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REPUBLIC OF RWANDA

MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES

RWANDA FEEDER ROADS DEVELOPMENT PROJECT

FINAL REPORT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT & ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN FOR INDICATIVE FEEDER ROADS

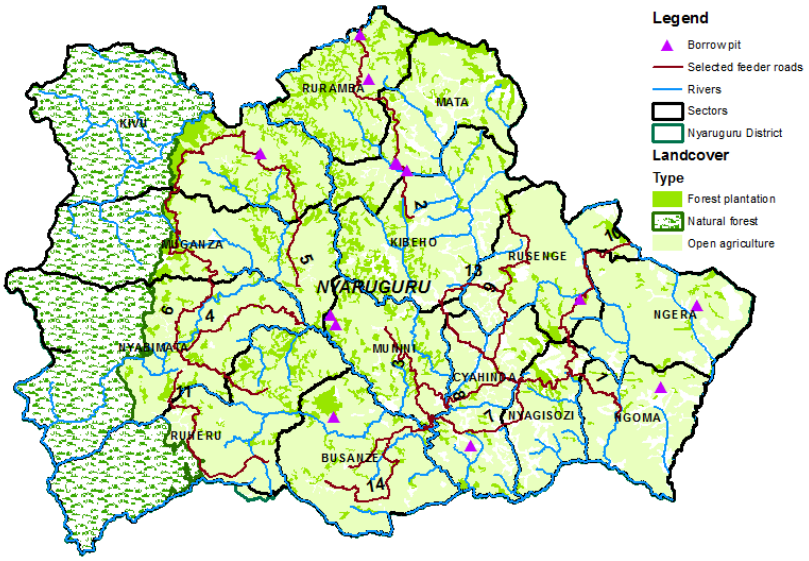
NYARUGURU DISTRICT

Intercontinental Consultants and Technocrats Pvt. Ltd. (INDIA)
In Association With
ALN Consultants Ltd (RWANDA), as Sub-Consultant

December, 2016

0 EXECUTIVE SUMMARY

The Government of Rwanda (GoR) through the Ministry of Agriculture and Animal Resources (MINAGRI) and various Development Partners are intensifying their support to agriculture andfeeder roads infrastructure development to minimize post-harvest loss and high transport cost across the country. In this regards, the GoR launched the Rwanda Feeder Roads Development Project (FRDP) to develop agricultural marketing roads. This project received financing from IDA to rehabilitate, upgrade and maintain 500 km of indicative feeder roads in Rwamagana, Gisagara, Karongi and Nyamasheke Districts. The GoR also applied for additional funding for the rehabilitation of 1200 km of feeder roads in other sixdistricts, namely Gatsibo, Nyagatare, Nyaruguru, Gakenke, Rutsiro and Nyabihu Districts. Nyaruguru District is one of the 8 Districts of the Southern Province,made up of 14 sectors, themselves subdivided into 72 Cells and 332 Villages. The District covers a surface area of 1,007.1sq.km, with a population of 294,334 inhabitants[1] and road network in poor condition.The MINAGRI through FRDP prepared the feasibility report for 194.56km of feeder roads in the district of Nyaruguru. The major activities associated with the indicative feeder roads in Nyaruguru District include rehabilitation/upgrading ofcarriageway pavement with a standardised width, bridges and drainage work as well asmaintenance of rehabilitated infrastructures. The requirements of construction material have been identified along with the quarry and borrow area sites. The map showing different feeder roads and sensitive receptors are presented below.



[1]Rwanda 4th Population and Housing Census, 2012 (NISR)

The average carriageway width of the indicative feeder roads ranges from 3.4 to 6.7 m and will be upgraded to 6m. The project plans to construct 571 culverts and bridges with a total length of 2,338 m and 116.71 km of drains. The requirements of construction materials have been identified along with the quarry and borrow area sites. Twelve potential borrow areas were identified close to the project site. The quarry sites are outside the project site/ROW and have not yet identified. This identification will be done prior to construction and will be covered by the construction ESMP to be prepared and submitted by the contractor to the SPIU.

The rehabilitation of the feeder roads requires the preparation of an Environmental and Social Impact Assessment/ Environmental and Social Management Plan (ESIA/ESMP) to ensure that the planned activities are environmentally and socially implemented in full compliance with Rwanda's and the World Bank's environmental and social policies and regulations. In this regards, MINAGRI/FRDP hired Intercontinental Consultants and Technocrats Pvt. Ltd. (ICT) in association with ALN Ltd to carry out an Environmental and Social Impacts Assessment (ESIA) study in indicative feeder roads of Nyagatare, Gatsibo, Nyaruguru, Nyabihu and Rutsiro Districts. The present report focuses on the main findings from Nyaruguru District.

The main objective of the assignment is to assist the Rwanda Feeder Roads Development Project (FRDP) of the Ministry of Agriculture and Animal Resources (MINAGRI), in conducting the Environmental and Social Impact Assessment (ESIA) and corresponding Environmental and Social Management Plans (ESMP) for indicative feeder roads in Nyaruguru District.

The methodology adopted for the preparation of this report includes the review of feasibility reports and detailed designs,national and international regulations related to environmental and social safeguards, district reports and field observations and measurements as well as discussions with project's experts/ personnel. Public consultation meetings with different stakeholders were also conducted in the project area to explain the project and determine the beneficiaries' opinions and concerns on the environmental impacts of the rehabilitation of feeder roads in the District.

The assessment by the Consultant revealed that the District is a mountainous region characterized by steeper slopes, with an altitude of 1600-1900m and a very rich and vast hydrographic network.

The District is covered with diverse ecosystems that include both natural and artificial ecosystems. The total number of people within RoW reaches 9,108 people including 4,308 men and 4,800 women, grouped in 1,980 families.

The findings of the ESIA study showedthat the feeder roads project in Nyaruguru has both positive and negative impacts. The positive impacts include employment opportunity, skill transfer, enhanced economy in rural areas, increase in social and industrial activity, improved transport system, saving in travel time, reduction in accidents, better drainage system, reduction in fuel consumption and green house gases. Potential negative impacts likely to occur include loss of 95.61 ha of land, 156trees and178 houses; increase in erosion rates, soil pollution due to spill of oil, grease and other chemical/ material on road, disruption of natural drainage, water pollution due to construction in water front structures or disposal of waste; increase in water demand, increased roads embankment landslides, risks to health due to poor waste disposal and outside labour employment; increase in noise and air pollution in the vicinity of the construction sites, increased road congestion, encroachment to protected areas, loss of biodiversity and 7 water points.

The above adverse impacts are low to mediumand can be mitigated.Adopting a proper waste management system at the site, designing and constructing properly the drainage pattern, provision of sanitary facilities, construction of erosion control measures combining vegetative measures and stone masonry,checkdams/ silt trap structures before discharging roadside runoff into water bodies, using motorized equipments in good working conditions during daytime, regular spray of water during road construction, application of traffic management measures or preparing alternative roads in case of road closure, provision of protective equipments to workers, organizing awaireness campaigns for the prevention of communicable diseases, compensation for affected assets, etc. are among the measures to mitigate the potential adverse project impacts. The monitoring plan was set up to ensure the negative impacts are attenuated. The contractor and supervising firm will respectively implement the project and follow up its compliance with environmental and social safeguards under the direct supervision of MINAGRI/FRDP and Nyaruguru District. RDB will approve the report while REMA will oversee the project implementation and conduct environmental audit during the project implementation. Other stakeholders include MININFRA/RTDA, MINIRENA/RNRA, MINALOC, RSB and World Bank.

Different stakeholders (local authorities, Community, Road Users and Cooperative and church leaders) were consulted to explain the project and give them the opportunity to express their views and concerns. Most of the consulted stakeholders are in favour of the project but requested for the compensation of their properties likely to be affected.

The bills of quantities (BoQ) prepared for the cost of environmental and social management along with monitoring plans, are estimated at **646,140,000Frw** which is 3.6**%** of project, including 601,370,000 Frw for ESMP and 44,770,000 Frw for environmental and social monitoring plans.

The Government of Rwanda will disclose this ESIA/ESMP report and will authorize the World Bank to disclose it electronically through its InfoShop.

In view of the ESIA/ESMP results, it could be concluded that the project will bring substancial benefits to the Nyaruguru community. The identified negative impacts can be mitigated with the proposed Environmental and Social Management Plans. However, for the successful implementation of planned development activities, the timely implementation of the proposed mitigation measures is required.

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ABBREVIATIONS

AIDS	:	Acquired Immune Deficiency Syndrome
amsl	:	Above Mean Sea Level
BP	:	Bank Procedure
CBD	:	Convention on Biological Diversity
DPR	:	Detailed Project Report
DPs	:	Displaced Persons
EA	:	Environmental Assessment
EDPRS	:	Economic Development and Poverty Reduction Strategy
EIA	:	Environmental Impact Assessment
EMP	:	Environmental Management Plans
ESIA	:	Environmental and Social Impact Assessment
ESMP	:	Environmental and Social Management Plan
FS	:	Feasibility Studies
GDP	:	Gross Domestic Product
GOR	:	Government of Rwanda
HIV	:	Human Immune Deficiency Virous
IDA	:	International Development Association
IL	:	Impact Level
IWRM	:	Integrated Water resources Management
LCV	:	Light Commercial Vehicle
LHS	:	Left Hand Side
MDG	:	Millennium Development Goals
MINAGRI	:	Ministry of Agriculture and Animal Resources
MINALOC	:	Ministry of Local Government
MINIRENA	:	Ministry of Natural Resources
NAP	:	National Action Plan
NAPA	:	National Plan of Action
NBSAP	:	National Bio-diversity Strategy and Action Plan
NCC	:	National Consultative Committee
NGOs	:	Non-Governmental Organizations
NFP	:	National Forest Policy
NMT	:	Non-Motorized Transport
NR	:	National Road
NWP	:	National Water Policy
OP	:	Operation Policy
PAPs	:	Project Affected Persons
PCRMP	:	Physical Cultural Resources Management Plan
POL	:	Petrolium, Oils and Lubricants
PM	:	Patriculate Matter
QA	:	Quality Assurance
RAP	:	Resettlement Action Plan

RCC	:	Reinforced Cement Concrete
RDB	:	Rwanda Development Board
REMA	:	Rwanda Environmental Management Authority
RFP	:	Request for Proposal
RFRDP	:	Rwanda Feeder Roads Development Project
RLDSF	:	Rwanda Local Government Development Support Fund
RHS	:	Right Hand Side
RMF	:	Road Maintenance Fund
RNRA	:	Rwanda National Resources Authority
RSB	:	Rwanda Standards Board
RTDA	:	Road Transport Development Agency
SPM	:	Suspended Particulat Matter
Sq. mi	:	Square Mile
STD	:	Sexually Transmitted Disease
ToR	:	Terms of Reference
ROW	:	Right of way
TP	:	Transport Policy
WB	:	World Bank
WHO	:	World Health Organization

1 INTRODUCTION

1.1 BACKGROUND OF THE PROJECT

Rwanda, the world's 149th largest country, has an area of 26,338 square kilometres (10,169 sq mi). Rwanda has four provinces (East, West, North and South) and Kigali City. Nyaruguru District is one of the eight Districts that makes the Southern Province. The District has 14 Sectors, which are Busanze, Cyahinda, Kibeho, Kivu, Mata, Muganza, Munini, Ngera, Ngoma, Nyabimata, Nyagisozi, Ruheru, Ruramba and Rusenge. NyaruguruDistrict is about 165 km from the Capital Kigali and it can be approached via National Roads RN-1.**Figure 1** indicates the location of Nyaruguru District in Rwanda.

Figure1 : Map of Rwanda showing the location of Nyaruguru District

The District covers a surface area of 1,010sq.km, with a population of 294,334 inhabitants[2]. It is the least densely populated district in the Southern Province and seventh least densely populated district in Rwanda. The population density accounts for 291 inhab/sq.km, ranking the District seventh from bottom country-wide; density is 30% lower than the national average (415 inhab/sq.km) and 33% lower than the Southern Province average (434 inhab/sq.km). The population growth is expected to decrease, from 2.4% in 2012 down to 1.9% in 2032. The District is prevalently rural, the urban population accounted only for 2.0 % of the total District population in 2012. The road network in the District is in poor conditions.

The Government of Rwanda, through the Ministry of Agriculture and Animal Resources (MINAGRI), launched the Rwanda Feeder Roads Development Project (FRDP) in order to reduce post-harvest loss and the high transport price in the project areas by developing agricultural marketing roads. The FRDP has initially received funding from IDA of the World Bank to rehabilitate, upgrade and maintain 500 km of indicative feeder roads in four Districts. Under the same project, the Government of Rwanda applied for additional funding for the rehabilitation of 1200 km of feeder roads in other six Districts, Nyaruguru inclusive.The total road network in the project area is estimated at 194.56kmwhichare in poor condition. All indicative feeder roads are dirt roads and their rehabilitation and upgrading will change the road cover from dirt to gravel. The implementation of FRDP will improve the consumer access to safe and affordable food and enhance producers' access to markets, especially in areas with high agricultural potential through improvement of feeder roads.

M/s Intercontinental Consultants and Technocrats Pvt Ltd, in association with ALN Consultants Ltd (*as sub-consultant*), was contracted by MINAGRI / FRDP to provide the consultancy services in conducting the Environmental and Social Impact Assessment (ESIA) and Environmental and Social Management Plan (ESMP) for indicative feeder roads in five Districts,namely Gatsibo, Nyagatare, Nyaruguru, Gakenke, Nyabihu and Rutsiro.The present report only concerns Nyaruguru District. **Figure 2** presents the indicative feeder roads in Nyaruguru District.

[2]Rwanda 4th Population and Housing Census, 2012 (NISR)

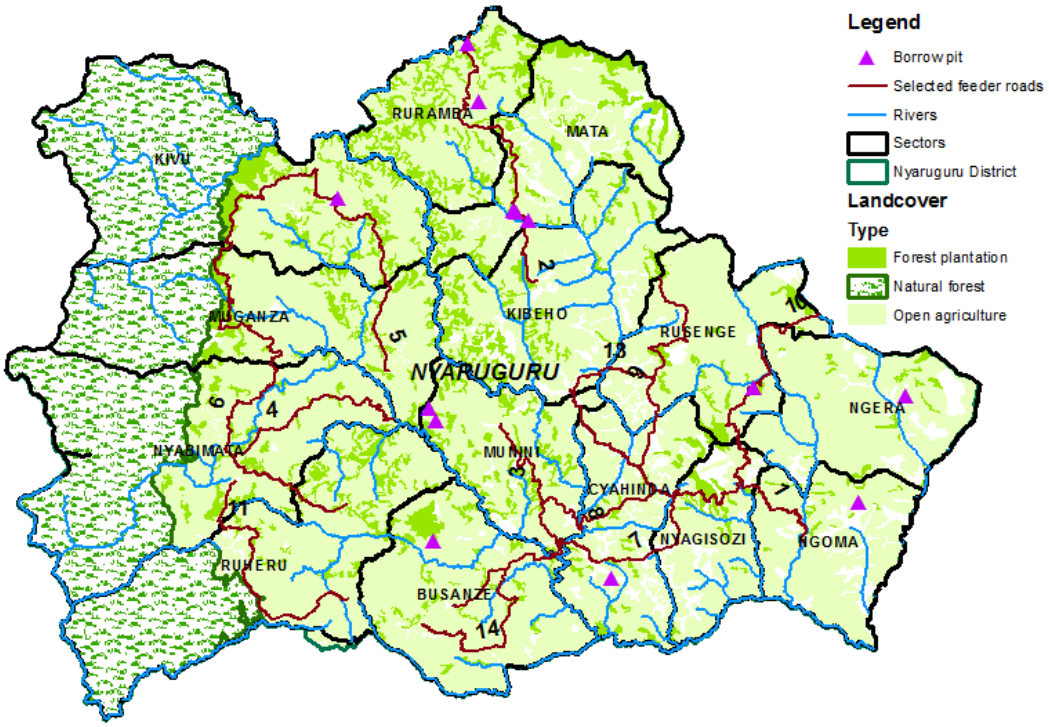

Figure 2 : Map showing the indicative feeder roads in Nyaruguru District

NB: The Figure 2 does not present quarry and disposal sites because good quality construction stones were not found within the Project area and will be obtained from outside the site. The surplus soil from the RoW will be dumped into borrow areas for their rehabilitation. Other wastes will be disposed of in the dumping sites to be identified by the District and availed to the Contractor.

1.2 OBJECTIVE

The **main objective** of the assignment is to assess the Environmental and social Impacts of the rehabilitation of indicativefeeder roads in Nyaruguru District for the account of Rwanda Feeder Road Development Project (FRDP).

The **specific objectives** are:

- To assess the potential positive and negative environmental and social impacts of the feeder roads rehabilitation projects in Nyaruguru District,
- To propose environmental and social management measures to mitigate the negative impactsand enhance positive impacts;
- to provide guidance and means for monitoring the implementation of environmental and social management measures;

- To produce reports in the format and level so that these are meeting EIA guidelines, policies and regulation of Government of Rwanda (GOR) and the operation policies and safeguards measures of the World Bank (WB).

1.3 SCOPE OF SERVICES

The scope of services includes ensuring that feeder roads rehabilitation is implemented in an environmentally and socially sustainable manner and compliance with Rwanda's and the World Bank's environmental and social policies and regulations.

The scope of work is issued along with Request for Proposal (RFP). However, keeping in view World Bank Operation Policy (OP), the tentative scope of work has been drawn for the study and according approach and methodology have been drawn. The scope of services in brief for the present studyis as follows:

- Development of baseline status for various environmental and social attributes on Physical Environment; Ecological Environment; Physical Cultural Resources and Socio-economic profile;
- Organizing public consultation meetings with various stakeholders
- Assessment of potential positive and negative environmental and social impacts of proposed feeder roads;
- Proposing Environmental and social mitigation measures and management plans to effectively address the negative impacts;
- Prepare the ESIA/ ESMP report for review and approval by FRDP, RDB and the World Bank;
- Prepare post project monitoring programs, institutional arrangement to implement the environmental and social plans and cost involved.

The project will improve the existing infrastructure in rural areas, which will boost the connectivity and transfer of goods and people from one place to another in less time. The improved feeder roads will contribute towards the GDP of the project area and the country in general. The project will also pave the way for systematic improvement and continued investment in Nyaruguru District.

