that the agro-ecological and social conditions are generally uniform across the country and, importantly, the activities, in these areas, are almost the same. The assessment had two main components – a preliminary field assessment report and the comprehensive ESIA Study report.

3. RELEVANT ENVIRONMENTAL POLICIES AND LEGISLATIONS

3.1 Gambia Environmental Action Plan (GEAP)

The Gambia's Environmental Action Plan provides the overall policy framework for sound environmental management in The Gambia. It seeks to promote and implement sound environmental policy. The GEAP puts special emphasis on environmental management, pollutions and nuisances and the necessity to safeguard the well-being of the populations. It is the first integrated environment and natural resources management policy framework of the country that provides an overview of the existing environmental situation and outlines approaches to deal with the problems, including institutional changes and other actions required. Therefore, the performance of ESIA's for projects like Trans Gambia Corridor Project means fulfilling the objectives of the GEAP.

3.2 The Agriculture and Natural Resources (ANR) Policy

The ANR policy objectives focus on: (i) improved and sustainable measurable levels of food and nutrition security in the country in general and vulnerable populations in particular; (ii) a commercialized sector ensuring measurable competitive, efficient, and sustainable food and agricultural value chains, and linkages to markets; (iii) strengthened institutions (public and private) in the sector, providing needed services, strong and enabling environment, and reducing vulnerability in food and nutrition security; (iv) sustainable effective management of the natural resource base of the sector.

3.3 National Health Policy, legal and administrative framework

The Government of the Gambia places a high importance on the protection and promotion of the health of its citizenry. It is from this perspective that a new national health policy and strategic plan was developed in 2012. The main philosophy of the National Health Policy 2012-2020 is that "a healthy population is a wealthy population". The policy is in line with Vision 2020 and Program for Accelerated Growth and Employment (PAGE), MDG and the Local Government Act, 2002.

The Ministry of Health and Social Welfare (MOH&SW) is responsible for overall policy formulation, planning, organization and coordination of the health sector at national, regional, district and community levels. In order to facilitate efficient and effective coordination of the sector, regional health terms have been established for coordinating policy interpretation, planning and implementation of health services at regional levels.

The health service delivery in the regions consist of three levels: primary, secondary and tertiary health care. The primary health care level is the village health posts and primary health care services which are offered by village health workers, and a community health nurse. The secondary level offer more specialized and wider range of care than the primary level and include maternal and new born care, management of malnutrition, malaria, TB, HIV/AIDS and STIs. The secondary level makes referral to tertiary level which is the final level.

3.4 Gender and Women Empowerment Policy 2010 - 2020:

The Government of The Gambia recognizes that gender equality and women empowerment is a key factor for the attainment of social and economic development as well as improved population well-being. As a result a number of measures have been taken to mainstream women in the development process in the country. Among such measures include: (i) the establishment of the National Women's Council and Bureau by the Council Act of 1980 which

consists of women representatives from all Districts in the country with the Women's Bureau serving as its executive arm; (ii) the development of the National Policy for the Advancement of Gambian Women (NPAGW 1999-2009), formulated to provide a legitimate point of reference for addressing gender inequalities at all levels of government as well as among other stakeholder activities; and, (iii) the formulation of a Gender and Women Empowerment Policy 2010-2020 which resulted from a series of consultative processes at national, regional, district and community levels.

Women comprise 78 percent of economically active population who work in agriculture compared to just 57 percent of men. The majority of women farmers is unskilled agrarian wage earners and is responsible for about 40 per cent of the total agricultural production in the country. Their massive contribution does not translate to the desired improved social status for women. Their productive activities are mainly subsistence -based and for home consumption. Women are also active in horticultural production which generates relative good income.

However income gained from such activities is often ploughed back into maintenance of the household. Their limited capacity and skills to embark on viable agro-based and entrepreneurial activities, lack of ownership and control over resources such as land and modern agricultural equipment, coupled with the triple roles of women, impede all efforts for rural women to graduate into the mainstream livelihood economy.

3.5 Relevant Regulatory Framework - National Act and Regulations

3.5.1 The National Environmental Management Act 1994

The National Environmental Management Act (NEMA, 1994) is the legal framework for the control and management of the environment and for matters connected therewith; it is under the purview of the National Environment Agency (NEA). Part V of the NEMA and the EIA Regulation 2014 provides for certain projects listed under Schedule A to be considered for environmental impact assessment. These include tourism projects, large scale agricultural investment projects, large scale aquaculture projects, roads, waste management, and urban development; Trans-Gambia Bridge Corridor suits the large-scale urban development projects on road infrastructure as described in the Act.

3.5.2 The Biodiversity and Wildlife Act (2002)

The Wildlife and Biodiversity Act of 2003 provides for the Department of Parks and Wildlife Management to declare and manage national parks, reserves and local sanctuaries, as well as Ramsar sites for the purpose of preserving the country's biodiversity. It also allows for the participation of 'local people' in biodiversity management for the purpose of ensuring their sustainable use.

3.5.3 The Mines and Quarries Act, (2005) and Draft Quarry Regulations, (2011)

All these seek deals with issues related to mining or quarrying activities in the Gambia

3.5.4 The Local Government Act, (1990)

This Act and its re-enacted version of 2002 establishes, and empowers, local government Councils to, among others, ensure, in their areas of authority,: (i) prevention of soil erosion; (ii) the management of forests and forest products, especially as it will impede soil erosion and (iii) the regulation of the disposal of refuse, the prevention and generally for the oversight of health and sanitation; (iv).

The establishment and management of recreation grounds open spaces and parks. This Act was enacted in 2002 to make provisions for (i) the functions, powers and duties of local authorities, (ii) development in the decentralized governments, (iii) local government civil service, traditional authorities and the co-ordination of local government authorities.

3.5.5 The Forestry Act (1998)

The relevance of the Forestry Act is largely the same as described under the biodiversity act. A number of project activities have bearing on forest resources and wildlife necessitating the consideration of this Act in the execution of the project.

3.5.6 Institutional Framework for EIA/ESIA/ESMP/ESMFs Implementation

The NEA is the custodian of the EIA process outlined below. The Agency works closely with a multi-sectoral EIA Working Group comprising the public sector, private sector and civil society. The roles of the various stakeholders in the EIA process are as follows:

3.5.7 The EIA Working Group

- Advises the NEA Executive Director on the approval or otherwise of environmental impact statements
- Undertakes scoping exercises, public consultations and the review of draft environmental impact statements that developers submit to the NEA for the Executive Director's approval.

3.5.8 The NEA

- Screens projects using the EIA Screening Forms
- Supports the EIA Working Group to conduct scoping of projects requiring EIA
- Develops the terms of reference for the subsequent environmental impact study

In addition it coordinates public consultations on draft environmental impact statements submitted to the NEA, the review of same are also its responsibility

In addition, the conduct of ESIA/ESMP is line with AfDB's environmental and social impact Assessment procedures 2001, Integrated Environment Impact Assessment Guidelines 2003, the Policy on the Environment 2004 and the Integrated Safeguard System Policy 2013.

The Bank's Strategy for 2013-2022 emphasises the need to assist regional member countries in their efforts to achieve inclusive growth and transition to green growth. In addition, the Bank is committed to ensuring the social and environmental sustainability of the projects it supports. The ISS is designed to promote the sustainability of project outcomes by protecting the environment and people from the potentially adverse impacts of projects. The safeguards aim to:

- Avoid adverse impacts of projects on the environment and affected people, while maximising potential development benefits to the extent possible;
- Minimise, mitigate, and/or compensate for adverse impacts on the environment and affected people when avoidance is not possible; and
- Help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.

The trans-Gambia Bridge Corridor Project has been categorized by the bank as *Category 2* : which implies projects likely to have detrimental and site specific environmental and social

impacts which can be minimized by the application of mitigation measures to be incorporated in an Environmental and Social management Plan (ESMP) thus the requirement to prepared the ESMP instead of full ESIA;

3.5.9 African Development Bank Safeguards Policies

Integrated Safeguard System (ISS)

The African Development Bank has established an Integrated Safeguard System (ISS) for a comprehensive projects review and ensuring a cross the board perspective of environmental and social linkages. The ISS comprises of four components, all that existed separately but with identifiable operational weakness. The components include:

(i) Integrated safeguard policy statement (ISPS),
(ii) Operational safeguards(OS),
(iii) Environmental and social assessment procedures (ESAPs), and
(iv) Environmental and social impact assessments (ESIAs).

Integrated Safeguard System (ISS) encompasses into five number (5 No) operational safeguards addressing the following fields:

(i) Environment,
(ii) Involuntary,
(iii) Gender,
(iv) Climate risk management and adaptation,
(v) Civil society engagement framework,
(vi) Health,
(vii) Integrated water Resources management,
(viii) Agriculture and rural development, and
(ix) Poverty reduction.

The specific safeguards are briefly described below:

Operational Safeguard 1 (OS 1)
This is the main safeguard that guides environment and social assessment as well as climate issues. The safeguard governs the process of determining a projects environment and social assessment requirement. OS is designed to identify, access and manage potential environment and social risks and impacts including climate change issues. More specifically, OS1 achieves the following:

(i) Identify and assess risks and impacts,
(ii) Avoid and/or minimize, risks and impact,
(iii) Provide for stakeholders participation,
(iv) Ensure effective management of risks and impacts, and
(v) Contribute to capacity building elements.

In the categorization requirements under OS1 – 5 are also considered as support safeguards. Under the safeguards environmental and social impacts assessment (ESIA) studies are undertaken on clearly defined projects while environmental and social management framework (ESMF) is prepared for programmes or plans with a multiplicity of uncertain projects.

Operational Safeguard 2 (OS 2)

The safeguard focuses on involuntary resettlements, land acquisition, population displacements and requirements and compensation. It consolidates the policy commitment and requirements on involuntary resettlements and incorporates improvements operational effectiveness.

Operational Safeguards 3 (OS 3)

This safeguard is designed to govern biodiversity and ecosystem services for the conservation and promotion of sustainable use of natural resources. Among the focus is on the integrated water resources management where commitments translated into operational requirements.

Operational Safeguard 4(OS 4)

OS4 governs pollution prevention and control, hazardous materials and resource efficiently. It covers a wide range of impacts arising from pollution, wastes and hazardous materials and particularly those under international conventions and regional standards. This also includes greenhouse accounting. The OS4 principles also support OS1 described above.

Operational safeguard 5 (OS 5)

Labour conditions, health and safety are a major concern in projects. The Bank therefore, has established OS 5 to address requirements concerning works conditions, rights and protection from abuse and/or exploitation.