1.4 APPROACH AND METHODOLOGY

In formulating this approach and methodology, care has been taken for the requirements of the ToR and accordingly given full consideration to the objectives, purpose and the scope of the study.

The review of project reports (feasibility reports and detailed designs, project appraisal documents, etc), national and international regulations related to environmental and social safeguards, district reports; visits for field observations and measurements; consultations with various stakeholders (local authorities, local communities, farmers'organizations, church leaders, private sector federation, etc) as well as discussions with project's experts/ personnel are tools and methodologies used to collect needed information.

A questionnaire was prepared and administered to affected families within the right of way (RoW) to assess their socio-economic conditions. The sample size of 80 families, ie 2 people for every 5km, was used to collect needed information.

Based on site assessment findings, the Consultant predicted potential impacts, both positive and negative, prepared Environmental and Social Management and Monitoring Plans as well as estimated costs before producing the ESIA/ESMP report. This report will be submitted for review and approval by MINAGRI/FRDP, RDB and the World Bank.

The study was conducted in such a manner and procedure that it fulfils the requirements of Government of Rwanda and the World Bank's environmental and social appraisal procedures.

2 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

2.1 NATIONAL RELEVANT POLICIES AND STRATEGIES[3]

This chapter describes the relevant policies and strategies, legal instruments, institutional arrangement and international framework applicable to rehabilitation and /or construction of feeder road in different districts of Rwanda. It summarizes the National Laws and describes the procedure for obtaining environmental permits to allow project implementation. The awareness of environmental and social issues started as early as in 1920. Thereafter were created respectively Albert Park (1925), the National Forest of Nyungwe as a reserved forest (1933) and Akagera National Park (1935). The environmental friendly initiatives were also supported by vast campaigns for soil conservation from 1947. In 1977 action program of environmental nature were launched such as: human settlement (1977), stockbreeding (1978), soil protection and conservation (1980), water supply in rural areas (1981), erosion control (1982) and reforestation (1983). However, it is only in 2003 that an elaborate National Evironment Policy was established by the Government of Rwanda.

2.1.1 National Environment Policy

The National Environment Policy was adopted by the Cabinet in November 2003. This policy aims at the following:

- to enable the country to strike a dynamic balance between population and resources while complying with the balance of ecosystems;
- to contribute to sustainable and harmonious socio-economic development such that, both in rural and urban areas, men and women may realize their development and well-being in a sound and enjoyable environment; and
- to protect, conserve and develop natural environment.

This policy therefore seeks to integrate environmental sustainability principles into all development processes, programmes and projects. For roads, the nature of the terrain in Rwanda makes environmental issues (e.g. water runoff and landslides), the main threats to sustainable road maintenance. The terrain and the settlement patterns also indicate that roads – which are the most common mode of transport –could be a potentially dangerous development, unless environmental and social considerations of human safety, risk of losses, are prior anticipated, identified, analysed and integrated into the project design and implementation.

[3] National Environmental Policy (November 2003)

This underscores the importance of EIA in road projects. This policy provides a framework for the reconciliation of the three pillars of sustainable development, namely environment, social and economic issues. Rwanda environment policy also advocates to ensure compliance with environment in all transport and communications activities which includes the following:

i) to ensure that land, lake and air transport regulations minimize pollution;
ii) to prevent air and soil pollution by emissions of gases and heavy metals from transport equipment;
iii) to ensure the protection of areas bordering roads;
iv) to protect the population against noise nuisances and dangers from air, lake and land transport.

2.1.2 National Transport Policy

The National Transport Policy was approved in December 2008. This policy takes into account the action plan of the Sub-Saharan Africa Transport Policy and cross-cutting issues such as HIV/AIDS, gender mainstreaming, socio-economic and environment. The transport infrastructure sector must be effective to facilitate the other socio-economic sectors and thus stimulate the growth for achievement of the objectives of EDPRS-II and Vision 2020[4].

This policy highlights the main objective of the road sub-sector in Rwanda as to Maintain, Rehabilitate and Develop the National Road Network, which is responsible for more than 80% of human and goods traffic in the country. The policy's strategies to meet these objectives are:

a) Expanding and improving Rwanda's road infrastructure, protecting existing capital investments, and improving road safety;
b) Establishing an appropriate institutional framework for the accelerated development of the road sub sector;
c) Financing road maintenance works through multi-year maintenance contracts, renewable under performance evaluation;
d) Encouraging community participation in road maintenance through the district development committees;

[4]The transport policy is inspired by planning tools such as EDPRS-II, National Investment Strategy, and the medium term expenditure framework. The policy enables the establishment of viable transport sector for economic development in Rwanda. It is also addressing the present and future shortcomings. The vision 2020 advocates the internal trade and mobility with access to market through road network particularly in rural area. The transport policy also matches with the millennium development goals of economic growth and reduction in poverty.

e) Improving the ability and quality of local road infrastructure, thereby enabling the rural community to market its crops;
f) Creating an environment conducive to the encouragement of Private Sector participation in rehabilitating, maintaining, and developing road infrastructure. Accordingly, a Road Maintenance Fund was established to provide adequate, reliable financing for road maintenance activities; and a Road Maintenance Strategy was formulated to guide the process.

2.1.3 Road Maintenance Strategy

The Road Maintenance Strategy of May 2008 emphasises routine maintenance as a more cost-effective tool of establishing and managing road infrastructure.The strategy aims to:

a) Provide a policy framework to guide RTDA and Districts staff in maintenance programming, planning and execution;
b) Ensure that investments are made in the development of roads;
c) Ensure that infrastructures are safeguarded and allowed to deliver their maximum benefit; and to allow all stakeholders to understand the investment decisions taken by MININFRA.

This strategy lays emphasis on building capacity, fostering public-private partnerships and a long-term project cycle involving multi-year contracts management. Environmental management is a key aspect of the Road Maintenance Strategy, as this is critical for cost-effective road maintenance and rehabilitation.

2.1.4 National Land Policy

National land policy was adopted in February 2004. This policy provides register and transfer of land and possibility of investments in land. It also highlights key principle of land use and land management. The policy advocates the protection of green areas, marshy land, valley and protected areas in Rwanda. These protected areas are classified as such because of their multiple roles, namely ecological, economical, cultural, and social. The main objective of their preservation was the conservation of different species and different habitats of biodiversity for educational, touristic and research purposes. These areas have been affected by various changes, one of which is the spatial reduction due to the resettlement of the population.

For road scheme development, the implications of this policy relate to resettlement and compensation; assessing the suitability of particular areas for road infrastructure; and the influence of infrastructure development on the changing value and use of land.

2.1.5 Integrated Water Management Policy

The Integrated Water Managemet Policy aims for sustainable management of water. This policy is relevant as some of the activities such as bridges, culverts and road construction will be undertaken in buffer zones of rivers and/or marshlands. The policy also highlights management of water on both demand and supply side. Policy also integrates the other policies on forests, wetland, agriculture and land.

2.1.6 National Development Strategy[5]

The Vision 2020 document has developed National Development Strategy in year 2000 wherein it is realized that Rwanda shall have a reliable and safe transport network of feeder roads. Hence feeder roads will continue to be extended and improved. Land use management, urban and transport Infrastructure development are considered as important pillar among 6 pillars of vision 2020 and protection of environment and sustainable natural resource management is one of the crosscutting areas of the vision. The other important planning tools are: the second Economic Development and Poverty Reduction Strategy (EDPRS-II), the National Investment Strategy, Millennium Development Goals (MDGs) and the Medium Term Expenditure Framework. The vision document advocates to the development of economic infrastructure of the country and transport infrastructure in particular.

The Government of Rwanda (GoR) developed National Strategies and Action plans for the following:

- National Biodiversity Strategy and Action Plan (NBSAP) 2003,
- National Plan of Action (NAPA) for climate change adaptation (2006/7), and
- National Action Plan (NAP) for combating desertification.

These strategies and action plans reflect national priorities for Environmental Natural Resources (ENR) sector that are online with the Rwanda's second phase Economic Development and Poverty Reduction Strategy (EDPRS-II) as a medium-term framework for achieving the country's long term development aspirations as embodied in Rwanda Vision 2020 and the Millennium Development Goals (MDG) priorities.

[5]Rwanda Vision 2020; Republic Of Rwanda; Ministry Of Finance and Economic Planning (2000).

2.1.7 National Wetlands Conservation Program

The program aims at engaging various government ministries in wetland conservation and ensure a holistic approach to wetland management. Rules governing wetlands in the country were put in place to enhance wetland conservation and enable environmentally adequate management of all development project activities, roads inclusive, that may negatively impact wetlands. All wetlands crossed by the roads under study are currently used for agricultural production.

2.2 LEGAL INSTRUMENTS

The main national legislations that provide for and guide Environmental and Social Impact Assessment (ESIA) for road infrastructure, and the provisions, thereof, include the following: National Constitution of June 2003 obliges the Government of Rwanda - current and future – together with the population, to carefully harness environmental resources in order to ensure sustainability and inter-generational equity. The degree of relevance of these legislative instruments varies with the activity and area, because environmental consequences of development tend to be area and theme specific.

2.2.1 Important Environmental Legislations

The legal instruments that are more relevant to the present project are:

i. The Constitution of the Republic of Rwanda, June 2003 promulgated in 2015: In particular, articles 29, 30, 49, 62, 88, 90, 93, 108, 118, 190, 191 and 201, make various provisions for environmental management; from guaranteeing rights to a healthy environment for every citizen.
ii. Organic Law No. 04/2005 date determining the modalities for the protection, conservation and promotion of environment in Rwanda.
iii. Law No. 55/2011 of 14/12/2011 governing roads in Rwanda;
iv. Law No. 32/2015 of 11/06/2015 relating to Expropriation in the Public Interest in Rwanda;
v. Law No. 62/2008 of 10/09/2008 regulating the use, conservation, protection and management of water resources;
vi. Ministerial OrdersNo. 003/2008 date and No. 004/2008 of August 2008 respectively relating to the requirements and procedure for environmental impact assessment and the list of works, activities and projects that have to undertakean environment impact assessment;
vii. Ministerial Orders No. 005/2008 of Date and No. 007/2008 of August 2008 re-

spectively establishing modalities of inspecting companies or activities that pollute the environment and list of protected animals and plant species;

viii. Ministerial Instruction No. 02/UPPR/09 with respect to excavations and restoration of public infrastructure by Communications and Infrastructure Service Providers (CISPs) operating in Rwanda, April 21, 2009.

ix. General Guidelines and Procedures for Environmental Impact Assessment of November 2006, prepared by Rwanda Environment Management Authority (REMA).

x. Sector Guidelines for Environmental Impact Assessment (EIA) for Road Development Project (August, 2009);

2.2.2 Environmental Impact Assessment Legislation in Rwanda

The Rwandan legislation governing EIA concerns also the construction or rehabilitation of national roads, district roads and repair of large bridges.

Some of the roads in Nyaruguru District will cross wetlands, and the Environmental Organic Law determines that:

(Article 17): The use, management of water and its resources shall not in any way use unfair methods of exploitation that may lead to natural disasters such as floods or drought. Any acts concerned with water resources like watering plants, the use of swamps and wetlands and others, shall always be subject to prior environmental impact assessment.

(Article 83): It is prohibited to dump in wetlands: 1° waste water, except after treatment in accordance with instructions that govern it; 2° any hazardous waste before its treatment. Any activity that may damage the quality of water is prohibited.

Chapter IV of Rwanda Environmental Organic Law is dedicated to EIA in its articles 67 to 70 as cited below:

(Article 67): Every project shall be subjected to Environmental Impact Assessment/Environmental Management Plan, before obtaining authorization for its implementation. This applies to programmes and policies that may affect the environment. An order of the Minister having environment in his/ her attributions shall determine the list of projects mentioned in this organic law.

(Article 68): The environmental impact assessment shall at least indicate the following:

- a brief description of the project and its variants;
- a study of direct or indirect projected effects on a place;
- analysis relating to the initial state of a place;
- measures envisaged to reduce, prevent or compensate for the damage;
- reasons based on in selecting such a place;
- an explanation of the methods that will be used in monitoring and evaluating the state of the environment before, during the activities of the project, but particularly after completion of the project;
- an estimation of the cost of the measures recommended to prevent, reduce or compensate for the negative effects the project may cause on the environment as well as the measures for examining and controlling the status of the environment.

An order of the Minister having environment in his or her attributions shall specify the details of the provisions of this article.

(Article 69): The Environmental Impact Assessment shall be examined and approved by the Rwanda Environment Management Authority or any other person given a written authorization by the Authority. The promoter pays a levy reduced from the operating cost of his or her project excluding the working capital. This tax is determined by the law establishing the National Fund for the Environment. The EIA shall be carried out at the expense of the promoter.

Note: REMA used to have the legal authority/ responsibility of overseeing the conduct of Environmental Impact Assessment (EIA) under Article 69 of the Environmental Organic Law, but since the establishment of the Rwanda Development Board (RDB) in September 2008, the responsibility of overseeing the conduct of EIAs was given to RDB under Article 3 of the Organic Law No. 53/2008 of 02/09/2008 establishing RDB and determining its responsibilities, organisation and functioning. Article 3 point 11 of the said law states that RDB should facilitate and help investors to meet environmental standards in the execution of their projects.

(Article 70): An order of the Minister having environment in his or her attributions establishes and revises the list of planned works, activities and projects, and of which the public administration shall not warrant the certificate, approve or authorize without an environmental impact assessment of the project.

The EIA shall describe direct and indirect consequences on the environment.

The list of works, activities and projects that have to undertake an Environmental Impact Assessment has also been published under the Ministerial Order No. 004/2008.

2.2.3 Environmental Impact Assessment Guidelines in Rwanda

Rwanda Environment Management Authority (REMA) has established a number of EIA guidelines, ranging from general EIA guidelines to sector specific guidelines in order to ease the EIA process in Rwanda.

The following areEIA guidelines presently available:

1. General EIA guidelines
2. EIA guidelines for environmental auditing
3. EIA guidelines for roads development projects
4. EIA guidelines for water resources management
5. EIA guidelines for wetlands management
6. EIA guidelines for waste management
7. EIA guidelines for housing industry

i. General EIA guidelines

These guidelines were developed by REMA in August 2009 in order to assist projects developers, contractors and EIA practitioners.

An EIA process in Rwanda includes 5 steps: (i) project application and registration, (ii) screening, scoping and terms of reference, (iii) EIA study and report, (iv) submission of an EIA report and finally (v) decision making. **Figure 4**summaries the EIA procedure in Rwanda including timeline in each stage.

Screening enables categorisation of projects according to their Impact Level (IL) as follows:

Category 1: (Impact level IL1): Full EIA not required. Rwanda Development Board (RDB) advises on the appropriate environmental management measures (plan). The Exercise may take 14 days from the day received the project brief; (days may be less or more depending on the nature of the project);

Category 2: (Impact level IL2): The proposed projects under this category are screened to determine whether or not a full EIA is needed.

In this connection, RDB provides the developer with clear indication of the additional information required. Once this information is received, RDB will determine whether or not a full EIA of the project is needed.

Category 3: (Impact level 3): Full EIA is required.

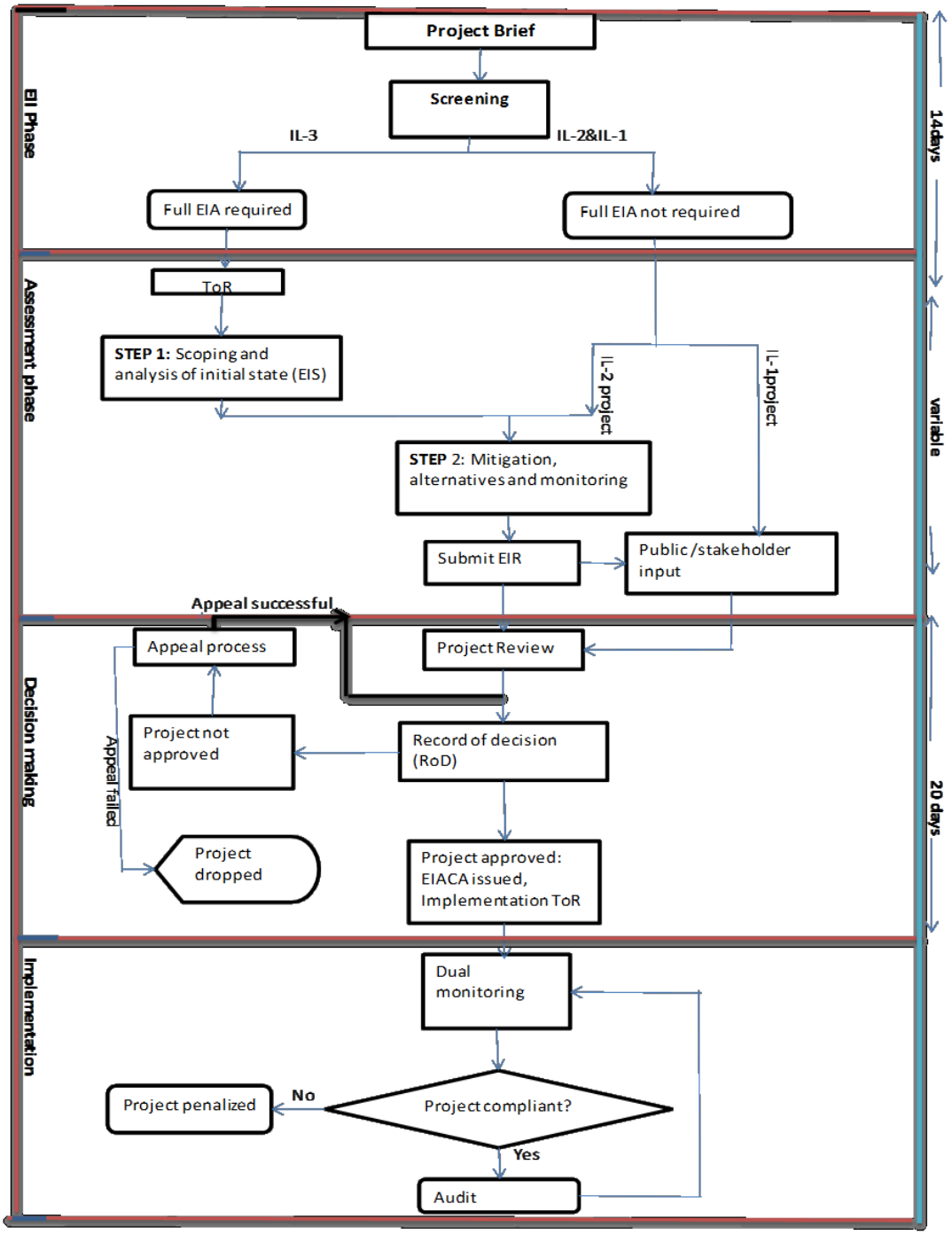

Figure 3: EIA Procedure in Rwanda[6]

[6]General Guidelines and Procedures for Environmental Impact Assessment

Ministerial order No. 004/2008 of 15/08/2008 establishes the list of works; activities and projects that have to undertake an EIA. They are classified into infrastructure, Agriculture and Animal Husbandry, works in park and in its buffer zones and mine extraction. According to that law, the proposed feeder road rehabilitation project falls in category 3 (IL3) of infrastructure where full EIA is required.

ii. EIA guidelines for roads development projects

These guidelines were developed by REMA in August 2009 in order to assist road developers, contractors, EIA practitioners and planners in the road sector, providing a tool that guides the EIA process so that EIA in the road sector is satisfactory and cost-effective. To ensure this, these guidelines:

- provide basic information to be collected on biophysical, social, cultural and economic parameters relevant for roads development, in each phase of the road development project cycle;
- advise on the methodology for collecting and analyzing data;
- provide a generic framework for logically documenting and presenting the EIA results (general report outline);
- provide basic guide on how to execute EIA activities including conducting public hearings for multi-stakeholder projects like roads development.

iii. EIA guidelines for water resources management

These guidelines were developed by REMA in March 2009; one of its objectives being to enable environmentally adequate management of all development project activities that may negatively impact water resources.

iv. EIA guidelines for wetlands management

These guidelines were also developed by REMA in March 2009; with the main purpose of enabling environmentally adequate management of all development project activities that may negatively impact wetlands.

2.2.4 International Environmental Related Conventions signed by Rwanda

Besides the law and regulation on EIA at national level, Rwanda has approved and signed several international conventions which are in one or another way related to environmental management of feeder roads development projects:

- Convention on Biological Diversity aiming at conserving biodiversity, using it sustainably and fairly and equitably sharing benefits arising from genetic resources;
- The CARTAGENA protocol on Biosafety, which is a supplement to the Convention of Biodiversity signed in NAIROBI from May 15, to 26, 2000 and in NEW YORK from June 5, 2000 to June 4, 2001 as authorized to be ratified by Law n° 38/2003 of 29 December 2003;
- The KYOTO Protocol to the Framework Convention on Climate Change adopted at KYOTO on March 6, 1998 as authorised to be ratified by Law n° 36/ 2003 of 29 December 2003;
- The RAMSAR International Convention of February 2, 1971 on Wetlands of International importance, especially as waterfowl habitats as authorised to be ratified by Law n° 37/2003 of 29 December 2003;
- The STOCKHOLM Convention on persistent organic pollutants, signed in STOCKHOLM on 22 May 2001, has been approved by Presidential Order n° 78/01 of 8 July 2002;
- CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora): This is an international treaty aiming to prevent species from becoming endangered or extinct because of international trade. Any trade in protected plant and animal species should be sustainable, based on sound biological understanding and principles.

This shows the commitment of Rwanda to fulfil all the requirements at international level in terms of environmental protection toward sustainable development.

2.3 INSTITUTIONAL FRAMEWORK

The roads sector is an anchor to social and economic transformation, and for this reason, has spider web-like networks with other sectors, including agriculture, international trade, local governance, education, health; etc. The institutional framework for environmental impact assessment in the feeder roads sector is, therefore, complex. The main institutions involved and their roles are summarised in **Table 1** below.

Table 1: Key Institutions in EIA implementation and major stakeholders in feeder roads development in Rwanda

Institution / Agency	**Key interests and responsibilities for feeder roads**
1. Rwanda Environment Management Authority (REMA)	National authority responsible for environmental protection, conservation and promotion. It oversees the implementation of EIA guidelines. It is responsible for conducts the project environmental audit during project implementation.
2. Rwanda Development Board (RDB)	In order to facilitate the investors, RDB has been given the responsibility of reviewing the EIA reports,conducting public hearing during the EIA processand providing environmental compliance certificates to development projects
3. Rwanda Standards Board (RSB)	RSB has a mission to provide standards based solutions for consumer protection and trade promotion for socio-economic growth in a safe and stable environment in Rwanda. It has developed standards for design and maintenance of feeder roads (**RS 267:2015**).It has also developed other standards related to the road sector like the standards on ambient air quality and noise levels.
4. Ministry of Agriculture and Animal Resources (MINAGRI)	Formulating policies andinitiating public investments for the agriculture sector in the country. Together with its stakeholders, MINAGRI is implementing feeder roads through FRDP for supporting the farmers in improving their access to markets, therefore improving the agriculture value-chain. MINAGRI also oversees the compensation process, approves the list of PAPs and proceeds to their payments and conducts regular crosschecking visits to PAPs and banks to ensure PAPs were paid and properly use the compensation.
5. Ministry of Infrastructures (MININFRA)	Formulating policies and laws for roads development in the country. It is also responsible for national roads, highways

	and bridges and oversees feeder roads development policies.
6. Rwanda Transport Development Agency (RTDA)	Oversees the implementation of the transport policy, including management of roads (National roads, District Roads and Feeder Roads); initiating public investment in transport services. It provides technical support to the Districts in the development of feeder roads.
7. Ministry of Natural Resources (MINIRENA)	Formulating policies and regulations for land administration and land use planning; environmental protection and natural resources utilization, including expropriation. In feeder roads development, a major responsibility is to allow the exploitation of borrow pits and quarries for the required construction materials.
8. Ministry of Local Government (MINALOC).	Formulating national policies and laws on decentralisation and local governance – Supervising District authorities which are responsible for feeder roads development.
9. Districts	Districts are responsible for planning and execution of feeder roads construction, rehabilitation and maintenance projects. They also oversee ESIA study & monitoring of the compliance with environmental and social safeguards
10. Rwanda Natural Resources Authority (RNRA)	Land registration and land use planning throughout the country. Compensation and resettlement will depend on legal ownership.
11. Rwanda National Police (RNP)	The National police have statutory responsibility for law enforcement including ensuring that road traffic laws are observed; and therefore all roads are constructed in conform to appropriate legislations. They also have to provide security to road construction facilities.
12. World Bank,	- Provision of loans and grants financing for road construction - Clearance of ESIA/ESMP report, - Technical assistance in the implementation of project activities;

13. Contractor	- Preparing and implementing the site specific ESMP during construction phase, including employing an environmental and social safeguards expert for the proper ESMP implementation.
14. Supervising Firm	- Supervising the proper implementation of site specific ESMP

2.4 WORLD BANK SAFEGUARD POLICIES

In order to avoid adverse negative environmental and social impacts of a proposed road for improvement, no road contract tender should be launched before a road specific ESIA and RAP based on final design is prepared, the ESMP with the management measures is incorporated in the bidding documents, and every person affected by the works on that section has been relocated and/or properly compensated according to Bank policies.

The World Bank Operational Policy OP 4.01 requires that the Environmental and Social Assessment report must be a standalone document to meet the bank appraisal procedures for the project. The disclosure should be in Rwanda where it can be accessed by both the general public and local communities. In accordance with the World Bank Safeguard operational policies and procedures the proposed Rwanda Feeder Road Development Project has been classified as Environmental Assessment (EA) risk category A equivalent to Category 3 under the Rwanda's EIA Guidelines. The EA categories are summarized on **Table 2**.

Table 2: Categorization of Projects Subjected to EIA (World Bank, 1999)

Category A	Category B	Category C	Category FI
The project is likely to have significant adverse impacts that may be sensitive, irreversible, diverse, comprehensive, broad or precedent setting. These impacts generally result from a	Although an EIA is not always required, some Environmental analysis is necessary. The projects have impacts that are 'less significant, not as sensitive, numerous, major or diverse. Few if any	The projects result in negligible or minimal direct disturbance of the physical Environment. Typical projects include educa-	It involves investment of Bank funds through a financial intermediary

major component of the project and affect the area as a whole or an entire sector. **A full environmental assessment is required**	of the impacts are irreversible and mitigation measures can easily be designed. **Typical projects include rehabilitation, maintenance, or upgrades, rather than new construction**	tion, family planning, health, and human resource development **No EIA or other analysis is required**.	

The project triggers the following safeguard policies:

Environmental Assessment – Operational Policies (OP) and Bank Procedures (BP) (OP/BP 4.01) require environmental assessment of projects proposed that are deemed to have potential adverse impacts upon the environment to help ensure that they are environmentally sound and sustainable.Environmental Assessment is one of the 10 environmental, social, and legal Safeguard Policies of the World Bank. World Bank Environment and Social Safeguard Policy aims at improving decision making, to ensure that project options under consideration are sound and sustainable, and that potentially affected people have been properly consulted.

Operational Policy 4.01 further requires that the ESIA/ESMP report must be disclosed as a separate and standalone document by the GoR and the World Bank as a condition for Bank appraisal of this project. Potential adverse environmental and social impacts include: noise, dust, soil and water erosion, and health and safety. Mitigation measures to address these impacts have been recommended in the ESMP as part of this ESIA. The measures built on Rwanda's EIA Guidelines for Roads, World Bank Group General Environmental Health and Safety Guidelines and international good practices.An Environmental and Social Management Framework (ESMF) was prepared, consulted upon, and disclosed prior to appraisal to guide the preparation of the ESIA for those subprojects yet to be identified and/or finalized. An ESIA/ ESMP will be prepared for finalized alignment of roads.

Natural Habitats (OP/BP 4.04) - This policy aims at the conservation of natural habitats, like other measures that protect and enhance the environment.

Natural Habitats are land and water areas where the ecosystems' biological communities are formed largely by native plant and animal species, and human activity has not essentially modified the areas primary ecological functions.The policy is essential for long term sustainable development. The Bank therefore supports the protection, maintenance, and rehabilitation of natural habitats.

The Natural Habitats policy is triggered by the project because two of the indicative feeder roads, FR5 and FR6, pass through the forest buffer zone of Nyungwe National Park. Nyungwe national park is an important site for biodiversity conservation in Rwanda" for its approximately 280 bird species, 25 of which are endemic. It is also home to primates population, myriad orchids, butterflies, moths and other fascinating insects. The Nyungwe buffer zone is also a protected area.
The forest is the Rwanda's primary water catchment, sheltering more than two-thirds of all of its watersand has a network of walking and hiking trails. It has a number of camping sites and the development of cultural tourism near the edge of the Park is underway – all of which constitute the potential for a major, low volume, tourist destination in the making. The ESMF and ESIA will include mitigation measures to address the potential impacts.

Physical Cultural Resources (OP/BP 4.11) - The Bank operational policy on safeguarding cultural properties aims at protecting cultural assets and knowledge of communities in bank financed project areas. Safeguarding cultural property policy requires the determination of what is known about the cultural aspects of the proposed project site. The policy calls for consultation involving all parties including scientific institutions and NGOs as part of this process. The policy defines cultural property as sites having archaeological, paleontological, historical, religious and unique natural value. These sites, when stumbled upon, require that the authorities are informed and the site is demarcated and protected.

The feeder road project triggers this policy as some of the indicative feeder roads pass close to physical cultural heritage resources that need to be protected. The feeder roads FR2 starts at Kibeho, a sacred site that hosted appearances of the Virgin Mary in 1980s. The FR14 passes close to the Nkanda memorial site.The ESMF and ESIA will address impacts on physical cultural resources and will require preparation and submission of a detailed physical cultural management plan as soon as the alignments and road designs are finalized but prior to the com-

mencement of civil works. The PCR Management Plan will include “chance finds procedures” in case of chance finds during civil works though highly unlikely since works will be done in existing alignments/ROW.

Involuntary Resettlement (OP/BP 4.12) - This policy covers direct economic and social impacts that both result from Bank-assisted investment projects, and are caused by; involuntary taking of land resulting in relocation or loss of shelter; loss of assets or access to assets, or loss of income sources or means of livelihood, whether or not the affected persons must move to another location. The objective of this policy is to avoid where feasible, or minimize the resettlement, exploring all viable alternative project designs. The proposed project settings may induce land acquisition. A resettlement plan has been prepared as a separate document to mitigate against effects of displacement.The project setting may induce land acquisition.

A Resettlement Policy Framework (RPF) was prepared, consulted upon, and disclosed prior to appraisal. Site wise RAPs were also prepared for subprojects already identified. A comparison between Rwanda laws and World Bank Policy is presented in Table 3.

Table3: Comparative Analysis between World Bank OP 4.12 and Rwanda Legislations

Principles	Rwanda Legislations	World Bank's involuntary Resettlement (OP 4.12)	Recommendations to fill the gaps
Valuation	Valuation is covered by the Expropriation Law and the Law establishing and organizing the real property valuation profession in Rwanda and stipulates that the affected person receive fair and just compensation.	OP 4.12 prefers Replacement cost method of valuation of assets that helps determine the amount sufficient to replace lost assets and cover transaction costs. In applying this method of valuation, depreciation of structures and assets should not be taken into account If the residual of the asset being taken is not economically viable, compensation and other resettlement assistance are provided as if the entire asset had been taken.	The replacement cost method of valuation will be used as required in World Bank financed projects.
Compensation	Article 27 of the expropriation law No 32/2015 of 11/06/2015 entitles the landholder to compensation for the value of the land and activities incorporated on that land on the basis of size, nature location considering the prevailing market value.	OP 4.12 gives preference to land based resettlement strategies for displaced persons whose livelihoods are land-based as compared to monetary compensation	Adopt OP 4.12 mode of compensation by giving preference to land based resettlement as opposed to monetary compensation
Participation and consultation	The Rwandan law on Expropriation simply stipulates that affected peoples be fully informed of expropriation issues. The law also conflicts	WB OP 4.12 requires that persons to be displaced should be actively be consulted and should have opportunity to participate in planning and design of resettlement programs	Adopt OP 4.12 methods of participation

Principles	Rwanda Legislations	World Bank's involuntary Resettlement (OP 4.12)	Recommendations to fill the gaps
	the very purpose of consultation and involvement by prohibiting any opposition to the expropriation program if considered to be under the pretext of self-centered justification which might not be the case		
Timeframe	Rwanda expropriation law stipulates a timeframe upon when the property to be expropriated must be handed over which is 90 days after compensation has been paid.	OP4.12 requires that displacement must not occur before necessary measures for resettlement are in place, i.e., measures over and above simple compensation. Measures pertaining to provision of economic rehabilitation however can and often do occur post displacement. WB OP 4.12 provides for a timeframe (cut-off date) upon which interested parties are entitled to respond	A cut- off date should be applied. OP 4.12 states that, Where the borrower has offered to pay compensation to an affected person in accordance with an approved resettlement plan, but the offer has been rejected, the taking of land and related assets may only proceed if the borrower has deposited funds equal to the offered amount plus 10 percent in a secure form of escrow or other interest-bearing deposit acceptable to the Bank, and has provided a means satisfactory to the Bank for resolving the dispute concerning said offer of compensation in a timely and equitable manner.

Principles	Rwanda Legislations	World Bank's involuntary Resettlement (OP 4.12)	Recommendations to fill the gaps
Overall strategy	Section 2 of the expropriation law on procedures, provides for the process to show how the sub projects fits into the land master plan of the area in question	Under the OP 4.12 , it's not necessary to prove that the project fits within the overall land master plan	Adopt Rwanda Expropriation Law
Eligibility	Article 26 of the law No 32/2015 of 11/06/2015 requires the person who owns land intended for expropriation to provide evidence of ownership or rights on that land and presents a certificate to that effect	OP 4.12 criteria for eligibility include even those who do not have formal legal rights to land at the time the census begins but have a claim to such land or assets--provided that such claims are recognized under the laws of the country or become recognized through a process identified in the resettlement plan and also those who have no recognizable legal right or claim to the land they are occupying	OP 4.12 will be more appropriate for determining eligibility due to the fact that many of those who farm the lands don't own it, although they may have depended on farming on such lands for their livelihood, and as such, should be assisted to at least maintain their pre-project level of welfare. (especially for assets)
	Expropriation law is silent on provision of alternative land and resettlement of those to the pre-displaced status	OP 4.12 requires and prefers resettlement of displaced persons.	Use World Bank OP 4.12 During the upgrading of the feeder road, some resettlement will be required
Required Measures	Expropriation law does not provide for alternatives when undertaking compensation	OP 4.12 requires displaced persons to be consulted on, offered choices among, and provided with technically and economically feasible resettlement alternatives	Use World Bank OP 4.12
Grievance re-	The new Expropriation Law of	OP 4.12 requires PAPs be informed of the	Adopt Rwanda Expropriation Law

Principles	Rwanda Legislations	World Bank's involuntary Resettlement (OP 4.12)	Recommendations to fill the gaps
dress mecha-nisms	2015 creates the Resettle-ment and Grievance redress committee and provides complaints procedures for individuals dissatisfied with the proposed project or the value of their compensation and process for expressing dissatisfaction and for seek-ing redress.	compensation exercise and establishes Grievance Redress Mechanisms	which establishes the GRM formed by District (sector/cell) au-thority, PAP representatives and Project

Forests (OP 4.36)

The objective of this policy is to assist borrowers to harness the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development and protect the vital local and global environment services and values of forests.

This policy applies to:

- Projects that have or may have impacts on the health and quality of forests;
- Projects that affect the rights and welfare of people and their level of dependence upon or interaction with forests; and
- Projects that aim to bring about changes in the management, protection, or utilization of natural forests or plantations, where they are publicly, privately, or communally owned.

The bank supports sustainable and conservation oriented forests. Where forest restoration and plantation developments are necessary to meet these objectives, the bank assist borrowers with forest restoration activities that maintain or enhance biodiversity and ecosystem functionality. The bank also assist borrowers with the establishment and sustainable management of environmentally appropriate, socially beneficial, and economically viable forest plantations to help meet growing demands for forest goods and services.

This policy is triggered by the Project as some of the indicative feeder roads, like FR 7, FR9, FR14, traverse small forest plantations, privately owned. The widening of roads will require tree cutting in forest plantations.The Project plans to plant trees for the protection of rehabilitated feeder roads and replacement of lost trees.