4. PROJECT DESCRIPTION AND ESIA

4.1 Environmental Conditions

Gambia lies within the tropical sub-humid eco-climatic zone, with rainfall range between 800 and 1200 mm annually. The climate is characterized by two seasons, a wet season (between June and October) and a dry season (November to April), which is six to seven months of no rains. During the dry season, the climate is dominated by dry and dust-laden winds that originate from the Sahara Desert in the Northeast. These north easterly winds are known locally as the Harmattan. The early part of the dry season, November through February, is generally cooler, with minimum temperatures of less than 20°C a common occurrence.

The rainy season in the Gambia lasts 5 to 6 months, with 98% of the rainfall occurring between June and October. August is the rainiest month in the year, when as much as 37% of the annual rainfall occurs. The average annual rainfall has considerable spatial and temporal variation. Higher rainfall is received in the southwest part of the country with an estimated 1200 mm annually. The lowest annual rainfall is received in the north-northeast part of the country. Average number of rainy days range from 54 days in Banjul, the capital city, to 31 days in Basse Santo Su in the Upper River Region.

Average temperatures in the Gambia range from 18 to 28 degrees Celsius in January to 23 to 36 degrees Celsius in June. Higher temperatures are recorded as one travels east with mean maximum in summer months reaching 43 degrees Celsius around Basse in Upper River Region. Highest temperature ever recorded in the Gambia was 45°C and the lowest temperature recorded was 9°C.

Temperatures in Banjul and Kombo are moderated by the Atlantic Ocean, experiencing less seasonal and daily variability in daytime temperatures. In an average year, temperatures exceed 35°C for only 34 days in Banjul, compared to 112 days in Basse in the URR. During the winter months (December through March) temperatures fall below 18°C for no more than 10 days in Basse Santo Su, compared to 56 days in Greater Banjul Area. Throughout the year the high temperatures encourage plant growth but during the dry season, lack of water becomes an inhibiting factor for plant growth.

The climate of the project area is tropical, with the alternation of two seasons – a hot, rainy season between June and November, and a cooler dry season from November to May.

Mean annual rainfall varies from 1200 mm in the south-west to about 500 mm in the north-east. Mean temperatures vary from 14°C in the Coastal areas to 40°C in the eastern part of the country. The rainy season is dominated by the Monsoon winds, while the dry season is dominated by cold and dry winds. The natural vegetation type of The Gambia is Guinea Savanna Woodland in the coastal area that gradually changes into Open Sudan Savanna in the east. The climate is Sudano-Sahelian characterized by a short rainy season from June to October and a long dry spell from November to May with scattered vegetation and forest cover.

4.2 Geology and dominant soils and soil conditions

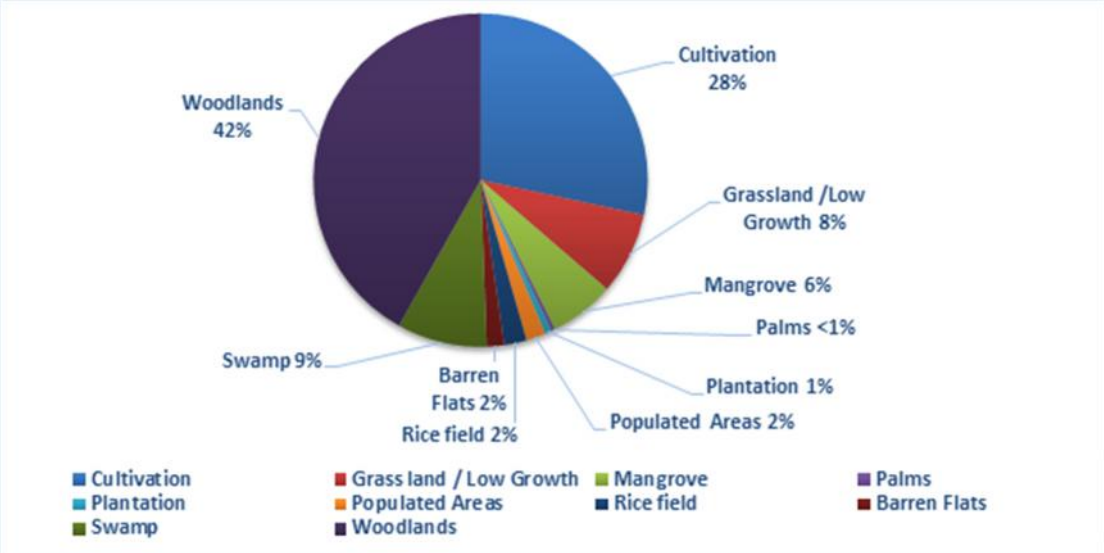
In general, the geological conditions of the project area in both Soma area and Farafenni are relatively flat with some isolated hilly terrain. These fields include recent silt and more or less sandy sediments

4.3 Land use and Land Cover

The natural vegetation formations are classed into more woody Guinea woodland in the west and less woody Sudan savannah in the eastern part. Wetlands consisting of mangroves, barren flats, and freshwater swamps constitute 17% of total land area and the remaining 83% is under various Sudanian-Guinean woodland savannah formations. Over the last one hundred fifty years, the Gambia has experienced significant transformation of the natural land cover as the result of a number of anthropogenic and natural factors:

Anthropogenic activities such as agricultural expansion, urban settlement, livestock rearing, wildfires, and increased climate variability including frequent and persistent droughts are blamed for the change in Gambian land cover. In 1946, woodlands that include mangroves covered an estimated 81% of the land area. By 2001, total woodland and mangrove area represented less than 50% of the land area. Closed forest, once the dominant woodland cover, is all but disappeared, and the remaining woodland has been reduced to single canopy woodland or grassland.

Figure 3 : Composition of Gambia's land scape in 2001: Source: Gambia 50,000 database. DoSLG & L2003



4.4 Potential Environmental Implications

1. The area has virtually limited vegetation cover
2. Waste generation issues
3. Noise during construction
4. Air Pollution /Dust creation during construction
5. Possible spread of communicable diseases

In addition, other issues of concern is related to safety particularly accidents by speeding vehicles when the road are completed and in use. Furthermore, the high level embankment of the road may cause flooding to adjacent houses particularly in Soma and Farafenni settlements which are densely populated and where at some point the roads currently serve as drains. Therefore proper drainage system and culverts be developed where appropriate to address such situation. Uncovered drainage system will floods and serve as a dumping ground for waste and breeding sites for insects particularly mosquitoes and other vectors.

Some stalls in Farafenni - NBR

Current Road Condition - LRR

Truck Garage at Keur Ali -NBR

Car park at Misera - LRR

5. SOCIO ECONOMIC STUDIES AND ANALYSIS

The upgrading of the 24 kilometres trans Gambia road from Sere Biran/Misera (Senoba) in the South bank to Keur-Ali in the North of Lower River and North Bank Regions Respectively have the following components as detailed below:

5.1 Demography, Land Ownership, Tenure and Use

The Trans-Gambia Highway cut through two administrative regions in Gambia: Lower River Region (LRR), with Mansa Konko as the administrative capital, and the North Bank Region – NBR with Kerewan as the administrative capital. The actual population of the districts where the Trans Gambia Highway are to be upgraded is estimated to be 68,808 with Jarra West accounting for (27,205) and Illiyasa / Upper Badibou 41,603 people respectively.

Population and economic activities in the PIZ is predominantly rural with high agricultural base with the production of groundnuts, rice, sorghum and vegetable but with more than 60% poverty rate.

Agriculture is the primary source of revenue for inhabitants along the corridor. There is a gendered division of labour in the agricultural sector. Men primarily grow sorghum, millet, maize and groundnuts while women grow rice and vegetables. Women mainly derive their income from small scale food production and trading.

Land Ownership, Tenure and Use:

The clans own the customary rights to the land within the project catchment. Individuals or families may acquire land usually for building or agriculture production.

The upgrading and construction of the highway would open up the growth area and improve access to agricultural inputs and markets to other sub regions. This will boost agricultural production and ultimately beneficiaries' incomes through trade and other services there is a gendered division of labour in the agricultural sector. Men primarily grow sorghum, millet, maize and groundnuts while women grow rice and vegetables. Women mainly derive their income from small scale food production and trading. Population of the project influence zone is shown in the **Table 2** below.

Table 2: Demography / Population in the PIZ

Region	Population	Men	Women
Lower River Region (Mansa Konko)	82, 361	40,721	41,640
North Bank Region (Kerewan)	221,054	104,931	116,123
Total	**303,415**	**145, 652**	**157,763**

Source: GBoS 2013

5.2 Analysis and Interpretation of Findings of Socio-Economic Studies

5.2.1 Focused Group Discussion

The first attempt was a courtesy call to the village head (Alkalo) who introduced the survey team to the Village Development Committee (VDC). Representatives of the FGD sessions were carefully selected and comprised; Men, Women, Youth and the Elderly. All of them were informed about the purpose of the study and solicited their active participation. Each participant was given the opportunities to express his/her views on the issues that may result during the pavement strengthening in view of the effect it will cause(impact)either positive or

negative gains. A total of seventy one (71) FGD members participated from the four villages. In addition, four members of the regional health team from Mansakonko also participated. The stakeholder consultations and the survey were carried within a period of eight days and was started on the on Tuesday, 24th – 31st May, 2016. The team were able to visit the sample communities and discussed with them on the proposed project and their views on its implementation.

5.2.1.1 Profile of the Surveyed Village

The surveyed villages comprise a total of 25,043 households with Soma and Farafenni being the largest settlements. Both Sare Biran /Misera and Bereto are small settlements and therefore have no social amenities. On the other hand, Soma and Farafenni as cosmopolitan towns have night club, sporting facilities (footballs and basketball pitches). There are large markets in these towns and a weekly conducted market (lumo) at Farafenni.

Regarding land ownership, all the settlements indicated that they have land for agricultural use. Soma and Farafenni have several schools; ranging from nursery to tertiary skills /technical institutions. There are other government institution like fire services, banks and two major health facilities at both Farafenni and Some.

There are pipe-borne water taps at the two towns whiles local water facilities; few wells and hand-pumps still around at the smaller villages. Besides the availability of tap water, there are wells and hand-pumps at soma. There is an electricity grid at Farafenni supplying Soma and other satellite settlements within the catchment area. However, Sare Biran and Bereto are without electricity, although structures (poles and wires) pass through their settlements.

5.2.1.2 Effects of the Road on Community Livelihoods

A good road is an important factor for development as it facilitates trade. All the settlements expressed that an effective road network enhances swift transport communications and especially for movement of agricultural goods. Equally, good roads also facilitate quick access to social services as health and education. People living by the road are opportune to build settlement and structures for business ventures thus getting their livelihoods improved.