3 PROJECT DESCRIPTION

3.1 PROJECT LOCATION

Nyaruguru District is situated in the Southern Province of the Country. The district borders with Nyamagabe District in the North, Huye and Gisagara Districts in the East, Burundi in the South and Rusizi District in the West. The distance between Kigali and Nyaruguru is about 165 Km on National Road 1, reachable by road in three hours. The population of Nyaruguru District is 294,334 people and spread over an area of 1,010 km^2. It has a population density of 291 person/km^2 (country density is 415 person/km^2) and ranks 24thfor population density among the 30 Districts[7] of Rwanda.

Nyaruguru District is made of 14 Sectors; which are all concerned with the present feeder roads project: Busanze, Cyahinda, Kibeho, Kivu, Mata, Muganza, Munini, Ngera, Ngoma, Nyabimata, Nyagisozi, Ruheru, Ruramba and Rusenge. The figure below indicates the location of different sectors of Nyaruguru as well as indicative feeder roads. The maps along with the description of each road segment and their location in the district map are shown in Annexure 10.

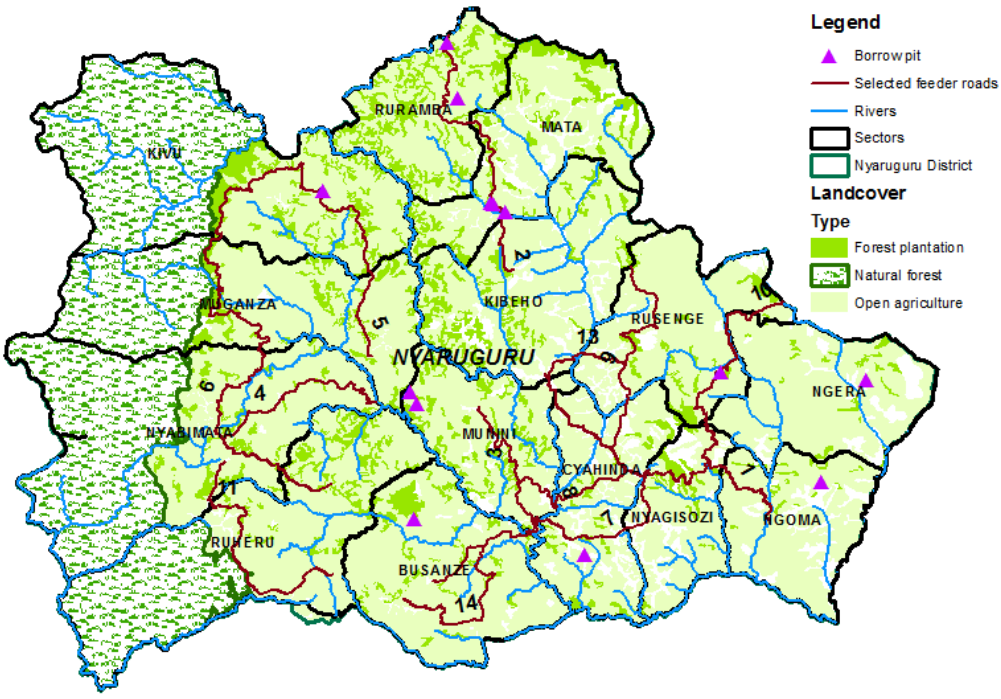

Figure 4: Administrative Map of Nyaruguru District showing different Sectors, indicative feeder roads and borrow areas

[7] Population and Housing Census 2012, National Institute of Statistics of Rwanda

Nyaruguru District is mostly mountainous; the feeder roads pass in high hills terrain, lowlands as well as in wetlands. The hills are populated with scattered settlements often located on the small holdings of individual households.

However, the government has launched an initiative, which encourages the scattered settlers to live in small townships established at indicative central locations for a population living in a defined rural neighbourhood (*Imidugudu*).

The hills are covered with forests, farms and small grazing lands. The marshlands are located in valleys between the hills, relatively well drained with many streams and rivers. The roads crossing marshlands may have to be raised and the side slopes may have to be flatter and involve widening, but this will not require relocating large population. The impact on fauna and flora is expected to be limited as the roads follow existing routes, and road sides are cultivated or already cleared. Roads in swamps require construction of culverts, many in numbers, following the existing natural water course. Side drains may require stone pitching and check dams to control erosion. The soil along the roads could be excavated by labor, which helps in limiting damages to the environment, as labor construction involves gentle cutting and minimal spill overs when a road section has to be widened.

The project area of influence covers the existing RoW, areas required for roads widening of indicative roads, proposed borrow pits, quarry and disposal sites in all Sectors of the Nyaruguru District.

3.2 OBJECTIVES OF THE PROJECT

The main objective of the project is to improve transport infrastructure with a view to support project area's social economic development. The project development will facilitate the economic growth, the improved transportation of goods and services. Specifically, the major purpose of the proposed upgrading project is to construct feeder road network in NyaruguruDistrict in order to meet the following objectives:

- To promote socio economic development of the project area by linking it with other district and cities; and
- To increase agricultural productivity and marketing capacities, by lowering the transport costs and losses of farm input and output. In particular, improved

feeder networks will enhance the commercial surpluses of rural households and their access to services, reducing poverty and isolation.

3.3 ROADS STATUS

The condition of the roads in Nyaruguru District varies from very poor to good. Most of these roads need to be rehabilitated while others require maintenance. The 2013 Development Plan of the District indicates that roads to be rehabilitated cover a total length of 167 km while 795 km of inter–sector roads need to be maintained. The district counts 129 bridges/culverts of which 21 are in good state, 63 need to be rehabilitated and 45 others in poor condition

Thirteen (13) feeder roads with a total length of 195 kmwere indicative for the feasibility studies. The existing average carriageway width varies from 3.4 to 6.7 m.Their condition ranges from very poor to good. As per the feasibility report by Sheladia (2016), the roads sections in very poor to poor condition total up 64.4 km while those in fair to good condition count 130.6km.

The road infrastructure in the rural areas has to be improved to facilitate the co-relation between the rural sectors and the urban centers, especially with regards to trade and transfer of agricultural products.

3.4 PROJECT DETAILS

The project details are reproduced from the feasibility study. The project components include rehabilitation of the right of way, construction of culverts, bridges and cross drainage works. The affected areas of feeder road rehabilitation are limited to the carriageway, plus the widening areas, borrow and quarry areas. The existing carriage way will be widened where necessary to attain 6 m width with a RoW of 10.5 m. Due to slopes and land shortage, settlements are placed along the sides of the road. Cultivation and plantations are extended closer to feeder roads. The main food crops produced in the district are Maize, Wheat, Bean, Cassava, sweet potato. Cash crops are dominated by Coffee and Tea. Inhigh slopes, landsare occupied with crops or Eucalyptus plantations, leaving very little room for native flora species. These feeder roads are discussed in subsequent sections.

The users of the indicative feeder roads in Nyaruguru District are mainly pedestrians and cyclists and motocycle related accidents remain the prevalent accident in the District.

They are mostly caused by bad condition of the road and inattention of drivers or pedestrians. Creating awareness among common public with regards to the proper and safe use of roads and enforcing regourously traffic regulations.

3.4.1 Brief Description on Feeder Roads

The Ministry of Agriculture and Animal Resources (MINAGRI) has prepared a feasibility report for 194.61 km feeder roads in the district of Nyaruguru. Based on technical, economical, financial, social and environmental factors, the feeder roads have been assigned the priority. The above length is covered in 14 priority section of feeder roads. A brief description of these roads is presented below;

1. Ndago- Cyahinda- Nyagisozi- Ngoma(NRFR1)

This alignment starts from Ndago where the district headquarters of Nyaruguru is located. This alignment begins in a 4 legged junction with National Road 9 and Road 13. This is predominantly a hillside alignment and generally follows ascending gradient towards fold and descend towards trough. It is better to widen this road on the hill side as widening on valley side would require protective structures and also encounter construction difficulties. Existing drainage structures on the alignment are generally having wooden logs and substandard width. Majority of the slab culverts located on the alignment needs widening to accommodate to the feeder road standard. Most of culverts are located on sharp curves and thus extra widening is required to ensure minimum required turning radius. Initial 13 km of this road is found in reasonably good condition with gravel surfacing.

2. Kibeho- Mata- Ruramba (NRFR2)

NRFR2 begins from National Road NR9 at Kibeho which is about 7km south of Nyaruguru district headquarters. Kibeho is the most important business center and also lot of religious tourist arrives here. From here, the road traverse generally in the northern direction and ends at minor bridge where the alignment meets the Nyaruguru – Nyamagabe District boundary. Broken stone soling provided on the road helps the road surface to stay in reasonably motorable condition during rainy season.

3. Munini- Kamana- Giswi- Gatunda- Remera (NRFR3)

NRFR3 start Munini, a T junction on National road 9(NR9). Munini located about 6.5 km from the district headquarters and is reached by NR9 from Ndago. This road forms an important links in the road network of Nyaruguru as it connects Sheke on NRFR08 at km6+500, Giswi on NRFR07 at km9+500 and Runyombyi on NRFR14 at km13+550 be-

fore meeting National Road 9 at Remera.

This road also provides a shorter connectivity to Remera from Munini compared to NR9. NRFR3 runs in the southern direction upto Giswi and then traverse in the south western direction to reach Remera. This alignment also passes through Marshland at km 10. This alignment is also on hilly terrain mainly following hill side alignment. Widening of this road is better on the hill side as valley side filling involve construction difficulties and must be more expensive.

4. Nshili- Rugogwe- Kabere- Nshili Tea Factory- Kabere(NRFR4)

All engineering surveys on this road is done from Ruheru towards Giswi and therefore the zero chainage for this road is at Ruheru. The alignment description also follows the ascending directing of chainage from Ruheru. This alignment starts from Ruheru on NR9 and end at Giswi on NR9. Giswi is on the north east of Reheru but this alignment follows a longer route traversing in the north western direction upto Nshili Tea factory and then proceeds to Rugogwe in the north east direction and finally runs towards south west direction to reach Giswi. Even though Giswi is shorter through NR9, this alignment have its importance as it provide National Road connectivity to NRFR06 and NRFR11 which are otherwise not properly connected. This alignment is also on hilly terrain mainly following hill side alignment. Widening of this road is better on the hill side as valley side filling involve construction difficulties and must be more expensive.

5. Muganza-Buruhukiro-Rubumburi- Rugerero- RDB(Nyungwe) (NRFR5)

Initial proposed alignment was for a length of 37km from Muganza but the road 5 alignment is terminated at Rukero due to non-existence of any track beyond Rukero and also it should be through the forest buffer zone of Nyungwe National Park. Now the length reduced to 28.6km. About 10 km of Road 5 is passing through Nyungwe National Park buffer zone and therefore widening and other construction activities would cause serious environmental impact. In order to avoid substantial number tree cutting on National Park and its buffer zone, the construction activity along the forest section is required to be limited to available formation width. This will result in reduced carriageway width.

Muganza is about 13.5km from district headquarters and is reached by NR9 and a district road. This alignment is also on hilly terrain mainly following hillside alignment. Widening of this road is better on the hillside as valley side filling involve construction difficulties and must be more expensive. The absence of proper cross drainage structures is causing serious troubles for all types of vehicles especially during rainy season.

6. Munini- Muganza- Rukore- Bigugu- Nyabimata (NRFR6)

Munini – Muganza section of this road is part of NR 9 and therefore omitted and the resultant alignment will starts from Rukore on end of NRFR05 and ends at Giswi on NR9. This alignment also gives an exit route to traffic from NRFR05. NRFR06 alignment initially passes through the forest buffer zone of Nyungwe National Park from Rukore for 1.08 km distance and then runs through a populated area.

Road beyond initial 6.5km is recently rehabilitated and therefore only maintenance is required for the last 7km. This alignment is also on hilly terrain mainly following hill side alignment. Widening of this road is better on the hill side as valley side filling involve construction difficulties and must be more expensive. Absence of proper cross drainage structures causing serious troubles for all types of vehicles especially during rainy season. Construction of forest alignment on the initial section of this road also proposed to be within the available formation to mitigate the environmental impact.

7. Ryabidandi- Viro- Akanyaru- Giswi (NRFR7)

Engineering survey for this roads starts from Giswi and therefore stationing will starts Giswi at zero chainage and the alignment descriptions follows the ascending direction of Chainage towards Ryabdandi. Giswi is on NRFR03 and is about 15km from district headquarters and is reached by travelling through NR9 and NRFR03. This alignment traverses in east direction up to 7.5km and then proceeds to northern direction to reach Ryabdandi on NRFR01. This alignment is also on hilly terrain mainly following hill side alignment. Widening of this road is better on the hill side as valley side filling involve construction difficulties and must be more expensive.

8. Sheke- Akanyaru- Cyahinda (NRFR8)

Engineering survey for this roads starts from Cyahinda and therefore stationing will starts from Cyahinda at zero chainage and the alignment descriptions follows the ascending direction of chainage towards Sheke. Cyahinda is on NRFR01 and is about 7 km from district headquarters, reached by travelling through NRFR01. This alignment traverses towards south west up to 6km and then proceeds to north western direction to reach Shekei on NRFR03.

This alignment is also on hilly terrain mainly following hill side alignment. Widening of this road is better on the hill side as valley side filling involve construction difficulties and must be more expensive.

9. Rusenge- Cyahinda (NRFR9)

Engineering survey for this roads starts from Cyahinda and therefore stationing will starts from Cyahinda at zero chainage and the alignment descriptions follows the ascending direction of chainage towards Rusenge. Cyahinda is on NRFR01 and is about 7 km from district headquarters, reached by travelling through NRFR01. This alignment traverses north to reach Rusenge on NR09.

This alignment also meets NRFR13 at km5+200. This alignment runs in hilly terrain and mainly following hill side alignment. Widening of this road is better on the hill side as valley side filling involve construction difficulties and must be more expensive.

10. Huye- Rusenge-Ngera- Nyagisozi (NRFR10)

Engineering survey for this roads starts from Nyagisozi and therefore stationing will starts from Nyagisozi at zero chainage and the alignment descriptions follows the ascending direction of chainage towards Huye. Nyagisozi is on NRFR01 and is about 14 km from district headquarters, reached by travelling through NRFR01. This alignment traverses north east and ends on a bridge located on Huye border near Gishamvu. From the end points road further proceeds towards Butare on Huye district. This alignment also runs on the hilly terrain mainly following hill side alignment. Widening of this road is better on the hill side as valley side filling involve construction difficulties and must be more expensive.

11. Ruyenzi- Uwimbogo- Remera (NRFR11)

Alignment starts from Nishli Tea Factory which is about 500m from NRFR04. This alignment runs generally in the northern direction to Remera on NR09. This alignment predominantly passing through tea plantion area and the existing formation is less than 5m. Therefore widening involve cutting of tea plants. Near the end point very steep gradient and rain out crops also noticed for about 100m.

12. Ndago- Akavuguto- Rusenge (NRFR13)

This alignment start from Ndago, the district headquarters of Nyaruguru and runs generally towards eastern direction to Rusenge on NRFR09. Rusenge is also connected through NR9 but this route together with last leg of NRFR09 alignment forms an alternative connection.

13. Runyombyi (Ryagwiza) – Nteko- Kirarangombe- Nkanda (NRFR14)

Engineering survey for this roads starts from Nkanda and therefore stationing will starts from Nkanda at zero chainage and the alignment descriptions follows the ascending direction of chainage towards Runyombyi on NRFR03. This alignment also runs on the hilly terrain mainly following hill side alignment. Widening of this road is better on the hill side as valley side filling involve construction difficulties and must be more expensive.

The table below provides details on the total length of each of the feeder roads, existing carriageway, number of bridges and culverts to be built, length and width of these bridges, cross drainages, paved or all-weather roads, etc.

Table 4: Details on indicative roads and structures to be built

Road ID	Road Name	Length (km)	Average Carriageway Width (m)	Paved road (m)	Length of Built up (km)	Length of Low lying area (km)	Length of drain (km)		Culverts + bridges		
							Left	Right	Number	Length (m)	Diameter (m)
FR1	Ndago-Cyahinda-Nyagisozi-Ngoma	20.1	6.1	6	1.87	2.40	11.19	3.50	80	119	1
FR2	Kibeho – Mata-Ruramba	17.8	6.5	6	5.35	1.80	6.99	4.20	42	98	1
FR3	Munini-Kanama-Gatunda-Remera	17.82	6.1	6	6.35	2.50	5.52	13.37	37	56	1
FR4	Giswi-Rugogwe-Kabere-Nshili Tea factory – kabere (Ruheru)	21.30	5.7	6	2.63	2.90	0	0	70	91	1
FR5	Muganza-Buruhukiro-Rubumburi-Rugerero-RDB Nyungwe	29.13	4.9	6	2.78	4.40	11.90	11.73	88	196	1
FR6	Rukore-Bigugu-Nyabimata	13.50	4.9	6	1.90	2.30	0	1.40	27	0	1
FR7	Ryabidandi-Viro-Akanyaru-Giswi	10.49	5.9	6	3.32	2.20	5.17	7.46	35	238	1

FR8	Sheke-Akanyaru-Cyahinda	8.56	5.9	6	1.45	2.90	1.70	2.10	5	84	1
FR9	Cyahinda-Rusenge	13.60	5.7	6	2.55	2.70	4.69	7.34	42	448	1
FR10	Huye-Rusenge-Ngera-Nyagisozi	11.30	5.9	6	1.82	1.20	1.00	0.20	70	462	1
FR11	Ruyenzi-Uwimbogo-Remera	14.96	3.4	6	1.56	3.20	2.0	1.10	41	322	1
FR13	Ndago-Akavuguto-Rusenge105	5.21	5.7	6	0.72	1.61	2.20	1.19	15	105	1
FR14	Runyombyi (Ryagwiza)-Nteko-Kiraran-gombe-Nkanda	10.80	6.7	6	2.88	1.70	4.40	6.36	19	119	1
Total/average		**194.57**		**6**	**35.18**	**31.81**	**56.76**	**59.95**	**571**	**2,338**	1

Source: Feasibility Study report, June 2016

3.4.2 Present Traffic Survey

The present traffic in the district is estimated in the feasibility study of the project. These projections are mostly linked to the demographic growth and the improvement of socio-economic conditions during the last 10 years. The same growth pattern has been taken for the projection of traffic during next 10 years (2022). **Table 5** presents the current and projected traffic.

Table 5: Summary of Traffic Count Survey Results on Feeder Roads in Nyaruguru District

Feeder Road ID	Road Name	Road Length (km)	Motorized Traffic (Vehicles per day)			Non Motorized Traffic	
			Motocycles	Light Vehicles < 3.5 Tons	Heavy Vehicles > 3.5 Tons	Bicycles	Pedestrians
1	Ndago- Cyahinda- Nyagisozi-Ngoma	20.10	132	24	11	286	1372
2	Kibeho-Mata-Ruramba	17.80	522	436	102	346	1820
3	Munini- Kanama- Gatunda-Remera	17.82	94	33	24	141	2014
4	Giswi- Rugogwe- Kabere- Nshili Tea Factory- Kabere(Ruheru)	21.30	62	25	11	20	229
5	Muganza- Buruhukiro- Rubumburi- Rugerero- RDB Nyungwe	29.13	115	34	9	236	2080
6	Rukore- Bigugu- Nyabimata	13.50	305	28	30	49	2682
7	Ryabidandi- Viro- Akanyaru-Giswi	10.49	152	83	12	609	1409
8	Sheke- Akanyaru- Cyahinda	8.56	23	9	0	40	792
9	Cyahinda- Rusenge	13.60	47	3	3	46	127
10	Huye- Rusenge- Ngera-Nyagisozi	11.30	135	46	10	308	1525
11	Ruyenzi- Uwimbogo- Remera	14.96	56	3	1	58	657
13	Ndago- Akavuguto- Rusenge	5.21	27	9	1	48	1092
14	Runyombyi (Ryagwiza)- Nteko-Kirarangombe- Nkanda	10.80	431	10	10	701	664

Source: Feasibility Study report, June 2016

The above summary highlights the typical traffic pattern of rural roads,partly in bad condition. Motorcycles account for two thirds of motorized traffic, whereas light and heavy vehicles are a minor share. Another typical feature of this type of traffic is the ratio bicycles / motorized vehicles - bicycles are in greater number as compared to motorized vehicles, because of the undulating - mountainous terrain of Nyaruguru District.

Table 6 presents the shares of motorized vehicles, motorcycles account for 68% of all motorized vehicles; the remaining 32% are mostly cars, pickups and, small or medium trucks with a payload up to 3.5 and 7 tons respectively.

The ratio bicycles / motorized vehicles, calculated on the total of the surveyed traffic highlights the prevalence of bicycles accounting for 94% of motorized vehicles.

Table 6: Structure of the Surveyed Traffic

Vehicle Category	Percentage of all motorized vehicles
Motorcycles	68%
Light vehicles	24%
Heavy vehicles	7%
Total motorized traffic	100%
Ratio bicycles/motorized vehicles	94%

3.4.3 Feeder Road Design Standards

Generally the study of rehabilitation intends to improve the condition of the district network that can:

- Ensure an average commercial speed of 40 km/h,
- Reduce routine and periodic maintenance cost, and
- Reduce vehicle operating costs and contribute to economic growth.

The existing horizontal alignments have been maintained and few corrections made near the existing bridges or when the road cross some villages. Minor realignments are however inevitable on the existing horizontal alignment at isolated sections where the radius fall short of the design requirements. The vertical alignment follows the existing natural ground in general with exceptions in the sections where the water cross the roadway especially near the existing bridges. In those limited sections the consultant proposes to construct small embankments to raise the vertical profile elevation.

The cross section consist of one carriageway with width between 6 and 7 m, no shoulder and two side drain, one on each side of the carriageway. The proposed project aims to widen the dual carriageway for 6-7 m. **Table 7** summaries the geometric Design Standards adopted for the project.

Table 7: Proposed Design Standards for Rwanda's Rural Roads

S. No.	Description	Unit	Value
1	Design Speed (both in settlement crossings and open countryside)	Km/h	40
2	Width of Roads		
	i) Main District Roads	meter	7.0
	ii) Secondary Roads	meter	6.0
3	Right of Way		
	i) 3.0 m off either side of the carriageway in villages,	meter	3.0
	ii) 5.0 m outside villages	meter	5.0
4	Cross-Fall		
	1.1. Carriageway Normal Cross-fall	[%]	6.0
	1.2. Shoulder Normal Cross-fall	[%]	8.0
5	Horizontal alignment design parameters in general follow the existing road		
	i) Minimum horizontal curve radius	meter	20.0
6	Vertical alignment design parameters**:** alignment follow the existing natural gradient		

The following are designs of the proposed road section, drainage and culvert/ bridge in Nyaruguru District.

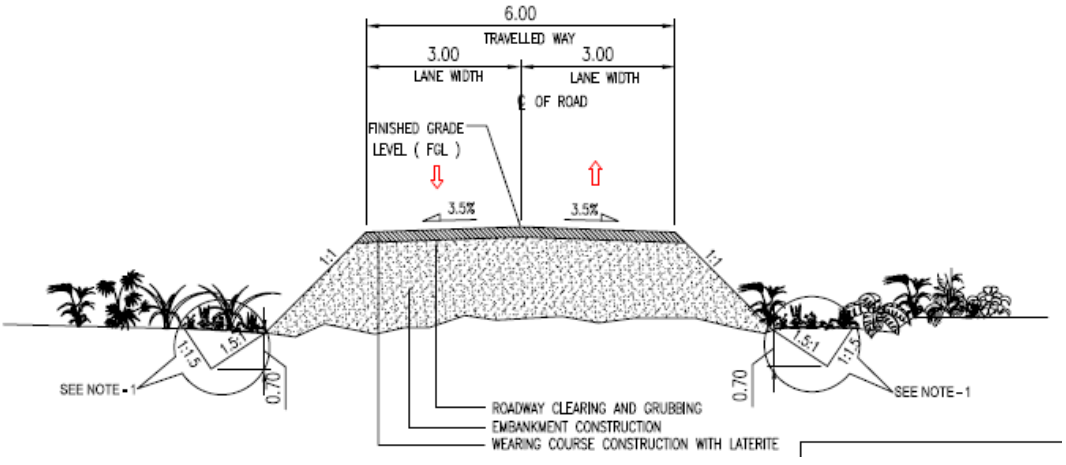

Figure 5: Design of the road section

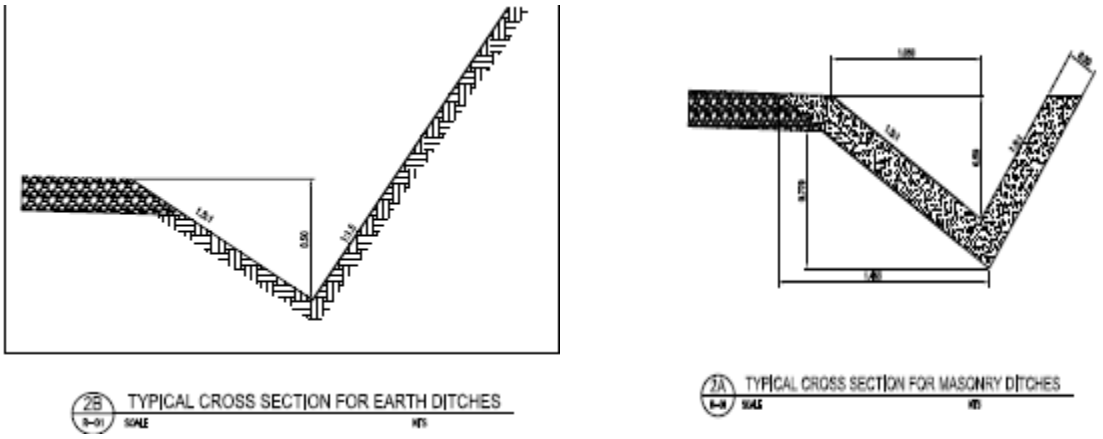

Figure 6: Design of the cross section for earth and masonry ditches

3.5 ANALYSIS OF ALTERNATIVES

During the planning stage, MINAGRI/FRDP and District as well as other district stake-holders preselect the long list of feeder roads based on the district needs including access to market, social and economic services, agricultural production areas, road condition, etc. During the feasibility stage of the proposed feeder road rehabilitation/reconstruction project, the proposed list is released to Consultant for deep analysis and evaluation as well as prioritization..The road prioritization matrix was prepared to select segments and eight indicators along with their respective weights were indicative to gauge the effects (benefits) of the FRs improvement. These indicators include the connectivity, remoteness, traffic, access to social and economic services, agriculture potential, community priority and impact on Vulnerable Sectors. The prioritization matrix as well as is presented in annex 9.

During the feasibility stage, options were also explored and these options were weighed from all considerations such as cost, environment, and ease of implementation and maximum utilization of available infrastructure. The aim of alternative analysis is to arrive at a development option, which maximizes the benefits while minimizing the adverse impacts. Alternative analysis is also a form of mitigation measures. Various alternatives were considered and detailed below:

3.5.1 Without Project Alternative

The No Project option in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing environmental conditions. This option will however, involve several losses on socioeconomic condition both to the local population and the nation as a whole. The local farmers will continue to face the constraints they are currently experiencing due to inefficient transport network and system and the anticipated economic development aimed at fulfilling the Vision 2020 will remain unattainable. The No Project Option is the least preferred from the socio-economic and partly environmental perspective due to the following factors:

- The socio economic status of the Nyaruguru District's residents would remain unchanged. Reduced interaction both at local and national levels;
- The local skills would remain under-utilized as no employment opportunities will be created for local population who would have otherwise worked at the project area;

- Reduced business development due to current bad condition of the feeder road project;
- The current erosion rate in the feeder road due to lack of drainage system will remain.

No project scenario case will also avoid social impacts due to the implementation of the project.

3.5.2 With Project Alternative

The implementation of the project will contribute to socioeconomic improvement and will have positive impacts on residents' life quality. The with project alternative have following advantages: There will be improved and assured transport facilities to the residents of the District. This will stimulate socioeconomic development of the area.

The proposed feeder roads are a major deterrent for commercial growth in the area, the project scenario will catalyse commercial growth in the different centres and there will be better business opportunities for locals. There will also be savings in the vehicle operation cost (fuel, operation and maintenance) due to better feeder road condition.

This alternative will have negative impact on land use, water, forests/trees, noise and air pollution during construction and operation phases.About 95.61 ha of land are likely to be acquired to have 10.5 m ofRoWor 10.09 ha to have the paved road with 6.0 m width.The properties (houses, trees, crops, etc) within road corridor will be affected.Edaphic- climatic based designs, tree planting program for replacing lost trees, compensation for lost properties, proper management of borrow pits and quarry areas, proper disposal of wastes, stabilization of slopes with vegetation, provision of adequate sanitation facilities, provision with protective equipments to workers, use machinery and truck in good condition during daytime, regular watering of road sections under construction are alternative technologies to mitigate adverse impacts of roads on environment.

3.5.3 Limiting works within the existing carriageway

Changing alignmentsand/or limiting the roads works within the available carriageway to avoid passing through at long lengths and large widths at the Nyungwe National Park and physical cultural resources such as Kibeho religious site are some of the alternative mitigation measures considered to avoid impacting sensitive receptors. This alternative also appliesto the indicative roads passing through grouped settlements or centers.

The encroachment to protected areas and wetlands, though converted into agriculture, are also avoided or minimized through changing alignments or limiting road works within the existing carriageway.

3.5.4 Preference of hillside cut over valley side cut

There exist some road alignments passing close to lowlands (valley/ swamp) and their rehabilitation may be done in either side of the road, while some road sections are passing through hilly areas.In such cases, the rehabilitation of the road is better done on the hillside as valley side filling involves construction difficulties and is more expensive.

3.5.5 Sourcing of construction materials and location of borrow pits

Road construction materials can be obtained from close or far away the RoW. Locally produced and sourced materialsclose to RoW are preferred over materials from very far to minimize transport costs and to also create local employement.

3.5.6 Preference of local labour over imported labour

Most building works are highly labour-intensive in nature.The use of local labour force over imported labour is important to increase local employment opportunities and ownership of project activities as well as limit the dissemination of communicable diseases. The awareness compaign on communicable diseases prevention for workers should be prioritized.

3.6 QUANTITY OF MATERIAL FOR CONSTRUCTION

The new Road Act[8], which requires upgrading some feeder roads to 6m width, may involve widening the existing road formation by around five meters considering a RoW of 10.5 m. This may necessitate expropriation of some farm lands and relocating households. Bidding process shall not be launched for a particular road section until every person affected by the works on that section has been relocated and/or properly compensated according to Bank policies.

Feasibility report has estimated thequantities of construction material road wiseand reproduced in **Table 8**. These have been further utilized in assessing the environmental and social impacts due to development of each road.

[8]Law No. 55/2011 of 14/12/2011 governing roads in Rwanda

Table 8: Quantity of Construction Material

S.No	Description	Unit	Quantity
1	**Preliminary Works**		
1.1	Re-reveling	m^2	1,120,090
1.2	Fill material	m^3	0
2	**Earthworks**		
2.1	Excavation in rock and earth; Removal of heap of rocks, embankment from borrow pits and purge marshy soils	m^3	220,805
3	**Roadway**		
3.1	Wearing Course	m^3	152,537
3.2	Caping Layer	m^3	0
4	**Bridge, Culverts& Drainage**		
4.1	Supply and install Culvert Ø 100cm (reinforced)	M	2,261
4.2	Reinforced concrete proportioned at 350kg/m3 for all works	m^3	1,058
4.3	Stone masonry works for culverts head	m^3	23,953

3.7 CONSTRUCTION SCHEDULE

The construction schedule of feeder roads depends on the methodology adopted for construction. In general the time period will also depend on the resources put in place by the contractor. 195 km feeder roads may take 24 to 36 months, including design tendering and construction. A Typical Construction Schedule is shown in **Table 9.**

Table 9: Typical Construction Schedule

Activity	Duration in Month											
	1-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24
Detail design of feeder roads, Tender documents and BoQ												
Notice inviting Tender, Tender process evaluation &award												
Preliminary works clearing, compensation etc.												
Construction of Bridges, Culverts and Roads etc.												

Testing and Commissioning Monitoring and Evaluation												

3.8 COST OF THE PROJECT

The cost of the interventions to improve the feeder roads has been reproduced from the feasibility report. The total cost for construction to improve 194.56 km of feeder roads in Nyaruguru District amounts to US$ 22.082 million; the average cost per km being US$ 113,500. The overall cost including construction, supervision and VAT amounts US$ 27.360 million.

4 ENVIRONMENTAL AND SOCIAL BASELINE DATA

4.1 GENERAL

The objective of Environmental Impact Assessment (EIA) is to ascertain the baseline environmental conditions and then assess the impacts as a result of the proposed feeder road project during various phases of the project cycle. Identification of environmental parameters, data collection and impact predictions are the core of Environmental Impact Assessment (EIA) process. A scoping matrix has been formulated to identify the attributes likely to be affected due to proposed project and presented in **Table 10**. In order to review and update the environmental aspects, the data has been collected, compiled and analysed for the following:

- Land Environment (land use, geology and soils);
- Water Environment (precipitation, hydrology and drainage);
- Air Environment (air quality and meteorology);
- Noise Environment (noise levels);
- Ecological Environment (flora and fauna);
- Socio-Economic Environment (demography, livelihood, income socio-economic etc.).

Based on environmental scoping matrix and project setting, the attributes likely to be affected are identified for baseline data generation. Data on geology, soils, air, noise, ecology, sociology are presented in this chapter and has been collected from various sources. Majority of data have been collected from field visits and desk research. Formal and informal discussions with the local people, project affected people and local government/non-government organisations, together with published reports, have provided very useful information for the preparation of this report. Information on project facilities, size, magnitude and cost of the construction activities, geology and soils of the project sites have been taken from the draft feasibility study of June 2016.

The concept is to assess the extent the construction and operation of the proposed feeder roads project is likely to have impacts on above environmental attributes. A baseline environmental condition comprises the features present within the proposed ROW as well as a strip of 5 m on either side of the existing road. This area is referred to as study area/project area in the report.

It includes environmental features such as forest areas, ecological sensitive areas, water bodies (rivers, marshy and ponds), and places of historical importance, tourism etc. The scope of this chapter is limited to only those issues, which are of concern in the environmental impact assessment. The land use of the project area is agriculture, built up, and tree plantation.

The major purposes of describing the environmental settings of the study area are:

- Understanding the need of the project and environmental characteristics of the area;
- Assessing existing environmental quality, as well as the environmental and social impact of the proposed project development;
- Identification of environmentally significant factors or geographical areas that could influence decisions about any future development

Table 10: Scoping Matrix for the Project

Project Cycle Phase	Likely Impacts	Baseline Data Review/ collection
A. LAND ENVIRONMENT		
Design Phase	- Change of land use	- Present land use
Construction Phase	- Increase in soil erosion/ soil loss - Pollution by construction spoils;grease/oil spills and domestic waste - Use of land for labor colonies and solid waste disposal	- Soil characteristics - Rainfall - Physiographic / Slopes - Construction materials / spoils - Number of employees during construction peak period
B. WATER ENVIRONMENT		
Design Phase	- Erosion of soil/roads	- Drainage Pattern - Rainfall
Construction Phase	- Water Quality Impacts due to disposal of wastes from labor colonies and construction sites - Water and energy supply - Waste water treatment and disposal from labour camps.	- Rainfall / Storms - Water courses/Drainage - Water quality - Waste water treatment
Operation Phase	Run off Drainage Problems	
C. AIR ENVIRONMENT		
Construction Phase	- Impacts due to emissions generated by construction machinery - Fugitive emissions from various sources.	- Ambient air quality at different locations
Operation Phase	- Exhaust emission due to road	- Ambient air quality

	operation	
D. NOISE ENVIRONMENT		
Construction Phase	- Impacts due to construction machinery - Vehicle noise	- Ambient noise quality at different locations
Operation Phase	- Noise due to road operation	- Ambient noise quality at different locations
E. ECOLOGICAL ENVIRONMENT		
Construction Phase	- Loss of Forest/Trees/aquatic vegetation - Migration of Fauna	- Forest Area/ Tree Numbers - Faunal Species - aquatic vegetation -
F. PHYSICAL AND CULTURAL RESOURCES		
Construction Phase	- Relocation of Infrastructure - Impact on Cultural Resources	- Status of Infrastructure - Status of Cultural Resources
Operation Phase	- Impact on schools, hospitals etc.	- Values of environmental attributes at sensitive locations
G. SOCIO-ECONOMIC ENVIRONMENT		
Construction Phase	- Loss of land, houses, livelihood, job potential	- Land, houses, livelihood data
Operation Phase	- Livelihood	- Socio-economic status
	- Potential for increase in road accidents and fatalities from increased use of roads and potentially higher speeds	- Road safety status

4.2 STUDY AREA

The primary baseline data has been collected within the formation width of 10 m or 5 m on either side from centre line of the existing as well as proposed carriageway. The project influence area has been defined as 15 m on either side (Arial distance) from boundary of road for collection of secondary data, including impacts due to ancillary sites like borrow areas, quarry, and material storage and disposal areas. The location of feeder roads is shown in chapter 3 on project description.