5.2.1.3 Environmental Considerations

According to findings of the FGDs, floods, erosion and inconvenience in accessing homes may be encountered if the road is raised to certain height above household settlements. There is need to construct steps or gentle slopes to all places leading to settlements. There should be numerous traffic signs and humps to maintain road safety. The roadsides in the towns and villages should be widened and parking space created for vehicles particularly long trucks. Shops and related businesses close to roadside be relocated and their owners compensated.

Sellers should be reasonably distant from the roadside so as not to disturb the traffic. Local authorities be instrumental in sensitizing the young to desist from playing on road, owners manage their livestock at home as frequent crossing of the road can influence accidents.

5.2.1.4 Health Considerations

Improving the condition of road network will enhance swift referrals of patients to the health facilities. However, given the anticipated busy transport flow, more accidents and incidence of HIV/AIDS and TB prevalence are expected to increase. To overcome these predicted challenges, there is need to improve the health service infrastructure within the project catchment area.

There is need for increased supply of medical items and a reliable ambulance for patient referrals. In addition, medical staff within the project area would require adequate and improved accommodation for their timely response to demanding health services associated with the project. **Table 3** shows the health staff who Participated on the Focus Group Discussions

Table 3: Health Staff who Participated on the Focus Group Discussions

Name	Posting	Designation
Basiru Drammeh	Mansakonko	Senior Nursing Officer
Binta Manneh	Soma major health center	State Registered Nurse (SRN) MIDWIFE
Ansumana Faye	Some health center	State Registered Nurse (SRN)
Kintehnding Kinteh	Soma major health center	TB & LEPROSY Assistant

5.2.2 Quantitative Findings

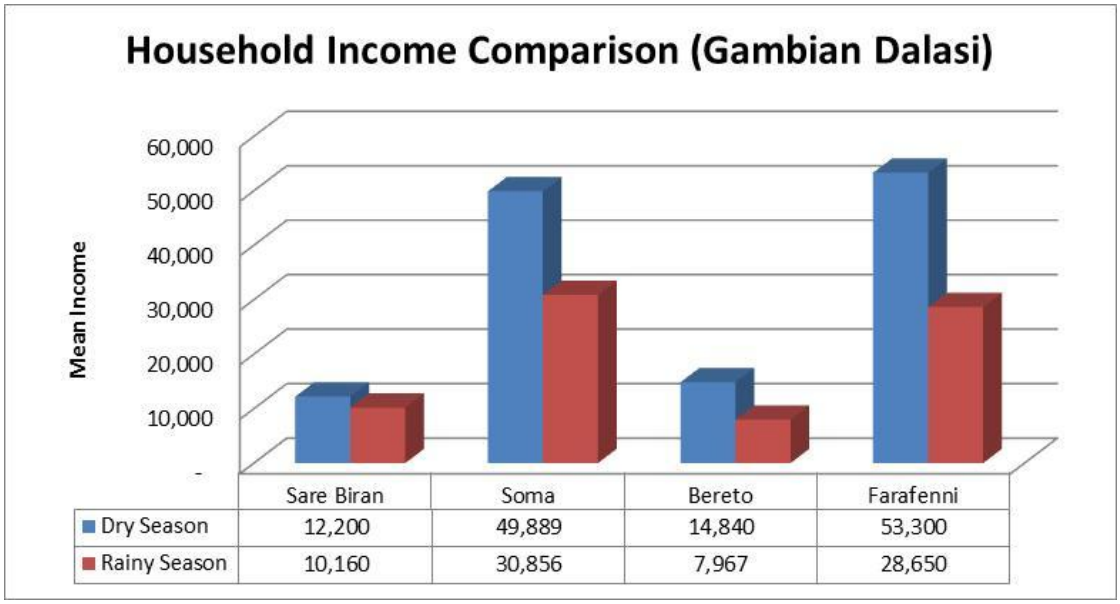
5.2.2.1 Household income

Table 4: Income in 2016 Compared with same Period in 2015

Settlement	HH income compared with the same period last year			Total
	Increase	Decrease	Similar	
Sare Biran	-	16.70%	-	16.70%
Soma	16.70%	13.30%	3.30%	33.30%
Bereto	6.70%	10.00%		16.70%
Farafenni	10.00%	13.30%	10.00%	33.30%
Total	**33.30%**	**53.30%**	**13.30%**	**100.00%**

The above **Table 4** shows that 53.30% of respondent reported a decrease in income in 2016 compared to same period in 2015. Of total respondents, 33.30% reported an increase with only 13.30% reported the same.

Figure 4 : Household Income Comparison



From the evidence, (illustrated above) respondents' average income during the dry season is greater that their rainy season income. Whereas mean income during dry season is D12, 200 (SareBiran), D49, 889, (Soma), D14, 840 (Bereto) and D53, 300 (Farafenni), rainy season incomes are lower by comparison across the four survey settlements. The average annual income is also higher in the towns of Farafenni and Soma than SareBiran and Bereto.

5.2.2.2 Production and Marketing

Table 5: Household main livelihood activity

Settlement	Household main livelihood activity			
	Farming	Trading	Formal Employment	Others
SareBiran	13.80%	-	3.40%	-
Soma	13.80%	6.90%	6.90%	6.90%
Bereto	10.30%	-	-	3.40%
Farafenni	-	20.70%	-	13.80%
Total	**37.90%**	**27.60%**	**10.30%**	**24.10%**

As tabulated in **Table 5** above, farming is the main livelihood activity (37.9%) followed by trading (27.6%). Formal employment accounts for only 10.30% and mainly in Soma and SareBiran and 24.10% are active on other livelihood activities as driving, carpentry, welding etc.

Table 6: Markets for selling household produce

Settlement	Most frequent market for selling household products		
	Local Market	Lumo	Nearby market
SareBiran	14.30%	-	9.50%
Soma	19.00%	-	4.80%
Bereto	-	4.80%	19.00%
Farafenni	23.80%	-	4.80%
Total	57.10%	4.80%	38.10%

The above **table 6** shows the most frequently visited markets. 57% sells their produce to local markets within 38% visiting the nearby markets and only 4.8% sells to lumo. Improving the quality of the Trans-Gambia is an important consideration since it would facilitate trade and transportation to the markets and hence enhance and improve economic activities in the satellite villages.

Table 7: Selling of products to middlemen

Settlement	Do you sell your products to middlemen?	
	Yes	No
SareBiran/Misera	15.80%	10.50%
Soma	15.80%	15.80%
Bereto	15.80%	10.50%
Farafenni	-	15.80%
Total	47.40%	52.60%

Even though there are large settlements (Farafenni and Soma) within the project site with several business activities, 47.4% sells their produce to middlemen as shown in the **Table 7** above. The remaining 52.6% indicated that they directly sell to consumers.

Table 8: Market risks

Settlement	Which marketing risks are you worried about?			
	Poor status of roads and transportation infrastructure	Price fluctuation	Products are highly seasonal	Products are highly perishable
SareBiran	17.60%	5.90%	5.90%	-
Soma	-	11.80%	-	11.80%
Bereto	-	23.50%	5.90%	-

Farafenni	-	17.60%	-	-
Total	17.60%	58.80%	11.80%	11.80%

The above **Table 8** shows marketing constraints and risks encountered by household members during marketing. There are numerous constraints and risks along the whole value chain but the most market constraint has been highlighted by this finding according to the beneficiaries. One major risk factor highlighted during the study is price fluctuation registering 58.8 % while 17.6 % indicated poor transport infrastructure as major constraint. Both product seasonality and perishability recorded 11.8 % marketing risks.

5.2.3 Transport Services

Table 9: Mode of transport to the preferred market

Settlement	Most frequent mode of transport to the preferred market?				
	Vehicle	Foot	Motorbike	Animal Drawn Cart	Others
SareBiran	-	8.70%	-	13.00%	-
Soma	-	17.40%	-	4.30%	4.30%
Bereto	8.70%	13.00%	-	-	-
Farafenni	4.30%	21.70%	4.30%	-	-
Total	**13.00%**	**60.90%**	**4.30%**	**17.40%**	**4.30%**

As tabulated above in **Table 9**, 60.9% of residents access their preferred market on foot and 17.4% using animal drawn carts. Only 13% reported using vehicles while 4.3% depends on motorbikes to access their preferred markets.

Table 10: Time in Days Travelling to Commonly Visited Market

Settlement	Time spend on travelling to your most common visited market?	
	Within one day	Within two days
SareBiran	17.90%	-
Soma	25.00%	3.60%
Bereto	17.90%	-
Farafenni	35.70%	-
Total	96.40%	3.60%

Given the proximity to the markets, 96.4% reported reaching the market within one day. Only 3.6% indicated accessing their commonly visited market within two days as described in the **Table 10**.

5.2.4 Positive Socio-economic Impacts

Transportation

- With good roads, transportation of agricultural produce will become much easier and with lesser risks. The construction of these roads could lead to reduction in transport cost given that more vehicles will be available as choice of transport.

Trade Facilitation

- Produce/product loss during transportation to the markets will be significantly minimized and hence post-harvest losses equally reduced leading to enhanced income generation for the rural communities.

5.2.5 Adverse Socio-economic Impacts

Although the project has lot of benefits, it may equally have some adverse effects as described below:

- There could also be a population boom as a result of the good road network thus resulting in an increase in disease prevalence such as HIV/AIDS and other STI.
- Compounds may also be affected during construction and accidents may increase after the road construction because drivers may tend to be driving in top speed.
- It is also foreseen that it may encourage the infiltration of thieves in the area due to good access road.

5.2.6 Project Alternative

The current proposed project is meant to align with the existing road network. Any change or alteration in terms creating a new road shall require the heavy destruction of housing in the PIZ and other livelihood of the PAPs as well the environment. This will trigger the consideration of the AfDB IRP and could require a full resettlement plan which then could categorized the project under category 1 meaning, the project impacts on both social and environment are severe and serious. Base on this, there is no project alternative under the current circumstances.

6. PUBLIC HEALTH AND SAFETY SITUATION OF THE PROJECT AREA

6.1 Description of Public Health in the Project Area

Overall, The Gambia has registered significant improvement has been made in reducing under five and maternal mortality as well as increasing life expectancy, including North Bank and Lower River Regions; the two regions directly affected by the Trans-Gambia Corridor Road Project. In North Bank region which include Farafenni and Bereto, under five mortality has dropped from 101 per 1000 live births in 2010 to 63/1000 live births. In Lower River Region which includes Soma, the under-five mortality declined from 98/1000 live births in 2010 to 52/1000 live births in 2013(MICS, 2010 and DHS, 2013).

However, it should be cautioned that MICS 2010 and DHS 2013 are two different surveys where sampling errors associated with childhood mortality estimates are large and should be noted when comparing the two surveys.

In both regions, the two main public health facilities: AFPRC General Hospital, and Soma Major Health Center, do not have occupational health physician or nurse. In both public health facilities, patients needing infectious disease care are seen at the Infectious Disease Unit or Out Patient Department. Patients with chemical injuries are seen by the general physician or nurse, while all other injuries including lacerations are seen by surgeons at AFPRC General Hospital.

6.2 Infectious Diseases (Including HIV/AIDS and TB)

Significant progress has been made in of reduction the prevalence of Malaria and tuberculosis. The results of the Malaria Indicator Survey (MIS2014) showed a 90% reduction in malaria cases over a 5-year period across all the two health regions. Similar trend has been observed for TB, but HIV/AIDs has stagnated and highest in Mansakonko (2.9 percent). In 2013 in Mansakonko, the proportion of HIV positive among women age 15-49 was 3.8%; while men were 2.8 %. In Farafenni, the proportion was 1.7% for women and 1.3% for men (DHS, 2013).

According to 2014 HMIS (Health Management and Information) database a total of 163 cases of HIV positive – 73 males and 90 females were seen in Mansakonko, while in Farafenni Health region, 149 HIV positive were reported in 2014 of which 57 are men and 92 were women.

This shows that men are higher of contracting HIV from women. Truck drivers and migrant workers, who are often men, therefore need protection to reduce spread of infection either to the communities or back to their families (WHO, 2012). In the 2013 DHS, self-reported prevalence of STIs was higher among women than among men. Overall, 8 percent of women and 3 percent of men reported having had an STI or experiencing STI symptoms in 2012.

In Mansakonko health region, 2.2 percent of women and 3.4 percent of men reported having an STI. In Farafenni health region, 1.4 percent of women and 1.3 percent of men reported having an STI in n the 12 months before the survey.

The risk of HIV/AIDS and STI is high in both regions. Among all men age 15-49, the percentage who had sexual intercourse with more than one sexual partner in 2012 was above 10% for both Mansakonko and Farafenni Health regions.

The volume of patients for AFPRC Hospital in Farafenni is adequate for the staff including HIV and TB patients seen at the Infectious Disease Unit (IDU) and Chest clinic. However, these clinics are located in isolated buildings. This could lead to stigmatizations leading to low utilization of the VCT services and treatments. The hospital has trained health workers that

provide VCT services and treatment to patients. Notwithstanding, the compliance rate for patients seen in the hospital is estimated to be very high. Almost all women and men age 15-49 in The Gambia have heard of AIDS.

However, comprehensive knowledge on HIV transmission is low and men are better informed than women. Comprehensive knowledge is defined as knowing that consistent condom use and having just one faithful partner can reduce the chances of getting the HIV, knowing that a healthy-looking person can have the HIV, and rejecting the two most common local misconceptions about HIV transmission in The Gambia: that HIV can be transmitted by mosquito bites and that HIV can be transmitted by sharing food with a person who has AIDS.

Overall, only 27 percent of women and 36 percent of men age 15-49 have comprehensive knowledge about AIDS. In Mansakonko only 36.2 percent of women and 29.9 percent of men age 15-49 have comprehensive knowledge about AIDS. In North Bank Region, only 17 percent of women and 42.2 percent of men age 15-49 have comprehensive knowledge about AIDS.

A couple of community and civil society organizations are active on health topics in the town of Farafenni and its environs, notably ADWAC, Red Cross, and North Star Alliance. Together these agencies provide services ranging from bed net distribution for malaria prevention and control, blood donation campaigns, awareness creation programs on HIV, TB, and support sex workers get screened, and supply of condoms. The North Star Alliance, who are supported by staff from the AFPRC Hospital, is specifically active in screening, counselling, testing, and supplying vulnerable populations (migrant workers, truck drivers, sex workers).

Table 11: Major health problems affecting the area

Settlement	Malaria (%)	Malnutrition (%)
SareBiran	13.80	3.40
Soma	27.60	3.40
Bereto	10.30	6.90
Farafenni	34.50	0.00
Total	**86.20**	**13.80**

The main health problems reported by the surveyed communities were malaria and malnutrition, with great proportion of respondents been concern with malaria (**Table 11**). The facts emerging from the data is that malaria continues to be a major public health concern despite significant declining trends over the years. Although, the proportion of respondents is lower for malnutrition, however malnutrition is not only a major public health problem but a development challenge in The Gambia because women and children are disproportionately affected.

Most women in rural areas are constantly energy-deficient because of poor dietary habits, heavy work and frequent infections (DHS, 2013). Children under five are vulnerable to malnutrition because of poor feeding practices, inadequate care, and exposure to infections (SMART, 2015). About 22% of the adult population (males and females) have a low level of physical activity, whilst nearly 59% of adults do not engage in rigorous physical activity. Gambian adults spend 231 minutes per day on sedentary activities.

6.3 Access to Health Care

The two major public health facilities within close proximity to the trans-Gambia Corridor are AFPRC General Hospital and Soma Major Health Center. However, there are local pharmacies in the region. Overall, these do not have the necessary clinical staff to treat illnesses and injuries, but do offer good options to supplement drug supplies to the communities. However,

AFPRC General Hospital and Soma Major Health Center continue to provide routine health care needs of the population for Lower River and North Bank Regions. Ninety-eight (97%) of the respondents reported using these facilities for their routine health care needs (**Table 12**).

Within the last two months to the survey, less than two-thirds (62.1%) of the respondents either did not visit the health facilities at all (20.7%) or visited once (41.4%) to seek treatment against any kind of illness or injuries (**Table 13**). Health seeking behaviour in the communities like any rural setting is often based on response to illness rather than preventive medical check-up. In an in-depth interview with an infectious disease treating physician at AFPRC General Hospital, the patient volume in the hospital is adequate for the facilities and staff numbers. However, it is anticipated that with the start of the road construction, patient flow needing health care will increase.

Table 12: Place for Seeking treatment

Settlement	Government Health Facility (%)	Private Clinic (%)
SareBiran	16.70	0.00
Soma	30.00	3.30
Bereto	16.70	0.00
Farafenni	33.30	0.00
Total	**96.70**	**3.30**

The type and nature of injuries and illnesses may also be slightly altered. Most of the respondents in Soma Town, 23.3% compared to 10.0%, were concerned with injuries resulting from construction vehicles or other motorized vehicles (**Table 14**).

Table 13: Number of Times visit to Health Facility

Settlement	None (%)	Once (%)	Twice (%)	3 times or more (%)
SareBiran	3.40	3.40	10.30	0.00
Soma	6.90	20.70	3.40	3.40
Bereto	0.00	6.90	6.90	3.40
Farafenni	10.30	10.30	10.30	0.00
Total	20.70	41.40	31.00	6.90

Table 14: Perceived Effects of Road Construction to the Health of the Community

Settlement	Violence against Women and Children		Injuries from Motorized Vehicles		Injuries from Construction Vehicles		Waste Management	
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
SareBiran	0.00	17.00	0.00	17.00	0.00	17.00	7.00	10.00
Soma	0.00	33.00	10.00	23.00	7.00	27.00	10.00	23.00
Bereto	0.00	17.00	0.00	17.00	3.00	13.00	10.00	7.00
Farafenni	3.00	30.00	7.00	27.00	7.00	27.00	17.00	17.00
Total	**3.00**	**93.00**	**17.00**	**83.00**	**17.00**	**83.00**	**43.00**	**57.00**

Table 15: Why Health Facility the Choice

Settlement	Ease of access (%)	Convenient cost (%)	Efficient service (%)	Other (%)
SareBiran	13.30	3.30	0.00	0.00
Soma	16.70	0.00	16.70	0.00
Bereto	6.70	3.30	6.70	0.00

Farafenni	0.00	0.00	30.00	3.30
Total	36.70%	6.70%	53.30%	3.30%

Table 16: Time to Nearest Health Facility

Settlement	< 1 hr. (%)	1 – 2 hrs. (%)	> 2 hrs. (%)
SareBiran	13.30	3.30	0.00
Soma	30.00	0.00	3.30
Bereto	13.30	3.30	0.00
Farafenni	33.30	0.00	0.00
Total	**90.00**	**6.70**	**3.30**

Table 17: What is the Commonest Mode of Transport to the Health Post

Settlement	Vehicle (%)	Foot (%)	Motorbike (%)	Animal-Driven Cart (%)
SareBiran	0.00	3.30	0.00	13.30
Soma	10.00	23.30	0.00	0.00
Bereto	16.70	0.00	0.00	0.00
Farafenni	3.30	26.70	3.30	0.00
Total	**30.00**	**53.30**	**3.30**	**13.30**

Place for health care seeking has been assessed in the communities by asking them where they seek treatment. Over 90% reported that they seek treatment from public health facilities because of ease access and efficient service (**Table 15**). Time taken to the nearest health facility is within one hour with 53% of respondents reporting walking on foot as commonest means of transport **(Table 17**), while 30% uses vehicle (Table 17). Many factors prevent women from obtaining medical health care service for themselves when they are sick. Information on health on such factors is important to know and address in order to address women health and nutrition problems.

In 2014, distance has been main one of the major barriers to health service in project regions. In Mansakonko, 32.2 % of women complained about distance and 42.2 % in Kerewan. Soma major Health in Lower River Region and APRC Hospital in Farafenni are the public health facilities where the project affected communities go for health services. Both facilities provide TB and PMTCT and VCT counselling services.

Radio remains the means for HIV/AIDs for the communities except in Soma and Farafenni where 60% of respondents mentioned health workers (**Table 18**). This could be associated to the easy accessibility to health facility staff and workers within the communities for interpersonal communication.