4.3 LAND ENVIRONMENT

The roads are located throughout Nyaruguru District. Thealtitude where these roads are passing is between 1,500 - 1,900 m asl.The **Figure 7**shows the altitude of the project area compared to the rest of the country.

The parameters involved in land environment are physiography, geology and soils and land use pattern. These are discussed in the following paragraphs.

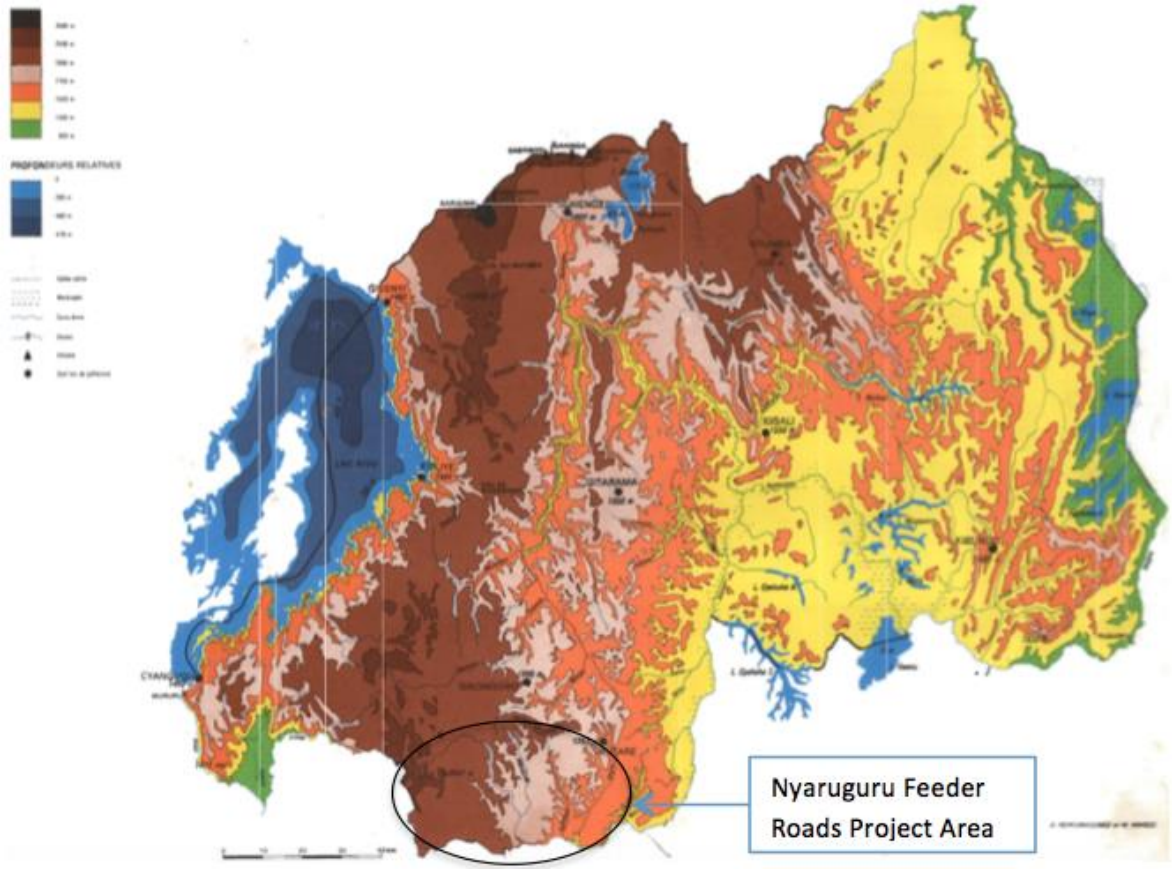

Figure 7: Map showing the altitude of the feeder roads project area in Nyaruguru District

4.3.1 Physiography and Land Use of Nyaruguru District

Nyaruguru District, the present feeder roadsproject area, is characterised generaly by the Congo-Nile Crest mountains in the west and west-northern parts of the District, with the peak at 2,767 m of altitude. Thesehigh mountains start from Nyungwe National Park in the Sectors of Ruheru, Nyabimata, Muganza and Kivu, and continue towards the volcanoes area in the north of the country, withsome peaks branching towards the north-eastern part of the District in the Sectors of Ruramba and Mata to form a mountainous ridge known as “IBISI” culminating at 2,300 m amsl. The coverage of forests in Nyaruguru District is about 27.7% of total surface area, while agriculture is practiced on 49.5%.

Nyaruguru District is a mountainous region characterized by steeper slopes, with an altitude of 1600-1900m. The annual average temperature is around 20°C while the annually rainfall varies between 1,000 and 1,250mm depending on the altitude.

In general, the District climate is characterized by 4 seasons:

- The great dry season (June to August) characterized by low agricultural activities (harvesting) and mostly by off-farm activities;
- The small rain season (September to Mid-January) considered as the main planting season;
- The small dry season (Mid-January to February) in which both planting and harvesting activities take place;
- The great rain season (March to May) characterized by planting in agricultural and low off-farm activities.

4.3.2 Geology and Soils

In General, Rwanda has a complex geological history which presents itself in varied topographic profiles from the mountainous Northwest to the glassland of Akagera in the East. The oldest rocks of Rwanda are the Paleoroterozoic migmatites, gneisses and mica schists overlain by the Mesoproterozoic Kibaran Belt. The folded and metamorphosed sediments of the Kibaran Belt are primarily schists and quartzites introduced by granites and cover most of Rwanda, including Nyaruguru District.

The soils in Nyaruguru District are generally clay and sandy with some aggregate of stones. The pH of the soil is between 5 and 5.5; such soil is adapted to tea and coffee plants, sweet potato.

Nyaruguru District currently has two mining sites located in Busanze Sector. Colombo-tantalite (coltan) is the main mineral available and few quantity of wolfram. A number of twelve (12) borrow pits have been identified by the feasibility study, and they will be used as a source of materials for the construction of feeder roads in Nyaruguru District.

4.4 WATER ENVIRONMENT

Water environment consists of water resources such as streams, lakes, estuaries, water use, and quality. Understanding the water quality is essential in the preparation of EIA and to identify critical issues with a view to suggest appropriate mitigation measures for implementation. Water availability is essential in the project area for the construction and drinking. It is anticipated that water will be available for the above purposes in project area.

The hydrographic network of Nyaruguru District is very rich and vast, with the main water bodies being Akanyaru River, a tributary of Akagera Riverand constituting the border of Rwanda and Burundi. Other main rivers in the District are Agatobwe, Akavuguto, Giswi, Simbuka, Nshili, Agatare, Migendo, Rwerere, Kaburantu and Mwogo. All those water courses are tributaries of Akanyaru river, except Mwogo, the Nyabarongo tributary.

The proposed feeder roads will be crossing or passing by side of number of water bodies. Those roads and location are summarized in **Table 11**.

Table 11: Water Bodies Along NyaruguruIndicative Feeder Roads

Feeder road No.	Feeder Road Name	Water Body	Cross drainage at Chainage	Status/ Remark
1	Ndago-Cyahinda-Nyagisozi-Ngoma	Agatobwe River Gishayo stream Stream Stream Stream Rwongi wetland	0+500 1+400 6+500 7+800 9+200 12+100	
2	Kibeho-Mata-Ruramba	Mwogo River	18+300	The road does not cross Mwogo River but its end point is Mwogo River, at the border of Nyaruguru and Nyamagabe District.
3	Munini-Kamana-Giswi-Gatunda-Remera	Giswi River	10+300	
4	Giswi- Rugwogwe-Kabere- Nshili Tea Factory- Kabere (Ruheru)	Giswi River	0+000	
5	RDB Nyungwe-Rugerero- Rubum-buri	Stream Giswi wetland	1+900 21+200	Dominant plantations of beans, and presence of

				fish ponds
6	Nyabimata- Bigugu- Rukore/Akagano	Nyiragasi stream Wetland Wetland	5+600 8+500 12+100	
7	Ryabidandi- Viro	No water body		
8	Sheke-Akanyaru-Cyahinda	Akanyaru River	4+800	
9	Rusenge-Cyahinda	Agatobwe River Stream Kigogo Wetland	0+000 0+300 16+550 - 17+000	Dominant maize plantations
10	Huye-Rusenge-Ngera- Nyagisozi	Agatobwe River Stream Stream Stream Stream Maraba stream	4+500 4+400 5+100 10+400 13+100 19+800	River associated with a wetland with dominant sorghum plantations
11	Remera-Uwimbogo- Ruyenzi	Mudasomwa stream Nyiragasi stream Tegera stream	0+700 5+300 7+800	
13	Ndago-Akavuguto-Rusenge	Rwoganyoni wetland Akavuguto River	2+300 2+700	Tea plantations
14	Nkanda- Kirarangombe- Nteko-Runyombyi	Simbuka River	14+000	

Source: Consultants Field Surveys, May 2016

4.5 BIOLOGICAL ENVIRONMENT

4.5.1. Plants diversity

Nyaruguru district is covered with diverse ecosystems that include both natural and artificial ecosystems. The natural ecosystem consists of Nyungwe national park and wetlands. The forested areas and agro-ecosystems dominate the artificial ecosystems. All these ecosystems are very rich with flora.

The coverage of forests in Nyaruguru district is about 27.7% of the total surface. These are dominated by the Nyungwe national park and private eucalyptus plantations. Tea and coffee plantations also occupy vast parts of the land surface. The remaining area is covered with other crops (seasonal crops and coffee) and small pastures.

The plants of Nyungwe forest include a vast diversity of species, with more than 1000 species, with 137 endemic species, including many rare/threatened species, such as *Entandophragma excelsa* (Umuyove)*, Newtonia buchananii* (Umukereko)*, Pentadesma reyndersii* (Umwasa), *Prunus africana* (Umwumba), *Symphonia globulifera* (Umushishi), etc. The forest also hosts more than 250 species endemic to the Albertine Rift. Seasonal crops include beans, maize, wheat, sweet potato, irish potato and sorghum. Tea and coffee are the major cash crops. Forest plantations are dominated with Eucalyptus spp but agroforestry trees such as Grevillea spp, Calliandra spp, Leucaena spp, etc are found in croplands.

Out of 13 indicative feeder roads, two feeder roads, FR5 and FR6, are passing through the buffer zone of Nyungwe National Park. In order to avoid significant number of tree cutting on Nyungwe park and its environmental impact on the forest, the construction activity along the forest section should be limited to the existing road carriageway of 5 m.

The wetlands crossed by the indicative roads were already converted into agriculture and are therefore no longer protected areas. No endangered plant species within the road corridor of the indicative feeder roads in Nyaruguru were observed. However, the current wetland conditions should be maintained to ensure that they harbor some important flora and fauna as well as regulate water. Eucalyptus spp, Agroforestry tree species like Alnus spp, Grevillea spp, Cedrella spp, etc, coffee and tea that are likely to be affected will be replanted along the roadsides for replacing those affected and protecting the roads.

Trees within Immediate Corridor of Impact (COI): The survel revealed that atotal number of 28 tree species, comprising of trees (89%) and shrubs (11%) were inventoried along feeder roads project's area in Nyaruguru District (**Table 12**).

Table 12: Dominant plant species along the Feeder Roads

No	Plant species	Vernacular name	Morphological forms
1	*Alnus glutinosa*	Alinusi	Tree
2	*Anthocleista grandiflora*	Umwarangabo	Tree
3	*Bersama abyssinica*	Umukaka	Tree
4	*Camellia sinensis*	Icyayi	Shrub
5	*Carapa grandiflora*	Umushwati	Tree
6	*Carica papaya*	Ipapayi	Tree
7	*Casuarina equisetifolia*	Filawo	Tree
8	*Erythrina abyssinica*	Umuko/Umurinzi	Tree
9	*Eucalyptus sp*	Inturusu	Tree
10	*Euphorbia tirucalli*	Umuyenzi	Tree
11	*Grevillea robusta*	Gereveriya	Tree
12	*Macaranga kilimandscharica*	Umusekera	Tree
13	*Maesa lanceolata*	Umuhanga	Tree
14	*Mangifera indica*	Umwembe	Tree
15	*Musanga leo-errarea*	Umugajagaja	Tree
16	*Myrianthus holstii*	Umwufe	Tree
17	*Neoboutonia macrocalyx*	Icyanya	Tree
18	*Persea americana*	Avoka	Tree
19	*Pinus elliotii*	Pinus	Tree
20	*Pinus patula*	Pinus	Tree
21	*Podocapus falcatus*	Umufu	Tree
22	*Polycia fulva*	Umwungo	Tree
23	*Psidium guajava*	Ipera	Tree
24	*Senna spectabilis*	Gasiya	Tree
25	*Symphonia globulifera*	Umushishi	Tree
26	*Synadenium grantii*	Umukoni	Tree
27	*Tetradenia riparia*	Umuravumba	Shrub
28	*Vernonia amygdalina*	Umubirizi	Shrub

One hundred and fifty six individual trees (156) (with at least 30 cm of girth size, which is the upper limit of semi-mature trees) have been identified in the proposed Road Corridor of feeder roads (**Table 13**)**.**

Table 13: Trees Along Feeder Roads Within the Road Corridor

Road No.	Feeder Road	Length in Km and Number of Trees							Total number
		0-3	3-6	6-9	9-12	12-15	15-18	18-21	

1	Ngoma-Nyagisozi-Cyahinda					3			**3**
2	Kibeho-Mata-Ruramba	10							**10**
3	Munini-Kamana-Giswi-Gatunda-Remera		5	3	10	1			**19**
8	Cyahinda-Akanyaru-Sheke		3						**3**
9	Rurenge-Cyahinda			1	8	35	29	14	**87**
10	Huye-Rusenge-Ngera-Nyagisozi	4	4	6	2	7			**23**
13	Ndago-Akavuguto-Rusenge	7							**7**
14	Nkanda-Kirarangombe-Nteko-Runyombyi	1				3			**4**
Total number		**22**	**12**	**10**	**20**	**49**	**29**	**14**	**156**

Source: Field Surveys May 2016

The number of trees by girth size is detailed in **Table 14**. Most trees are in the girth class of G7 (35%), while no single tree was found belonging to the first girth class (G1).

Table 14: Girth Wise Details of trees

Road No.	Feeder Road	Girth Class							Total
		G1	G2	G3	G4	G5	G6	G7	
1	Ngoma-Nyagisozi-Cyahinda	-	-	1	-	1	-	1	**3**
2	Kibeho-Mata-Ruramba	-	-	-	-	3	3	4	**10**
3	Munini-Kamana-Giswi-Gatunda-Remera		-	-	-	4	6	9	**19**
8	Cyahinda-Akanyaru-Sheke	-	-	2	-	1	-	-	**3**
9	Rurenge-Cyahinda	-	7	12	-	33	9	26	**87**
10	Huye-Rusenge-Ngera-Nyagisozi	-	-	-	-	4	5	14	**23**
13	Ndago-Akavuguto-Rusenge	-	4	2	1	-	-	-	**7**
14	Nkanda-Kirarangombe-Nteko-Runyombyi	-	-	2	-	2	-	-	**4**
Total		**-**	**11**	**19**	**1**	**48**	**23**	**54**	**156**
G1:20-60cm; G2:61-90cm; G3:91-120cm; G4:121-150cm; G5: 151-180; G6: 181-210; G7: >211									

4.5.2. Wildlife: mammals, birds and herpetofauna

Most wildlife found in the district arethose hosted in Nyungwe National Park. The park is home to 14 species of primates, including large troops of colobus monkeys.

Other main mammals include L'Hoest's Monkey – *Cercopithecus lhoesti*, Owl-faced Monkey – *Cercopithecus hamlyni*, Golden Monkey – *Cercopithecus mitis kandti,* Vervet Mon-

key – *Chlorocebus pygerythrus,* Olive Baboons – *Papio anubis* and Chimpanzees – *Pan troglodytes*. Other main mammals include squirrels, bush pigs, duikers and servals.

For birds, more than 280 avian species are known to be present. They include species such as turacos, hornbills, eagles, francolins, sunbirds, wagtails.... (25 of those species are endemic to Albertine Rift). There are also 43 species of reptiles, 8 of which are endemic. Thirty-one species of amphibians are present, with 15 endemic species.
There are innumerable invertebrate species present, and Nyungwe is especially known for its abundant butterfly populations. Eucalyptus plantations found in the area are habitat for a good number of birds.

All indicative feeder roads are far from Nyungwe National Park, except FR5 and FR6 that are passing through the buffer zone of the park. The construction is likely to lead to wildlife disturbance (noise, lights, pollution, etc) in the road section passing through the buffer zone of the park. Protection measures will be taken to avoid adverse impacts on wildlife.

4.6 SOCIO-ECONOMIC ENVIRONMENT

4.6.1 Demographics

Nyaruguru District is part of the Southern Province. The District has a population of 294,334 inhabitants (Census 2012) and extends over an area of 1,010 sq. km.The population density accounting for 291 inhab/sq.km and ranks the District seventh from bottom countrywide; density is 30% lower than the national average (415 inhab/sq.km) and 33% lower than the Southern Province average (434 inhab/sq.km), whereas the population growth 2002-2012 has been 2.4%, slightly lower than the national average (2.6%). The District is prevalently rural, the urban population accounts for 2.1% of total District population.

The population of Nyaruguru district is predominantly female; 155,055 are women corresponding to 52.7% of the total resident population. Females are also predominant in all Sectors of the District.The population is unevenly distributed over the District area.The most densely populated area is the sector of Nyagisozi while the least densely populated is Nyabimata Sector in the western part of the District. The highest and lowest population number was recorded in Ruheru(35,599 people) and Mata (13,900 people) sectors respectively.Ruheru, Busanze and Rusenge are the mostly populated Sectors with over 24,000 residents each. They represent 12.1%, 9.2% and 8.2% of the total population of

District, respectively. Two less populated sectors are Mata (13,900 inhabitants) and Munini (15,900 inhabitants). They represent 4.7% and 5.4% of the total resident population of Nyaruguru District, respectively.