Table 18: Sources of Information about HIV/AIDS

Settlement	Radio (%)	Health Workers (%)	Traditional Communicators (%)
SareBiran	16.70	0.00	0.00
Soma	13.30	20.00	0.00
Bereto	10.00	6.70	0.00
Farafenni	10.00	20.00	3.30
Total	50.00	46.70	3.30

6.4 Community Public Health Concerns Due to Road Construction

Table 19: Perceived Effects of Road Construction to the Health of the Community

Settlement	Air pollution	Water contamination	HIV/AIDS	TB

	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
SareBiran	10.00	7.00	0.00	17.00	0.00	17.00	0.00	17.00
Soma	30.00	3.00	3.00	30.00	3.00	30.00	3.00	30.00
Bereto	17.00	0.00	0.00	17.00	0.00	17.00	0.00	17.00
Farafenni	20.00	13.00	0.00	33.00	0.00	33.00	0.00	33.00
Total	**77.00**	**23.00**	**3.00**	**97.00**	**3.00**	**97.00**	**3.00**	**97.00**

Seventy-seven percent (77%) of the respondents perceived air pollution to be the main effects of the construction work, 43% mentioned waste management and 17 % stated injuries (**Table 19**). On the other hand, 3% reported HIV/AIDS and TB as perceived effects of the road construction to the community. This means that already, there are awareness level and concerns of the community on the impact of the project on their health.

6.5 Methods of Preliminary Risk Assessment

The Preliminary Hazard Analysis (PHA) technique was used to assess the physical and environmental risks to people in the villages and towns along the trans-Gambia Corridor, and the worker with the aim to provide an initial overview of the hazards present in Trans-Gambia Corridor. The results provide a hazard assessment that is broad, but not detailed. The key idea of the PHA is to at least briefly consider risk in every aspect of the road.

The PHA helps overcome the strong tendency in traditional, intuitive risk management to focus immediately on risking one aspect of the road. In the least, it provides baseline information of hazards with potential to risks during construction. The PHA is a broad brushed, initial study, to identify apparent hazards, and the methods to effectively control them. To do this analysis, checklists were developed and used. A team approach was used, which consisted of experts in public, environmental health and safety.

The team had a thorough knowledge of hazards in the proposed worksites and the existing physical structures along the trans-Gambia Corridor. The current flow of events vis-à-vis motorized vehicles and non-motorized vehicles, existing operations and services were visualized from Misera to Keur Ali through the major towns of Soma and Farafenni. Limitations: The PHA presented here is based on information available prior to the start of the road construction.

Therefore, the report is limited in assessing the full score of the hazards present when operations is at its peak. However, this report is a living document and provides baseline information that can be reviewed and updated throughout the development cycle.

6.6 Impact of Construction on Roads Users and the Physical Environment

The trans-Gambia Corridor is a major road that connects north and south the country. The volume of traffic on the road is high and this is expected to increase with the completion of the bridge and reinforcement of the corridor connecting northern and southern regions of the country. The goal is to continue the movement of good and service during construction. Road diversions will provide the temporary service for the movement of people and merchandise for this traffic. Therefore, the diverted traffic will increase volume of traffic especially the motorized vehicles in the cluster of villages along the corridor. For big towns like Farafenni and Soma, there will be safety concerns on pedestrian volume and the non-motorized vehicles. Additionally, air quality and noise from vibrating machines and trucks are anticipated.

Five major roads were assessed for volume of traffic, likelihood of pedestrian injuries, and overall safety of population along the corridor, including air quality and noise. Road 1 is the trans-Gambia corridor which will be under construction as shown in **Table 20 & 21**. The 24 km Trans Gambia Highway from Misera (Senoba) cut across five settlements in the Gambia: Misera, Sare Musa, Soma Town, Pakalinding, and Genoi (about 16 km in Lower River Region); and Bereto and Farafenni Town (about 8 km) in North Bank Region. Road 1 will be the diversion connecting villages and towns in the south bank. Road 2 will be the diversions connecting villages in the north bank. Roads 3 and 4 are possible diversions which pass through the major towns of Soma and Farafenni.

Table 20: Summary Impact

		Road 1	Road 2	Road 3	Road 4
Users of facilities	Traffic	NMi	PMa/NMi	PMa/NMi	NMi
	Pedestrians	NMo	NMi	NMi	NMi
	Safety	NMa	NMi	NMi	NMi
Environment	Air Quality	NMo	NMi	NMi	NMi
	Noise/Vibration	NMo	NMi	NMi	NMI

Table 21: Key Impacts Definition

Positive	Minor = PMi	Moderate = PMo	Major = PMa	Extreme = PEx
Negative	Minor = NMi	Moderate = NMo	Major = NMa	Severe = NSe

6.6.1 Injury Prevention Measures

Without compromising safety standards in the construction zones and diversions, injuries to pedestrians and other road users can be minimal. The construction zones should be clearly marked with safety signs and restricted areas to the population especially children. Depending on a variety of factors, injuries to pedestrians and other road users range from minor to severe or even fatal.

Effects of Hazard: Probable, Direct

Nature of Hazards: Avoidable

6.6.2 Noise Control

Noise from motorized construction machines (including vibration machines) can be a hazard to construction workers and neighbourhood population. However, workers are often protected with appropriate gears, though the intensity and population exposure can be overtly different. Effects on neighbourhood population especially residents along the Trans-Gambia Corridor is anticipated. Notwithstanding, noise when not confined diffuses quickly with distance from the source. Noise from all machinery should be assessed on regular bases and ensuring is kept within 85 DBA. No work should be done during night or rest period of the community from 6 pm to 7 am daily.

Effects of Hazard: Frequent, Direct

Nature of Hazards: Avoidable

6.6.3 Air Quality

Air quality (dust from unpaved roads) on both the construction zone and the diversions is anticipated. This can reduce visibility, which increases chance for crashes. Moreover, dusts are formed due to disintegration process and respirable particles moves with air currents and

settles in further distances from the construction zone. Such respirable dusts can contribute to upper respiratory tract infections.

Effects of Hazard: Frequent, Direct

Nature of Hazards: Avoidable

Potential Impact and Mitigation Measures due to proposed project road is mentioned in the **Table 22**:

Table 22: Potential Impact and Mitigation Measures

Stage of Development	Public Health/Safety Concern	Type of Impact	Mitigation/Improvement	Responsible Party
Construction	Increase in migrant workers including truck drivers may lead to increased HIV infection in the project area, especially with current high prevalent rate among women.	Negative	Continued community awareness creation programs and provision of sex education materials and information.	Health workers, local and national radio stations, Road Construction companies, Workers and community members
	Job creation in the construction phase of the project work by hiring skilled and non-skilled workers as well security guards.	Positive	Skilled workers be used to support other national and community road construction and rehabilitation projects.	National Road Authority, Local Area Councils
	Disruption to regular traffic (or traffic congestions) leading to use of feeder roads in big towns for high volume traffic.	Negative	All diversions should be clearly marked with bright signs. Crash prone roads should be blocked to access by traffic	Road Construction company
	Diversions will pass through smaller villages that were not initially planned. This will lead to disruption of flow of traffic consequently leading to speeding.	Negative	Speed limits should be clearly marked and enforced	Road Construction company (Flaggers); Police
	Generation and piling up of debris from excavation, gravels, metals cuttings, concrete reinforcing bars and casings will be an additional nuisance to the people.	Negative	Waste from construction materials should be well managed by a well-designed management system and waste segregation without creating unnecessary hazards to people and the environment. Community and worker awareness	Road Construction company, affected communities

Stage of Development	Public Health/Safety Concern	Type of Impact	Mitigation/Improvement	Responsible Party
			programs should also be designed and implemented.	
	The works will generate high amounts of fine dust on the sites and surrounding areas. The dust may affect the local residents, leading to risks of respiratory diseases	negative	Dust emission during construction should be minimized by wetting the major areas affected and advising workers to put respirators.	Road Construction company
Operations	Improved access to health facilities and other services will be enhanced and improved in terms of travel time, safety and comfort.	Positive	Continued maintenance of maintenance of the road infrastructure with appropriate road signs and marks	National Road Authority, Local Area Councils
	The volume of traffic in the Trans-Gambia Corridor is expected to increase hence leading to increases in movement of people and goods. The vulnerable population will continue to exist, if not increase, hence an anticipated increase in communicable diseases like HIV and other STIs and TB.	Negative	Expansion of services and supplies for HIV, TB and other communicable diseases to both the local and transit communities.	Ministry of Health and Social Welfare

7. ENVIRONMENTAL IMPACT PREDICTION OF THE PROJECT AREA

7.1 Introduction

Essentially, all the project activities that form the basis of this evaluation involve some form of land development; in this regard, the impact prediction and evaluation is considered at two levels described as 'construction' and 'operations' phases. The construction phase refers to the period of land development particularly during road works while the operation phase refers to the functioning period of the structures.

The proposed improvement of the current road infrastructure for communities along the highway was noted to have positive impacts to the lives and wellbeing of not only resident of these villages but also the entire sub region. Key among these impacts includes: Improving access to communication, facilitation of economic activities among others.

However, there are a few concerns that are anticipated mostly during the construction of the project and they include:-

- Increased noise and vibration mostly during construction phase.
- Clearing of the some mangrove vegetation around the river banks particularly the linking point between the bridge and the road network in the northern site
- Air pollution as a result of dust particles emanating from excavation and construction activities.
- The health and safety of workers and neighbours would be affected due to accidents, pollution and disturbance
- Increased waste generation (both solid and liquid) during construction of the road
- Children are exposed to speeding vehicles, dust pollution and noise as some schools are located around the highway
- Exhausts from the trucks, caterpillars and other heavy machinery will lead to increased levels of noxious gases
- Potential spread of STIs and HIV/AIDs to local communities as foreign work force will be interacting with the local people during the construction.

7.2 Description of environmental and social factors

In the prediction and evaluation of the environmental and social impacts of the strengthening of roads works of project and in consideration of impacts, two perspectives must be taken into account;

i. the project on the environment and

ii. External factors on the project (externalities)

The rehabilitation and changes resulting from alterations to the operating infrastructure for the current road shall have environmental impacts that may not immediately be anticipated such as air pollution and waste generation among others

7.3 Environmental Factors

7.3.1 Atmosphere

The main consideration is air quality and how project activities will affect this, particularly considering the emission of fumes and dust.

7.3.2 Noise/Vibration

Impacts in this regard are described in terms of how project activities' use of heavy machinery and equipment in particular, will affect the amenity of settlements and of wildlife as a result of noise and/or vibration.

7.3.3 Water

This entails surface- and groundwater as well as aquatic life. The impact of these resources by the project is perceived to be minimal hence the projected work will be more on upgrading the current road infrastructure rather than complete over haul.

7.3.4 Land

This element encompasses soil condition and the entire terrestrial biodiversity; it is therefore a matter of how project activities would degrade or improve these sub-elements.

7.3.5 Natural landscape (forests, wetlands, water bodies and Wildlife

There is significant variability in terms of landscape of the area, generally, the terrain is flat but with few pockets of hills in some areas .The soil is sandy clay with sparely populated vegetation in the area. At the swampy areas around the river, there are species that are physically and physiologically adapted to these special conditions, and which form an ecosystem, namely the mangrove forest. It is made up mainly of mangroves extending along the river up to the perimeter of the saline incursion, and consists of the following vegetation: Rhizophoraracemosa; Avicenniaafricana, Rhizophora mangle; among others.

The increasing population and agricultural pressure is causing a decline in natural environment and their diversity. The mangrove is home to two mammals: (i) the manatee: an aquatic mammal (Trichechussenegalensis). Its habitat and area of nutrition is the mangrove for instance the sitatunga: a protected antelope in Gambia (Tragelaphusspekei). The presence of warthogs, baboons, pata and green monkeys is linked more to crops than the river

7.3.6 Geology and dominant soils and soil conditions

The geological conditions of the project area stem from a series of quaternary fills caused by a lowering sea level phenomenon, deepening of the area, and significant clogging of the estuary by deposits of sand and clay. Some of the areas are rocky which includes recent silt and more or less sandy sediments. The project area is generally flat and consists of: (i) an inter-tidal zone with gentle slopes; (ii) the river valley, and (iii) the valleys of the tributaries

7.3.7 External factors on the project

Two elements are considered in the evaluation of the social effects of the project namely public health and income status.

7.4 Potential environmental effects at construction phase

The project's construction phase is more likely to cause negative than positive environmental effects. The negative effects are largely related to the use of heavy machinery, which is common to almost all the activities. The impacts that include soil compaction, noise and atmospheric pollution, waster generation are deemed largely localized with negligible to moderate effect.

This activity is characterized by extensive and prolonged use of heavy machinery such that noise& vibration could be issues for wildlife around the wetland areas; atmospheric quality could also be affected by fumes and dust though the open environment could dilute the potential effects these could cause. Essentially none of the project activities has meaningful potential for enhancing current environmental conditions during the construction phase.

7.5 Potential social effects at construction phase

There are atmospheric and noise pollution associated with the construction phase as described above but these are considered negligible and the fact that most of these sites are not highly populated except Soma and Farafenni means even less negative effects on the populated areas hence virtually no major negative effect on public health. The impacts are likely to vary according to the stage of the implementation of the project. For example during the construction period, there may be specific health and other social risks due to an influx of migrant workers living in temporary and unsanitary accommodation.

The aforementioned is largely the case for all the activities but construction period, which is expected to employ a large number of people for a fairly long period as labour force; this means, people are expected to travel from different places who may be infected with HIV/AIDS and STIs, could serve as a potential source of infection to the local community.

The possible creation of water bodies could serve as breeding ground for mosquitoes among others. Therefore, communicable diseases such Malaria, could be an issue. The positive social benefits are mainly employment opportunities, increase income, quality diets and standard of living associated with generation of income through service and trade within the two regions and beyond.

7.6 Potential environmental effects at operation phase

The environmental implications for the upgrading of this highway are not very adverse and the hence some of the section of the roads is not densely populated and also devoid of vegetation and other sacred placed.

However, other issues of public concern is related to safety particularly accidents by speeding vehicles when the road are completed and in use. Furthermore, the high level embankment of the road may cause flooding to adjacent houses particularly in Soma where the roads currently serve as drains. Therefore proper drainage system and culverts be developed where appropriate to address such situation as well as speed limit measures for motorists. .

7.7 Potential social effects at operations phase

Population and economic activities: The population of the Project Influence Zone (PIZ) along the corridor is estimated to be over 68,000 and is agricultural based. Therefore, the completion and operation of the highway shall enhance their economic activities and ease of transportation within and outside Gambia.

The upgrading and construction of the highway would open up the growth area and improve access to agricultural inputs and markets to other sub regions. This will boost agricultural production and ultimately beneficiaries' incomes through trade and other services.

7.8 Location and sensitivity status of the project area

The structural and infrastructural developments of the Trans - Gambia highway or its upgrading will not be undertaken in any fragile or legally protected or ecologically and culturally sensitive areas. The project activities will be carried out on the current alignment of the current road network. All activities during construction phase will be those that have minimum or short-lived negative environmental implication for the short run.

8. ANALYSIS OF POTENTIAL IMPACTS

The identification of impacts was made through potential impacts sources related to the activities in the construction phase of the work. The impacts can be positive or negative, direct or indirect. It is important to note at this stage, some are known but most of the impacts are potential. Main impacts sources and receivers of the project is shown in **Table 23**

Table 23:Main impacts sources and receivers of the project

Phase	Main Phases of Impacts Sources	Main Impacts Receivers	
		Bio-physical Environment	Human Environment
Works	○ Site and life base installation including bringing and removal of material ; ○ Freeing, clearing and cleaning of the area ; ○ Performing crossing works and drainage devices ; ○ Opening and exploitation of quarry and borrow pit; ○ Transportation and warehousing of materials ; ○ Presence of workers	○ Air ○ Soil ○ surface waters ○ Underground waters ○ Vegetation ○ Fauna ○ Landscape ○ Flora	○ Health and safety ○ Job ○ Traffic ○ Agriculture and livestock ○ Trade and transport ○ Crafts ○ Touristic and cultural activities ○ Infrastructures and cultural heritage ○ Women living conditions

8.1 Impacts on biological and physical environment

8.1.1 Air

Dust emanating from earthworks, reloading of paths and quarrying exploitation and vehicular movement will locally affect the air quality This activities over the medium term will affect the ambient air quality within the surrounding locality. The extent of the emissions will essentially depend on the weather.

The heavy construction machines using oil gas as fuel will cause discharge of combustion gas in the atmosphere ((COx, NOx, Sox etc.) rich in heavy metals and hydrocarbons that will also affect the air quality. Because of the limited importance of project sites, this impact will be mostly reduced to the influence of the paths

8.1.2 Soils

The soils will be potentially polluted because of the opening of borrow pits, quarries, and sand pits (or exploitation of borrow pits and existing quarries). The soils can as well be contaminated by direct discharge of:

- Liquid waste (sewage oil of machines, leakage and spills and waste water of site and life base, hydrocarbons from machines and other site operations
- Solid waste namely numerous waste from garage, warehouses, hydrocarbons storage and lubricants storage.

Besides, the traffic of machines and vehicles on site will cause a subsidence of soil as well as compaction particularly during the upgrading of highway on both PIZ.

In places where the access roads are different from the current one, the repeated compaction due to use of heavy machinery to and from quarry sites through open farmland could reduce soils potential used for agricultural activities and/or modify the agricultural value of the land as it could enhance erosion and less water infiltration.

8.1.3 Surface water

The construction phase of the highway, potential pollution by solid and liquid waste as well as the toxic residues of the site (cement additives, fuel, burnt oil etc.,) when left uncover particularly during rain. The transportation of liquid and solid waste such as site waste and waste oil through may modify the quality of the surface waters in case of spillage and could potentially be harmful to in terms of contamination in the swampy areas of the high way.

8.1.4 Underground waters

The pollution of existing watercourses could contaminate the underground waters through infiltration. This impact is slow compared to the quantity of surface waters liable to be polluted. To get water for construction, the companies will be able to have recourse through the borehole water.

8.1.5 Flora

The construction of the highway is perceived to cause minimal destruction of the flora in the PIZ as the highway shall follow the current alignments which do not go through any form of vegetation to be cleared. However, around the interconnection between the roads and the bridge, certain mangroves will be cleared. Considering the importance of the vegetation in the biodiversity preservation and the fight against desertification, the removal of the vegetation whatever the number, has a high degree of importance and should be compensated adequately at some point within the intervention site by the project.

8.1.6 Fauna

The noise that would be created by the operation of construction machines could disturb the tranquillity of fauna in general and birds in particular around the mangroves area. The birds and terrestrial animals around the sites will be disturbed during the construction of the highway and the creation of diversions for the paths though this shall be of medium term:

8.1.7 Landscape

The impact of works will be visibly over the medium term distorts the existing landscape. It concerns site facilities; temporary work and bare appearance of borrow areas.

8.2 Impacts of the Project on human environment

8.2.1 Health and Safety

The dust, the fumes and the odour that would be generated by the sites cleaning of the area, construction work, and odour of fuel may cause diverse nuisances and breathe related implications among workers and paths residents. The risk of infections of local residents and workers by HIV/AIDS and other STIs, are to be taken into account in the workplaces hence the project will attract different work force with different background which shall serve as a recipe for sexual cohesion thus the spread of the diseases.

The machine and the plants noise will disturb the usual tranquillity of the environment and will be a source of nuisance among the residents along the trans-Gambia highway during borrows areas and quarries transportation. Continuous traffic of refuelling trucks and construction machines in and through settlements can cause accidents and therefore constitutes a risk for the safety of persons and their properties (children, animals, and physical assets).

8.2.2 Jobs

The construction activities will generate jobs, by hiring local labour. The economic benefits will be felt in the local households who are near the future infrastructures (bridge and highway) and these benefits are predicted to be even sub-regional

8.2.3 Road traffic

The traffic will be temporarily disturbed by the performance of upgrading process of the highway and border road link over the construction phase. This inconvenience however, will address through creation of good bypass roads to reduce traffic congestion during the construction period.

8.2.4 Agriculture and Livestock

The risks are not important because of the low importance and the size of the concerned areas with such situation along the trans-Gambia Highway.

8.2.5 Trade and transport

Trade activities especially restoration and sale of foods and basic food stuffs will be amplified by the presence of the companies staff. The construction works will affect people movement on the paths whose initial bench marks has been removed during the upgrading process.

8.2.6 Infrastructures and cultural heritage

The presence of workers coming from diverse areas may involve a loss of costumes and traditional values. In the urban conglomerations such as Soma and Farafenni the site activities will cause hindrances to the movements (vehicles, pedestrians) and temporary nuisances for users of socio-economic infrastructures (schools, markets, places of worship)

Some excavation works of access roads could as well affect underground infrastructure networks such as water installation and may be telephone network and other service networks.

8.2.7 Petty trading activities

During the phase of work, the restaurant owners and the traders will see increase their incomes significantly as workers will serve as potential buyers and during operation, the movement of goods and services shall potential increase their economic activities within the PIZ.