The average household size in Nyaruguru District (4.6 persons/HH) is slightly above the national average household size of 4.3 persons/HH.The mean demographic data of Nyaruguru District are highlighted in **Table 15** below.

Table 15: Population in Nyaruguru District

District Sectors	Both Sexes	Urban Population	Rural Population	Population share (% of District Pop.)	Area (Sq. Km)	Density inhabitants per Sq.km.	House-hold Size	Pop. Growth rate (2002-2012)	Estimated pop. 2025
Busanze	27190	13,006	14,184	9.2	70.3	387	4.7	2.9%	28,513
Cyahinda	21377	10,078	11,299	7.3	53.0	403	4.6	2.1%	22,417
Kibeho	21456	10,300	11,156	7.3	78.5	273	4.5	3.0%	22,500
Kivu	17719	8,460	9,259	6.0	124.0	143	4.8	1.9%	15,581
Mata	13900	6,644	7,256	4.7	62.2	224	4.6	2.8%	14,576
Muganza	19208	9,057	10,151	6.5	91.4	210	4.7	1.8%	20,142
Munini	15994	7,600	8,394	5.4	47.0	341	4.7	-0.5%	16,772
Ngera	22440	10,371	12,069	7.6	59.4	378	4.3	1.2%	23,532
Ngoma	22950	10,847	12,103	7.8	46.9	489	4.4	3.5%	24,067
Nyabimata	16953	7,918	9,035	5.8	126.5	134	4.6	1.0%	17,778
Nyagisozi	18275	8,682	9,593	6.2	34.7	526	4.6	1.6%	19,164
Ruheru	35599	16,837	18,762	12.1	104.3	341	5.0	6.4%	37,331
Ruramba	17126	8,113	9,013	5.8	49.0	349	4.8	1.8%	17,959
Rusenge	24147	11,366	12,781	8.2	59.9	403	4.4	2.5%	25,322
Nyaruguru District	**294334**	**139,279**	**155,055**	**100**	**1007.1**	**292**	**4.6**	**2.4%**	**308,653**

Source : NISR, 2012

4.6.2 Gender and child context

a. Demographic data

As per the results of the 4th population and housing Census (2012), the females outnumber males by 15,776 in Nyaruguru District. The total District population is 294,334 residents of which 52.7% are females. In each sector of Nyaruguru District, females are more than 50% of the total district population.

The majority of the population of Nyaruguru is young with 81.2% of the population aged less than 40 years old. About 50.3% of the resident population of Nyaruguru (or 95.5% of the district female population) are females aged less than 40 years old. Elderly people

(above 65 years old) make up only 3.8%. The females aged 65 years and above represent 2.4% of the total population.

The population aged below 14 years old is 129,677 people, representing 44.1% of the total district population.
This group is predominantly female; 65,213 are women, corresponding to 50.3% of the population below 14 years old or 22.2% of the total district population.

b. Gender based violence and child labour /abuse situation

Gender-based violence (GBV) is a universal reality existing in all societies. The assessment done by the Gender Monitoring Office (GMO) identifies four major forms of GBV including:

- ✓ Economic violence (denial of economic rights to property, succession, employment or other economic benefits);
- ✓ Physical violence (ie the intentional use of physical force with the potential to cause harm);
- ✓ Sexual violence (act of forcing another individual, through violence, threats, deception, cultural expectation, weapons or economic circumstances, to engage in sexual behavior against her or his will); and
- ✓ Psychological violence: trauma to the victim caused by acts, threats of acts or coercive tactics; these threats are often related to sexual or physical violence).

Though there are limited data on GBV, it is not a big problem in Rwanda and particularly Nyaruguru District. The Country has achieved impressive results in the fight against GBV, including a GBV hostile legal and policy framework that supports prevention and response to GBV, and provides an opportunity for further advancements. The National Policy against Gender-Based Violence and its strategic plan, the Law No 59/2008 of 10/09/2008 on prevention and punishment of gender based violence, Law No 22/1999 of 12th November 1999 to supplement Book one of the Civil Code and to institute Part Five regarding Matrimonial Regimes, Liberalities and Successions, Law No 13/2009 of 27th May 2009 regulating Labor in Rwanda, Law No 32/2016 of 28/08/2016 governing persons and family among others were put in place and awaireness campaigns on GBV prevention done. All those legal provisions prevent and punish GBV Crimes in all of its forms, sexual harassment in the workplace inclusive, provide for equal inheritance rights between women and men, girls and boys and provide for equal opportunities and equal pay for women and men.

c. Child labour and women trafficking

As per the 4th Population and Housing Census of 2012, the children (below 17 years old) constitute (33.5%) of the resident population of Nyaruguru district, with females outnumbering males. The female children represent 52.8% of the total female population in the District.

Though there are no data for both Rwanda and Nyaruguru District, the child labour or abuse situation in the District is not alarming. Legal mechanisms were put place to prevent child labour/ abuse in the country. The most noticeable regulations include the Law 54/2011 of 14/12/2011 relating to the rights and protection of the child and Law No 13/2009 of 27/05/2009 regulating labour in Rwanda, in addition to the Constitution of the Republic of Rwanda of 2003 revised in 2015.

Concerning women and child trafficking, this type of crime is likely still unknown in Rwanda, and there is no related provision in the Penal Code.

4.6.3 Population on the right of way

The feeder roads in Nyaruguru District mostly pass through scattered settlements and trading centers. In general about 3.8 to 5.6 m average width will be required for widening of roads to have right of way of 10.5 m. About 0 to 1.1m average width will be needed to have the paved road with 6.0 m width.The widening will have impact on houses, agricultural land and other infrastructure facilities.

The following are the socio-economic characteristics of the RoW.

a) Families within the right of way

The survey of the people likely to be affected by road widening works revealed that 1980 families are living or have properties within the RoW for all indicative feeder roads. The total number of people within RoW reaches 9,108 people including 4,308 men and 4,800 women.

b) Age structure of the respondents

The age structure of the respondents was a necessary part of the research to determine whether the results of the findings are from mature persons who understand the situation. According to Rwandan legislation, the majority age starts from 18 years.

The table below gives a clear age structure of the respondents.From the table below, it comes out that 48% of the respondents (majority) are in the range of 30-40 years. During this age, it assumed that people are more active and likely to be involved in various activities. This range is followed by the group age of 20-29, which represents 24%.

The group 41-51 which has 18% is followed by the range of PAPs who have 52 year and above representing 10%. These results show that the majority of respondents are mature and active; therefore they can be reliable.

Table 16: Age of the PAPs of household surveyed

Age group	Number of Respondents	Percentage (%)
Less than 20	-	-
20-29	19	24
30-40	38	48
41-51	15	18
Above 52	8	10
Total	**80**	**100**

Source: Field survey and Analysis, May 2016

c) Education level of Respondents

The level of education among the affected communities is very low as revealed by the data analysis reported in **Table 17.** Among the respondents, 18% are illiterate, primary (elementary level) education represents54% and 14% have incomplete secondary level. The proportion of 4% representing those who completed the secondary and vocational represents 10%. The main reason is the poverty of families that could not afford school fees and materials required for the education of their children.

But nowadays, due to the government policy, elementary education is free of charge, therefore every parents has an obligation to send his children to school.

Table 17: Level of Education of respondents

S/N	Level of education	Frequency (No)	Percentage (%)
1	Illiterate	15	18
2	Primary	43	54
3	Incomplete Secondary	11	14
4	Secondary	3	4
5	Secondary vocational	8	10
6	Incomplete Higher	0	0

7	Higher (Bachelors Degree)	0	0
8	Postgraduate	0	0
	Total	**80**	**100**

***Source**: Field survey and Analysis, May 2016*

d) Family Size of the Household of respondents

Table 18 summarizes the family size of the households' respondents. The Analysis has indicated that 18% of the respondents' families size is Large, means that the size of the family is above 7 per household. While 54% are medium, which means that they are with-in the range of 5-7 in the family and 24% has small size, means between 2-4 persons per family. The average size of the household of respondents on the feeder road is between 5-7.

Table 18 Family Size of the Households

S/N	Family size	Number of Respondents	Percentage (%)
1	Small (2-4)	19	24
2	Medium (4-6)	47	58
3	Large (Above 6)	14	18
	Total	**80**	**100**

Source: Field survey and Analysis, May, 2016

e) Marital status of respondents

The marital status of the PAP is an important parameter to know the views of different categories of people about the project. **Table 19**shows the marital status of the respond-ents. About 76% of PAPs are married; single, 6% and 18% widows.

Table 19: Marital Status of Respondents in Household Surveyed

S/N	Marital status	Number of respondents	Percentage (%)
1	Married	61	76
2	Single	5	6
3	Widow	14	18
4	Divorced	0	0
	Total	**80**	**100**

Source:*Field survey and Analysis, May, 2016*

f) **Vulnerability of PAPs**

The vulnerability and social group for individuals in the community is for a paramount importance because it gives the idea of level of vulnerability. The **Table 20** gives the details on vulnerability within the road corridor.

The majority of the project affected population (68.6%) are in normal conditions and persons representing 12.5% are orphans, persons living with disability, elderly people and women headed households are represented by 6.3% each.

Table 20: Vulnerability in the PAPs

S/N	Social group	Frequency (No)	Percentage (%)
1	Living with disability	5	6.3
2	Orphans	10	12.5
3	Women headed households	5	6.3
4	Aged people (above 65years)	5	6.3
5	People in normal conditions	55	68.6
Total		**80**	**100**

***Source**: Field survey and Analysis, April 2016*

g) Housing conditions of the affected communities

Housing condition is an important variable in studying socio economic aspects of a family because it gives the idea on the living conditions of family members. The survey showed that 94 % of PAPs live in their own houses, while 6% live in rented houses. About 76% of these houses are built in mud bricks known as Rukarakara, while 24% are built in woods.

4.6.4 Socio-economic Conditions

Concerning the households economic condition and making reference to poverty and extreme poverty lines, set out at 159,375 and 105,064 RWF respectively, Nyaruguru District is ranked 23rdposition countrywide by percentage of extreme-poor and poor population categories, In previous survey EICV3 2011, Nyaruguru was ranked 27th. About 36% of the population in Nyaruguru District is identified as nonpoor, 25% as poor (excluding extremepoor) and 18% as extremepoor on total population by District. Compared with other Districts of Southern Province, Nyaruguru District comes seventh (out of eight) for proportion of nonpoor.

Referring to the sectors' contribution to household income, the EICV3 results shows that at the national level agriculture contributes the largest share of a household's income (46%), followed by wage income (25%), business income (i.e. selfemployment), transfers,

and rents.In Nyaruguru District household income is driven by agriculture (50%), followed by wage income (22%) and rents (9%). The smallest contributor to household income in Nyaruguru District is private transfer income (5%).

a) Agriculture

Nyaruguru District is among the districts that have a high percentage of farming households (87%) that cultivate under 0.9 ha of land. The mean size of land cultivated per household in Nyaruguru District is 0.44 ha.

The proportion of households cultivating under 0.3 ha land by district represents 52% in Nyaruguru District, ranking it eleventh among all districts in terms of the percentage of households with under 0.3 ha of land.

Nyaruguru district is subdivided into two agricultural zones: Zone 1 comprising of 5 sectors around Nyungwe forest (Busanze, Nyabimata, Kivu, Ruramba, Ruheru) andZone 2 including other 9 sectors (Kibeho, Rusenge, Ngoma, Ngera, Cyahinda, Nyagisozi, Munini, Muganza, Mata). The edapho-climatic characteristics differ from one zone to another, reason why crops are also different.

Various crops are grown in Nyaruguru District. Those include bean and wheat which occupy the first and 2ndplace with an average of 28.4% and 24.9% of the total district production. Cassava and sweet potato come 3rd and 4th respectively, followed with maize. Cash crops are dominated with tea and coffee. The following table illustrates the proportion of the crop production in 2015 A and B Seasons in Nyagatare District.

Table 21: Crop production in Nyaruguru District

District Sectors	Production (Tons)						
	Maize	Wheat	Beans	Cassava	Coffee	Tea	All Produce
Busanze	3,391.5	2,900.3	3,769.7	0.0	1,293.0	1,864.8	13,219.3
Cyahinda	704.0	0.0	7,576.8	1,430.0	1,281.0	0.0	10,991.8
Kibeho	299.2	0.0	7,217.4	1,457.5	161.2	3,496.4	12,631.7
Kivu	3,228.3	4,369.2	1,561.9	0.0	0.0	3,186.5	12,345.9
Mata	475.2	94.5	5,640.4	0.0	465.0	5,739.4	12,414.5
Muganza	3,660.0	4,216.0	3,183.2	0.0	0.0	3,821.3	14,880.5
Munini	544.5	0.0	6,256.6	0.0	538.8	3,514.4	10,854.3

Ngera	536.8	0.0	5,306.8	15,675.0	1,927.0	0.0	23,445.6
Ngoma	829.1	0.0	7,474.7	11,178.8	2,922.1	0.0	22,404.7
Nyabimata	2,408.3	45,442.7	956.3	0.0	0.0	8,693.1	57,500.4
Nyagisozi	768.8	0.0	7,411.5	2,736.3	1,629.2	0.0	12,545.8
Ruheru	5,033.9	5,395.0	1,019.7	0.0	0.0	2,191.6	13,640.2
Ruramba	633.6	357.7	6,195.8	0.0	192.2	916.5	8,295.8
Rusenge	461.7	0.0	8,093.1	17,118.8	1,729.3	0.0	27,402.8
TOTAL district	**22,974.9**	**62,775.4**	**71,663.9**	**49,596.3**	**12,138.8**	**33,424.0**	**252,573.3**

Source: Feasibility study of indicative feeder roads in 5 Districts by Sheladia, June, 2016

In Nyaruguru District, bean (28.4%), wheat (24.9%), cassava (19.6%) and Tea (13.2%) are the predominant crops. Bean and wheat represent 53.2% of the total production. The total production is mainly used for domestic consumption and marketing. The Table below presents the marketed share in Nyaruguru area.

Table 22: Marketed crop production in Nyaruguru District for 2015 A and B Seasons

District Sectors	Sold Production (Tons)						
	Maize	Wheat	Beans	Cassava	Coffee	Tea	All Produce
Busanze	678.3	1,060.5	481.1	0.0	1,136.0	1,608.0	4,963.9
Cyahinda	140.8	0.0	966.9	80.2	1,125.0	0.0	2,312.9
Kibeho	59.8	0.0	921.0	81.8	141.6	3,015.0	4,219.2
Kivu	645.7	1,597.6	199.3	0.0	0.0	2,747.7	5,190.3
Mata	95.0	34.6	719.8	0.0	408.6	4,949.1	6,207.0
Muganza	732.0	1,541.5	406.2	0.0	0.0	3,295.1	5,974.8
Munini	108.9	0.0	798.4	0.0	473.4	3,030.5	4,411.2
Ngera	107.4	0.0	677.2	879.4	1,693.2	0.0	3,357.2
Ngoma	165.8	0.0	953.9	627.1	2,567.6	0.0	4,314.4
Nyabimata	481.7	16,615.7	122.0	0.0	0.0	7,496.1	24,715.5
Nyagisozi	153.8	0.0	945.8	153.5	1,431.6	0.0	2,684.7
Ruheru	1,006.8	1,972.6	130.1	0.0	0.0	1,889.8	4,999.4
Ruramba	126.7	130.8	790.7	0.0	168.9	790.3	2,007.4
Rusenge	92.3	0.0	1,032.8	960.4	1,519.5	0.0	3,605.0
TOTAL district	**4,595.0**	**22,953.3**	**9,145.0**	**2,782.4**	**10,665.4**	**28,821.5**	**78,962.6**

Source: Feasibility study of indicative feeder roads in 5 Districts by Sheladia, June, 2016

The total marketed production averages 31.3% of the total production and is dominated with coffee (87.9%), tea (86.2%), wheat (36.6%) and maize (20%). Beans and cassava are mainly used for home consumption.

Commercialisation of crop production overall, as measured by the share of harvest sold (including households selling zero crops), is 19% in Nyaruguru district. It is 20.9% at national level. The mean share of harvest sold for staple crops (17%) is a little lower than that of fruit & vegetables (20%) in Nyaruguru district (District Development Plan, 2013).
In addition to crops production, livestock is another important source of income and food for agricultural households. The assessment done in September 2012 indicated that the milk production in Nyaruguru district was estimated to 27,083 liters per day. Meat, eggs and honey (2846 kg) were the main livestock products within Nyaruguru district. EICV3 results showed that 82.8% of all households raise some type of livestock. The following table shows the distribution of livestock in Nyaruguru district.

Table 23: Livestock distribution in Nyaruguru District

Sector	Cattle	Goats	Sheep	Pigs	Poultry	Rabbits	Beehives	Pond fish
BUSANZE	3690	6073	1402	2110	1222	3313	230	0
CYAHINDA	3497	3015	485	1421	1297	1840	876	0
KIBEHO	3991	7879	1590	994	2672	1719	786	0
KIVU	2635	3197	1737	1280	1220	2838	2388	0
MATA	2267	2136	1139	1186	1571	1389	783	0
MUGANZA	4216	8904	1027	1780	1780	10700	0	0
MUNINI	2030	1181	134	402	236	221	0	0
NGERA	3364	4693	480	1699	2326	1669	146	37
NGOMA	2070	5592	59	1107	1873	2333	4118	0
NYABIMATA	2903	3524	2034	948	1016	1407	998	0
NYAGISOZI	2055	3271	306	1292	1391	2311	50	0
RUHERU	3290	4530	1740	995	810	1338	1331	0
RURAMBA	2521	4677	515	1060	815	1017	1472	7
RUSENGE	3585	3182	955	2107	1907	1681	3647	17
TOTAL	**42,114**	**61,854**	**13,603**	**18,381**	**20,136**	**33,776**	**16,825**	**61**

Source: Nyaruguru District Development Plan (2013)

Some crops products are processed before their commercialization. In Nyaruguru Districts, 5 agro-processing factories including 2 tea industries (Mata and Nshili) and 3 coffee washing stations (located in Ngera, Ngoma and Nyagisozi sectors) are available.

b) Access to basic infrastructures

Nyaruguru district is located in highland with dense hydrographic network.It has only 2 functional water pipelines with 19 km, serving one part of the Ruramba and Kibeho Sectors. The EICV3 reported that 66% of Nyaruguru district households use safe drinking water source, this is below the national level of 74.2%. The majority of households use protected spring water (44%), followed by public standpipe (15%) and protected well (6%). However, 34% of households in Nyaruguru district are still in use of unimproved water sources, mostly surface water from water courses (Nyaruguru District Development Plan, 2013).