8.3 Summary of Site Impacts

The **Table 24**: details out the potential impacts of the project during implementation both the positives and negatives

Table 24: Summary of Site Impacts

Components	Description of impacts	
	Negative Impacts	Positive Impacts
Air	Air pollution by : - Dust and fumes emanating from, works on site, borrow areas - Fumes coming from the traffic during the works	
Soils	- Soils subsidence by the machines and the trucks due to the works. - Destruction of soil in borrow areas and quarries (regarding quarrying timeline see work plan construction) - Pollution risks of soil by liquid and solid waste from workshops - Erosion of bare areas and the one caused by the works - Modification of soils drainage.	
Surface waters	- Oil contamination - Pollution risks of waters especially the river by solid and liquid waste from site. - Recalibration of the watercourse	
Flora	- Destruction of the flora located in the influence of paths and diversion roads, in the areas of diverse site and the opening of borrow pits.	
Fauna	- Disturbance of existing fauna. - Destruction and disturbance of aquatic animals	
landscape	- Visual impacts due to the presence of machines during construction and deforestation of quarry sites and creation of borrow areas.	
Human environment		
Health, safety, noise and vibrations	- Diseases and nuisance related to dust and fumes. - Occupational injuries - Spread risks of AIDS and STIs related to population mixing.	Facilitation of emergency evacuations with site vehicles for populations
Job		- Creation of jobs for local people
Traffic	Congestions, potential accidents	
Agriculture, Livestock and fishing	- Loss of agricultural land in the influence of the borrow areas - Compaction of agricultural lands - Enhancing erosion	
Trade and transport	- Increase (or favouring) of cross-border fraud between Senegal and Gambia	Development of trade and transport activities in the project area and beyond
Infrastructures and cultural	- Disturbance of Traffic (pedestrians, motorcyclists)	

Components	Description of impacts	
	Negative Impacts	Positive Impacts
heritage	○ movement of populations	
Petty trading activities	Incident of theft related activities	○ Increase of women income through the indirect development of activities generating income during the works

8.4 Proposed Mitigation Measures

The **Table 25:** identifies potential activities that would impact on the environment and proposed mitigation measures with timeline on how they could be address with responsible institutions.

Table 25: Proposed Mitigation Measures

Activities	Measures	Period of Performance / Responsible Department
Vegetation clearing for access roads where necessary	DOF authorization replanting of trees preservation of green land	DOF/DPWM
Diversion roads	Use as much as possible of existing roads. Regular watering to reduce dust emissions and wearing appropriate masks by employees. Sensitization of population on the need of covering food. Putting in place a traffic plan with appropriate signs to facilitate the traffic –footbridge is required. Traffic management by police Site restoration after works	Contractor, NRA /NEA
Opening of Quarry	Administrative formalities Cutting the minimum possible of trees for exploitation Regular watering – employees sensitization and wearing of dust masks Rehabilitation of the borrow site	DOF NEA/ GD
Transport of materials	Trucks covered with tarpaulin – watering quarry, sensitization of machine operators – Wearing dust masks in the quarry	Contractor, NEA
Earthwork	Regular watering to reduce dust emissions Dust masks for employees	Contractor, NEA
Restoration of access road ways	Salvage of bitumen waste - removal of contaminated soil and backfilling until reaching previous level – Regular monitoring of liquid discharge to avoid soil pollution – Sensitization of employees	Contractor, NEA NRA

Activities	Measures	Period of Performance / Responsible Department
Civil engineering	Salvage of concrete laitance – removal of polluted soil – send to the authorized disposal area	Contractor, NEA NRA
Waste management	Household waste : storage in bins and transportation to an authorized waste area	Contractor,
	Construction waste: salvage and valorisation of concrete slaps, pieces of steel, woods. Otherwise sending to the designated waste dumpsites sites in LGA	MKAC/KAC, NEA
	hazardous waste : storage in watertight containers	
	Green land : use to adjust slope and disturbed areas	
Works in forest	Respect of environment: all measures of the ESIA are applicable Ban to light a fire. The guards shall not under any circumstances violate this provision. Ensure that cigarette butts are extinguished and buried in the sand. Prohibited to dispose waste in the forest	Contractor, DOF/ NEA
STIs, HIV/AIDS	Sensitization of employees and local population Supplying with condoms HIV / AIDS screening	Contractor, DOH/NAS
Maintenance areas	Waterproof area - slope for salvage hydrocarbons and rain waters– Separation system- emptying septic tank regularly	Contractor, NEA
Waste waters	Septic tank – emptying regularly and discharge in authorized areas	Contractor, NEA
used batteries	Storage in a watertight area and an agreement with a salvage organization	Contractor, NEA
Use of chemicals	Safety data sheet is compulsory prior to the approval of the product Compliance with instructions for handling and storage , Derivatives and containers are managed as hazardous waste , wearing adequate PPE	Contractor, NRA NEA
Use of Trawlers	Compliance with instructions related the radioactivity adequate PPE	Contractor, /NRA NEA
Use of generator	Installation in a waterproof retention to prevent soil pollution State if the regulatory limit is achieved	Contractor NRA NEA
Waste oil	Storage on retention and salvage by health and safety officer approval for recycling	Contractor, NRA NEA
Unloading and fuelling	Waterproof exploitation area	Contractor, FRS, NRA

Activities	Measures	Period of Performance Responsible Department
	Implementation of unloading procedures OMCs refuelling procedure) Device for fire prevention and accidental pollution Statement of Fuel tank Posting safety instructions	NEA
Site rehabilitation	Rehabilitation of site in a condition better than before its occupation or in the worst case get it back in the same condition	Contractor, NRA NEA GD

9. ENVIRONMENTAL MONITORING SCHEDULE

The environmental monitoring will be carried out through observations and evaluation of activities throughout the construction phase to determine the most pre-occupying real impacts on site compared to predictions of impacts in order to provide, if necessary the mitigations measures to be recommended to address the situation. It is necessary to monitor the evolution of the characteristics of some sensitive impacts receivers affected by the construction site includes mainly:

- Air Pollution
- Noise Pollution
- Soils deterioration
- surface waters quality
- ground water quality
- Flora degradation / restoration;
- Fauna destruction/ disturbance;
- Public health and safety

The **Table 26** detailed description of the elements of environmental monitoring. The Ministries of Infrastructure and Environment are responsible for monitoring through NRA which plays the role of Client's Representative and NEA is responsible for all environmental aspect of the project.

Table 26: ESIA/ESMP Monitoring.

Impact receiver	Elements of monitoring	Monitoring indicators	Monitoring Institutions	Monitoring period	Monitoring frequency
Soils	Erosion	- Gullying from borrow and career areas. - Appearance of erosion signs in slick, and through gullies.	NRA NEA, DOF, DPWM, DOH, GD, NAS, DWR	During and after work	Monthly
	Pollution	- Appearance of vegetation on the construction sites, station bases and different warehouse after work. - Contamination of various soils.			
Surface waters/ underground water	Pollution	- Concentration of waters by pollutants			Half-yearly
	Sedimentation	- Level of siltation of watercourses.			yearly
	Hydraulic regime	- Stagnation of water not desired.			Monthly
Fauna Flora	Degradation of vegetation	- Change of the number of deforested areas annually			yearly
	Vegetation	Success rate of reforestation			Half-yearly
	Fauna disturbance and destruction	- Rate of change of poaching. - Change of behaviour of wild animals during the work.			Monthly

Impact receiver	Elements of monitoring	Monitoring indicators	Monitoring Institutions	Monitoring period	Monitoring frequency
Health / Safety	STI/ HIV/AIDS, occupational injuries	- Evolution or prevalence rate of STI and HIV/AIDS			Quarterly
	Breathing Infections	- Evolution or prevalence rate of serious breathing infections.			Quarterly
	Traffic accident	- Occurrence and prevalence rate of traffic accidents.			Monthly

9.1 Company

The contractor who is charged with implementation shall effectively adhere to the mitigation measures of negative environmental impacts if not eliminate them .The environmental officer should be responsible for the managing interactions between stakeholders within the site. He/she shall also be in charge of relations with public especially on environmental and social issues with stakeholder institutions.

The performance procedures shall deal with environmental question. Therefore for each task, an environmental analysis is made to get out specific risks to be taken into account in the performance procedures. The environmental officer ensures an effective presence on site, ensuring the application of defined measures. He is independent of the production chain; he ensures the monitoring of the application of the provisions as detailed in the ESIA

9.2 The Contractor /project manager

He/ She shall be in charge with controlling the compliance of the application of environmental measures. He/she is co-manager with the quality and environment company in the project areas. In case of environmental damage, he shall engage his responsibility. So, He/ she will have to ensure the effective implementation of the ESIA/ESMP and in collaboration with local technical services, NGOs and local authorities. .

9.3 Client's representative

NRA hinges on the National Environment Agency expertise through its responsibility to ensure performance of the implementation plan of environmental and social measures and it is working for environmental surveillance and monitoring on site. The NEA will consult with NRA as the main client on any issues of environmental and social concern during project implementation.

9.4 Sensitization & Monitoring

Sensitization activities for employees and local populations shall be undertaken on good environmental preservation measures. Every employee should be sensitized on the consideration of environmental aspects of his activities and existing procedures.

Health and Safety Exercise should be organized periodically (once a month) in presence of the project staff to address specific topics following the incidents of work or recent events that occurred, concerning safety and environment. This ESIA will be applied in all project phases

and all actors are obliged to minimize the potential environmental impacts that occur during project execution.

9.5 Communication with local population

Local populations in the construction sites or area should be involved in the environmental monitoring and surveillance. The environmental and social team under the leadership of the Site Environment Officer together with the public should implement an external communication with population who are at height of impacts of activities and possible corrections that may be performed in case of incident.

Table 27: Communication Action Plan

Addressed topics	Targets	Managers	Tools	Period
Sensitization on environmental and social stakeholders related to the works	Population local population, Local Authorities	Environment, health and safety managers/ NEA – RPO MKAC	Radios talks	Before start of works and once every three months
Sensitization on generation and management of waste	Company personnel	Environment manager / NEA - RPO	HSE	Quarterly
Information and sensitization on natural resources protection (animal and vegetable resources)	Site personnel	DOF, DPWM, DOA,NEA	Radio talks	Quarterly
Information and sensitization on highway safety	Site personnel Population	Health & Safety managers/ NRA	Radio talks	Before start of works and every three months
Sensitization on STIs and HIV/ AIDS	Site personnel Populations	/DOH/NAS Health & Safety managers/	Radio talks, posters and leaflets	Before start of works and Quarterly during works
Information and sensitization on rules and regulations	Site personnel	Environment, health and safety managers	Radio Talks, site briefing of workers	Before start of works and every three weeks
Communication with local population about the reconversion of some fields to quarry sites which were either farmland or grazing areas for livestock	Local population	Environment manager, NEA-RPO/GD LGA of LRR & NBR	Radio Talks/ FGD,	Completion of exploitation of each quarry and borrow pit

10. ENVIRONMENTAL COMPLIANCE AND MONITORING

10.1 Effective Monitoring of the ESIA /ESMP

The monitoring program of ESIA implementation, this exercise is essential in ensuring that the project is environmentally sound, by checking that the recommended mitigation measures have been carried out effectively in a timely manner. Monitoring also helps in evaluating whether the measures recommended are adequate in preventing, reducing or compensating the identified negative impacts. Efficiency of those responsible for the ESIA implementation and the proposed structures should also be reviewed and the necessary changes made accordingly.

The main issues to be monitored include activities that have been earlier identified to have potential significant negative impacts on environmental and socio-economic parameters, and corresponding mitigation. Monitoring and evaluation of the ESIA/ESMP will be mainstreamed in the general monitoring system of the Project at various levels.

The Project Coordinator (NRA), Contractor, MoWTI and the NEA with other key stakeholder's institutions have monitoring responsibilities. NEA takes the lead in overall monitoring role of the ESSIA/ESMP implementation. Notwithstanding, the beneficiaries within PIZ and general public also have monitoring roles by reporting issues to the NEA for addressing. Sensitisation on the ESMP before the Project commencement shall ensure consistency in understanding roles and responsibilities of each stakeholder.

It is the responsibility of the Project Coordinator (NRA) to ensure that all involved stakeholders are facilitated to monitor the ESIA/ ESMP implementation based on the Plan. Monitoring Programme for the ESIA/ESMP Implementation and associated Cost is presented in **Table 28**

Table 28: Monitoring Programme for the ESIA/ESMP Implementation and Associated Cost

Mitigation Measure	Responsibility for monitoring	Monitoring Frequency	Monitoring Timeframe	Monitoring Indicators	Budget (US$)
DURING WORKS ON THE TRANS-GAMBIA HIGHWAY					
Locate camp base away from Settlements and fore Bijilo Forest Park	NEA, NRA	Once, or as required	Preparation stage for construction	Camp located away from the Park or settlement	**4,000**
Avoid farmlands	NEA/**DPPH/**	As above	As above	No. of farmlands avoided	**1,000**
Re-vegetation	NEA, DOF	Quarterly	After the camp decommissioning	Area/Size of land that has been re-planted	**6,000**
Quarry Rehabilitation	NEA. GD, NRA , Contractor	Progressively as the work progress Daily contractor	During works	No of quarries rehabilitated	**15,000**
Heavy vehicles to only use approved routes to reduce com pacti on	NEA, MoWTI/ NRA, DOH	Weekly (visit to sites) Contractor	During all phases of works	Number of vehicles using approved routes	0
Quarries assessed and approved before use	NEA/GD/Contractor/MoWTI/ LGAs	Weekly	Prior to commencement of the works	No. of applications and approvals from NEA, GD	**4,000**

Mitigation Measure	Responsibility for monitoring	Monitoring Frequency	Monitoring Timeframe	Monitoring Indicators	Budget (US$)
				No. of quarries approved	
Use high quality oils and lubricants	Contractor supervisors, NRA, NEA,	Daily by contractor, Weekly by NEA, NRA	During the works	Quantity of high quality oils and lubricants used or procured	**0**
Prepare a waste management guide	NEA/ MKAC/KAC	Weekly	At start of Project	Waste management guide available	**2,000**
All construction and domestic waste collected, stored and disposed of properly	NEA	Daily by contractor,/ MKAC	During all phases of works	Collection and disposal records No. of reports on the process No. of illegal dump sites	**4,000**
Restrict public access to the sites	Contractor supervisors, NEA, NRA	Daily by contractor (Site Manager)	During all phases works	No. of safety signs put up No. of non-Project related people sighted in the Project area No. of accidents to the public recorded	**0**
Raise public awareness on the project activities	Contractor/supervisors/NEA/ NRA	Monthly	During the works	No. of sensitization activities programmes, carried out	**7,000**
Provide safety information, training and protection for workers	NEA, NRA, CONTRACTOR	Quarterly	During the works.	No. of training sessions conducted No. staff accidents recorded No. of reports on the process	**20,000**
Constant supervision	NEA / NRA / MoWTI, LGAs	Weekly	During the works	No. of recorded accidents and oils spills	**3,000**
Over all ESMP Monitoring activities	NEA & stakeholders in	quarterly	During Project implementation	Quarterly monitoring carried out	**40,000**
Employ local community members	Contractor, NEA, NRA, MoWTI	As required	During all works	No. of local staff employed	**0**

10.2 Reporting

Effective communication within NEA, and between and amongst NEA and other stakeholders is essential. Weekly reporting of monitoring is recommended from NEA at regional level. This will be followed by quarterly monitoring with all stakeholder institutions to assess compliance with set provision of the ESIA/ESMP document by the contractor. The evaluated reports shall be used to facilitate immediate improvement, where necessary, considering the timeline of the Project cycle. The Project monitoring team shall continuously ensure that reports from the EMSP monitoring are taken into account.

10.3 Environmental Auditing

Environmental auditing is a systemic review of the activities against the ESIA. Part VI of the EIA Regulation, 2014, makes provisions for self-audit and audit by the NEA to ensure the ESIA is implemented as planned, and identify potential impacts that have arisen due to any change in activity.

10.4 Cost Estimation for Implementation of the ESIA/ESMP

To ensure that the mitigation measures in the ESMP are fully implemented, training and capacity building of personnel, and sensitisation on the issues are essential in addition to constant monitoring. Total cost of the ESIA implementation is indicated in **Table 29**.

Table 29: Estimated Cost of ESIA Implementation

Item	Budget (USD)
ESMP mitigation measures	66,000
Quarterly Monitoring of ESMP implementation	40,000
Environmental auditing	10,000
Capacity building	12,000
Total ESMP implementation Budget	**128,000**

11. CONCLUSION

The result from this environmental and socio-economic studies indicates that project activities in terms of upgrading or strengthening of trans Gambia Hay way sites in Jarra West District (Soma and the environs) in LRR and Upper Baddibou District (Farafenni and the environs) in NBR may not have major negative impacts on the environment and local communities during implementation.

However, upgrading of the highway or construction could potentially impacts on the environment as well as the social wellbeing of workers and local communities particular on air quality, some business activities along the highway will be temporally affected, However, upgrading of roads could potentially impacts on the environment as well as the social wellbeing of workers and local communities particular on air quality, mangrove, potential flooding, respiratory related illness, noise creation, enhancing of erosion and possible emergency of STIs among other over medium term

The activities of the project shall have insignificant destruction of vegetative cover in intervention areas. The overall negative environmental and social impacts that are anticipated during project implementation could be minimized and managed if the mitigation measures proposed are duly implemented during operation.

In addition, the contractors should consider local knowledge of the topography so that culvert can be located and identified at the correct places. This will reduce the level flooding that may arise as a result of the construction of the road during implementation and operation.

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Annexure -1 : Focus Group Discussion with Stakeholders at Sare Biram / Misera- LRR

Sr. No.	Name	Sex/Gender	Representative	Telephone
1	Salieu Dem	M	Alkalo	
2	Biram Dem	M		
3	Mariama Sowe	F		
4	Jareh Ceesay	F		
5	Jara Jallow	F		
6	Ramatoulie Jallow	F		
7	Awa Ceesay	F		
8	Isatou Bah	F		
9	Yorro Jallow	M	VDC chairman	2131299
10	Boi Sallah	M		7151838
11	Dadi Bah	M		7151838
12	Amadou Dem	M		6255836
13	Samba Jallow	M		2189591
14	Dawda Camara	M		2529633

Annexure -2 : Focus Group Discussion with Stakeholders at Soma Town – LRR

Sr. No.	Name	Sex/Gender	Representative	Telephone
1	Dembo Darboe	M	Alkalo	9029006
2	Ebrima Kanteh	M		9827913
3	Mamanding	M		9823740
4	Ngansumana Sarr	M		7506293
5	Buba Kanteh	M		6395977
6	Alh. Sedia	M		3993787
7	Sutayring Dibba	M		
8	Abdou Darboe	M		
9	Babucarr Darboe	M		
10	Lamin Fatty	M		
11	Kekoi Darboe	M		
12	AjaMatty Fofana	F		
13	Khady Njie	F		
14	Ebrima Jarjusey	M		
15	Manding Samateh	F		
16	Yaya Njie	M		
17	Sutay Jobe	F		
18	Joma Fofana	F		
19	Alaigi Seedy	M		

Annexure -3 : Focus Group Discussion with Stakeholders at Bereto Soma Town-NBR

Sr. No.	Name	Sex/Gender	Representative	Telephone
1	Burama Keita	M		
2	Abdou Suno	M		6303763
3	Omar Keita	M		3904890
4	Abdou Kanteh	M		6870668
5	Kebba Jaiteh	M		6133940
6	Binta Sawaneh	F		
7	Binta Sawaneh	F		6456682
8	Fatou Manjang	F		3187168
9	Foday Danso	M		6639684
10	Buba Gassama	M		6518240
11	Seedy Keita	M		6237500
12	Sulaiman Suno	M		
13	Ebrima Marong	M		6670590
14	Sulaiman Suwareh	M		6568526
15	Alagi Gassama	M		9908160
16	Tomaring Njie	F		6283906
17	Jankay Jadama	F		
18	Aja Fatty	F		
19	Aja Mama Trawally	F		
20	FatouNjie	F		
21	Mama Ceesay	F		
22	Mariama Fofana	F		
23	Fatou Darboe	F		
24	Jarra Sano	F		

Sr. No.	Name	Sex/Gender	Representative	Telephone
25	Karamo Dampha	M		
26	Wateh Kanteh	F		
27	Hadang Gassama	F		
28	Binta Dibba	F		6575112
29	Nyomi Touray	F		

Annexure -4 : Focus Group Discussion with Stakeholders at Farafenni – NBR

Sr. No.	Name	Sex/Gender	Representative	Telephone
1	Arabo Ansu Kanyi	M		
2	Mama Sireh Dibba	F		
3	SaikouTouray	M		
4	Momodou Mboge	M		
5	Bakary Jammeh	M		
6	Modou Cham	M		
7	Sunkarr Dibba	F		
8	Sainey Dibba	M		
9	Haddy Faye	F		

Annexure -5 : Selected Photos of sites

Photo 1: Certain building structure along the road in Soma Town - LRR

Photo 2: Quarry site near Pakaliding Village - LRR

Photo 3: Some isolated housing along the road between Soma and Pakalinding - LRR

Photo 4: Road entering Pakalinding Village

Photo 5. Some business outlet along the road in Farafenni Town - NBR