Nyaruguru district has 101 schools of which 89 are primary schools (including those with 9YBE or 12YBE), 10 secondary schools (including 2 privates and 8 semi-publics) and 2 Vocational Training Centres. The district also boasts of 37 nursery schools. The literacy rate is 63% among population aged 15 and above and 82% among the whole population. The net attendance rate in primary school in Nyaruguru district is 87%; this is below the national average of 91.7%. The district attendance rate in secondary school is 17% which is also below the national average of about 21%.

Nyaruguru District has one hospital (Munini Hospital), 16 health centers and 8 health posts, all serving a population of around 286,737inhabitants. These health centers are distributed to all 14 sectors (ie each sector has 1 health center, except Cyahinda and Nyagisozi Sectors with 2 health centers each, 8 sectors also possess health posts). Nyaruguru district has 996 community health workers (CHW). These are distributed in all villages (3 CHW by village) and are elected by the population.

In Nyaruguru district, themarket infrastructure is still under development. Four modern markets (with roof and stores) are operational in Rusenge, Kibeho, Muganza and Cyahinda Sectors.There exist a total of 10 unimproved markets in each of the remaining 10 Sectors. The district also trades with the neighboring districts, mainly Huye and Nyamagabe, especially in agricultural products.

Energy sector is also another important sector in economic transformation of the District.The overall distribution of electricity in Nyagatare district is 17.6% which is above the

national level of 10.8%. Out of 62,430 resident households in Nyaruguru District, 11,559 households are electrified and 53,645 (87.7%) households use improved cooking stoves. About 178 families use biogas as energy source.

The Consultant made an inventory of basic infrastructures along the indicative feeder roads in Nyaruguru District. The Table below presents the number of schools, health centers, churches, markets and public offices by road.

Table 24: Number of schools, health centers, churches and public offices by road

Road ID	Road Name	Basic Infrastructures				
		Health Center	School	public office	Market	Church
FR1	Ndago-Cyahinda-Nyagisozi-Ngoma	1	3	4	2	2
FR2	Kibeho-Mata- Ruramba	3	2	4	0	7
FR3	Munini-Kamana-Giswi-Gatunda-Remera	1	1	1	2	1
FR4	Giswi-Rugwogwe-Kabere-Nshili Tea Factory-Kabere (Ruheru)	1	2	3	1	1
FR5	Muganza-Buruhukiro-Rubumburi- Rugerero-RDB (Nyungwe)	1	2	1	1	2
FR6	Munini-Muganza-Rukore-Bigugu- Nyabimata	2	3	3	1	2
FR7	Ryabidandi-Viro-Akanyaru-Giswi	0	1	1	1	1
FR8	Sheke- Akanyaru- Cyahinda	1	1	2	2	1
FR9	Cyahinda- Rusenge	0	1	3	2	1
FR10	Huye- Rusenge- Ngera- Nyagisozi	1	1	1	0	0
FR11	Ruyenzi-Uwimbogo-Remera	0	0	1	0	1
FR13	Ndago-Akavuguto-Rusenge	0	1	1	0	1
FR14	Runyombyi (Ryagwiza)- Nteko- Kirarangombe-Nkanda	5	4	12	3	14
Total		**16**	**22**	**37**	**15**	**34**

About 60% of indicative feeder roads are in very bad condition. The indicative feeder roads are mostly used by pedestrians (76%) and bicycles (13%). The motorized traffic represents 11% of the roads users, including 10% of motocycles and 1% of vihicles. However, motocycles related accident due to bad road condition, distraction and inattention is the most frequent in the area and pedestrians are the most vulnerable road users. Road safety issues will need to be taken into account as part of final design.

c) Distances to basic services

Walking distance to basic services can be considered an indicator of both provision and coverage of such services and the remoteness of households' dwellings. Referring to the mean walking distance to primary school by district, it shows that Nyaruguru is classified

among eleven districts with a mean walking distance to a primary school within the interval of 28 to 33 minutes.

Around 36.7% of households are still between 30 and 59 minutes of a primary school. This walking distance to a primary school in Nyaruguru District is almost the same as the mean distance in rural areas (28.6 minutes), but slightly higher than the national level.

The mean walking distance to a primary school is 28.6 minutes in rural areas, 19.4 minutes in urban areas and 27.2 minutes at national level.The mean walking distance to a health centre in Nyaruguru District is 72 minutes and only31% of households walk for under than an hour on average to a health centre. The mean walking distance to a health centre is 35 minutes in urban areas and 64.4 minutes in rural areas, while it is one hour countrywide. When compared to rural areas, Nyaruguru District health centres are 7.6 minutes further from household dwellings than the average.

d) Social services and prevention of communicable diseases

Communicable diseases in Nyaruguru District include Malaria, HIV/AIDS, Tuberculosis, epidemics and other transmittable diseases. Social services were put in place for their prevention.

The rate of malaria within Nyaruguru District is around 2%. Treated mosquito nets are distributed free of charge to pregnant women attending antenatale care (ANC) and to children under 5 years through mass campaigns countrywide and campaign for malaria prevention and treatment.

The malaria treatmentdrugs wereintroduced in all health facilities, community health workers in all Districts and in some interested private pharmacies. The HIV/AIDS prevalence in Nyaruguru district averages 0.5% and this is below the national level of 3%. All health centers within the project site offer HIV/AIDS services.

e) Employment status of affected communities

The overall employment rate is 85% of resident population aged 16 years and above in Nyaruguru district while unemployment rate and economic inactivity rate are 0% and 15% respectively. The national average employment rate, unemployment rate and economic inactivity rate reach 84%, 0.9% and 15% respectively. Most of people aged 16 years and above in Nyaruguru are independent farmers with 72%, followed by wage non-farm with

11% and wage farm with 9%. Only 6% are independent non - farmers.Agriculture was shown as the main activity with 81% of the population aged 16 years and above, followed by Trade (6%) while other industries (mining and quarrying, manufacturing, construction, transport, etc.) are less represented. Charcoal making is another important income generating activity in the District. Nyaruguru District is one of the main source of charcoal used in Kigali City.

The survey done by the Consultant revealed that76.3% of the population within the road corridor are farmers and employed in either their own or at someone else agricultural farm. Moreover, a proportion of 21.3%, among the affected communities own small business, which they combine with agricultural activities. This can be explained by the fact that in the District, the agricultural activities (Maize, Banana, Rice, Beans) are dominant and combined withsmall businesseslike selling the produce in the local commercial centres. The percentage of PAPs that represents “mason” is 12.5%, the students/ pupils are 5% while 3.7% are producing and selling charcoal. Only 2.5% of the respondents are public servants, especially teachers in the local primary and secondary schools. **Table 25**describes the employment status of members in the communities surveyed.

Table 25: Employment Status of affected communities

S/N	Employment	Frequency (No)	Percentage (%)
1	Employed (in own agricultural farm)	44	55.0
2	Pensioner	0	0.0
3	Student, pupil	4	5.0
4	Mason	10	12.5
5	Charcoal making	3	3.7
6	Traders	17	21.3
7	Civil servant (Teachers)	2	2.5
8	Military Servant	0	0
Total		**80**	**100**

Source:Field survey and analysis, May 2016

4.6.5 Physical Cultural Resources

Two physical cultural resources in Nyaruguru District were identified in the surroundings of some indicative feeder roads. These include Kibeho religious site on FR2 and Nkanda memorial site on FR14. Kibeho is a religious place of pilgrimage for both Christians and non Christians. This sacred site, regularly visitedby thousands of people from within or

outside the country,is known to have hosted the appearances of the Virgin Mary in 1980s. The FR2 is passing close to the Kibeho square. On the other side, though not located within the RoW on FR 14, the Genocide memorial site of Nkanda is not far from the FR14 RoW and also needs to be protected.

4.6.6 Resettlement implications of the Project

The indicative feeder roads in Nyaruguru District pass through scattered settlements, villages and trading centers (towns). The widening will have impact on houses, agriculture land and other infrastructure facilities. About 178 houses on the indicative feeder roads are likely to be affected if the 10.5 m RoW is considered. Most of them are concentrated on roads passing through grouped settlements. About 95.61 ha of land likely to be acquired, mostly agricultural land, crops and trees on the land are potential properties to get affected due to widening of feeder roads in the District. The Subproject RAP for affected assets is being prepared and compensation for affected assets will be done before the start of civil works.

5 PUBLIC CONSULTATION AND PARTICIPATION

Public participation and community consultation has been taken up as an integral part of social assessment process of the project. Consultation was used as a tool to inform and educate stakeholders about the proposed action both before and after the development decisions were made. This participatory process enables the participation in the decision making process. Public consultation has been carried out in the project areas with the objectives of informing and educating all stakeholders about the proposed project both before and after the development decisions were made. It was also organized toto determine their thoughts, opinions and feedback on the impact of the rehabilitation of feeder roads in Nyaruguru District.

Two public consultation meetings, one at the screening stage and the second at the draft report presentation stage. The 1st public consultation meeting concerned various stakeholders, namely local authorities, private sector, farmers organizations, churches and local communities. The 2nd meeting brought together district officers (road engineers, environmental and social protection officers), representatives of the district private sector, farmers cooperatives, church leaders).

To this end, public consultation was carried out with different groups and different areas. The approach of zoning was used to group close roads in one zone. A total number of 3 zones have been identified and a public consultation was held in each zone. **Table 26**provides details of Zones and the way roads have been grouped in the zones.

Table 26: Zones of Public Consultation Meetings

S/N	Zone	Roads covered	Date of Public Consultation	Number of participants
1	NYAGISOZI-CYAHINDA	FR1, FR7, FR8, FR9, FR10	24/08/2016	105
2	RUSENGE-KIBEHO	FR2, FR9, FR10, FR13	24/08/2016	85
3	BUSANZE	FR3,FR14	24/08/2016	298
TOTAL				488

Source: Consultant's Survey and field visit, August 2016

5.1 Stakeholders

Involving stakeholders through participatory direct consultations is central to preparation of the ESIA/ESMP report. The stakeholders are those who have an interest in the project, and who will be involved in the further consultative process. The main groups of stakeholders met during the consultation process are:

- Project Affected Persons (PAP);
- Local authorities;
- Community People and Road Users;
- Private sector
- Churches and cooperative leaders
- Nyungwe national park authorities

5.2 Public Participation – Methods and Process

During the consultative process, beside the local authorities and ordinary population , other social organizations were invited to attend the communication meetings. These are church leaders, local cooperative leaders and private sector. The public consultation for ESIA andRAP, was conducted at the same time.

During these consultations, the communities were explained about the project(background, objectives, expected upcoming activities, social and environmental impacts) as well as project expectations from the beneficiaries for its success.The participants were given opportunities to raise their concerns and claims and answers were provided by the consultants.

During consultation meetings with the communities, efforts were made to reach as many people as possible. For this purpose, the strategy of reaching people in community works known as “UMUGANDA[9]” was exploited. For this purpose, public consultation was carried out with different groups in different areas.

5.3 Findings from Public Consultation Meeting

The data obtained from public consultation and views as well as concerns from different stakeholders are given in details in **Table 29, 30**and**31**. The lists of people who partici-

[9] Umuganda : Is a traditional practice, through which citizens living in the same Village, Cell, Sector with local authorities meet in public work. This is carried out every last Saturday of the month.

pated in the public consultation are available in **Annexure 4** and photographs are put at the end of this part.

5.3.1 Consultation with district authorities

As earlier indicated, the District will play a critical role in the project. Thus, during the field visits, District authorities have been consulted for the purpose of raising awareness about the project and acquiring their views/ perceptions on the project. A meeting with District authorities was held on 17/05/2016 at the District headquarters as well as meetings with the Executive Secretaries of Sectors during public consultation meetings on 24/08/2016. **Table 27**shows details of the consulted authorities.

Table 27: Authorities Consulted in Nyaruguru District

S/N	Names	Function	Contact
1	NSENGIYUMVA Innocent	Division Manager of the District	0788856885
2	MUNYENTWARI Paul	District Road engineer	0784711743
3	MUTESAYIRE Gloriose	District Social Protection officer	0788440212
4	BYUKUSENGE Assumpta	Executive Secretary of Nyagisozi Sector	0788230811
5	NYAMINANI Louis	Executive Secretary of Cyahinda Sector	0788671068
6	NSENGIYUMVA Vincent	Executive Secretary of Busanze Sector	0784826727

Source: Consultant's Survey, May 2016

The salient features of the meeting is presented below:

i) Views from the District Division Manager

The Division Manager of Nyaruguru District supports and appreciates the "Feeder Roads Project". He argued *"the rehabilitation of these feeder roads is synonym of development in the eyes of Nyaruguru Citizens and authorities ".*There are much benefits expected from the project such as employment during the project implementation, facilitating transport for agricultural production to the market. However, he pointed out that, though the project brings positive impacts to the people, it might also generate negative impacts; thus he urged the team to think about mitigation measures, including expropriation before

the project implementation. He finally insisted on the strict application of the laws, procedures and principles governing expropriation for public interests.

ii) Views from the Road Engineer of Nyaruguru District

The Road engineer of Nyaruguru District fully supports the "Feeder Roads Project". In his remarks during the meeting session, he stated that " *It is a pleasure to have this kind of project in our District".*He argued that *"the rehabilitation of these feeder roads will certainly bring positive impact to the people"* The benefits expected are (i) improved conditions of transporting goods and people; (ii) Opening up of the hinterland and improved access to basic socioeconomic infrastructure; (iii) Creation of direct and indirect employment during the road construction, operation and maintenance phases; (iv) Reduced risk of landslides and erosion thanks to the reinforcement and monitoring of embankments; (vii) Added value of land as a result of improved accessibility; and (viii) Improved security around schools along the road.

iii) Views from the Executive Secretaries of Sectors

In line with the Road engineer, Executive Secretaries acknowledge the huge benefits that they expect from the rehabilitation the feeder roads in Nyaruguru District. They urged the participants to welcome the project as it brings benefits to them. People should participate in the implantation and the protection of these socio economic infrastructures. People's participation has to be observed in the rehabilitation, as they will be thefirst ones to be given jobs. They reminded the participant that the compensation law and practices are there to protect them.

5.3.2 Consultation with Cooperative Leaders

During the public consultation, leaders of cooperatives have been consulted with the aim of raising their awareness about the project and getting their views about the project as opinion leaders. **Table 28**shows details about cooperative leaders consulted.

Table 28: Details about consulted cooperative leaders

S/N	Name of the Leader	Cooperative	Contact
1	MUKABATSINDA Concessa	DUHAGURUKIRE UMURIMO	0783245742
2	NSENGIMANA Narcisse	ABISHYIZE HAMWE URYOJYA	0785709070
3	NSHIMIYIMANA Moise	Cooperative of Moto-Taxis	0783103743
4	MUTANGANA Ildephonse	Cooperative of Minibus -Taxis	0785031346
5	HABUMUGISHA Innocent	Cooperative of Truck Transporters	0785757268
6	NSANZIMANA Fidele	Private Sector Federation	0788625124

Source: Consultant's Survey, August 2016

The salient feature of their views is that they all appreciate and welcome the project, as it will facilitate them to channel their production to the market. For the road users (mainly transporters), they point out that the rehabilitation of these roads will help them to decrease the cost of maintenance of their cars and motorcycles. Easy access to the market will certainly boost the value of their products. However, they all raised the concern of land in case the widening of the road requires land acquisition. They suggested that the project should avail a fair compensation for their properties, and payment has to be done before the transfer of their land.

5.3.3 Consultation with Church Leaders

During the public consultation, church leaders have been consulted, for the purpose of colleting their view and concerns about the project. Being opinion leaders, they are key stakeholders of the project their views are relevant due to their influential role in the society. They all appreciate the project and argue that infrastructures in general and roads specifically, are the engine of development. Thus, the rehabilitation of these feeder roads will bring development to the population. However, their prime concerns are related to the compensation, procedures that are followed, etc. They finally recommended that laws governing expropriation should be strictly observed during the project implementation, especially during the valuation and compensation payment.

Table 29: Details about consulted church leaders

S/N	Name of the Leader	Church	Contact
1	YIRIRWAHANDI Damien	Catholic Church/ Busanze Parish	0782081519
2	NGARUKIYE Thadée	UEBR[10]	0728000086
3	SADIKI Felix	ADEPR	0726775105
4	HATEGEKIMANA Obed	Seventh Day Adventist Church	0783011658
5	MUHOZA Samuel	UEBR	0788764379

Source: Consultant's Survey, August 2016

5.3.4 Consultative Meetings with community

As earlier indicated, public meetings were organized and held in different zones (see **Table 28**), after grouping close roads in one zone. Efforts were made to ensure that all prioritized feeder roads are represented in the public consultation. A total number of 488 people attended the meetings; and approximately 35% were women. The main objective of the public consultations was to gather information on their concerns, perceptions, reactions and fears of the livelihood changes to be brought about as a result/consequence of rehabilitation of feeder roads in Nyaruguru District. After the presentations, the community

[10] UEBR: Union des Eglises Baptistesau Rwanda

was given opportunity to give their views, comments and queries. Different community problems were addressed during the meeting in which the local participants expressed repeatedly their main concerns as follows:

- Road safety issues,especially motocycles related accidents;
- Compensation of affected assets
- Lack of jobs and income generating activities
- Very poor road conditions in some villages;
- Lack of sidewalk;
- Narrow local roads.

Any comments or questions raised by stakeholders were responded and recorded by the consultant. Employment opportunities in jobs associated with the rehabilitation of feeder roads was a theme brought up in the meetings. The consultant explained that local un-skilled labour will be given first priority in recruitment process.. Safety of roads users was also discussed and the consultant team highlighted that the project will follow government policies in protecting the population.

All the participants confirmed that they appreciate the Feeder RoadsDevelopment Project. The project received high degree of acceptability in that rehabilitation of the roads will boost local economy due to increased usage of the roads hence more exposure and increased trading opportunities. The data obtained from public consultations and views as well as concerns from local communities are given in details in **Table 30**.

Table 30: Summary of Feeder Roads' Public Consultation in Nyaruguru District

S/N	Gender	Question/comment	Response
1	Male	I strongly appreciate the project, but there are some roads which are very important, and more useful for us, which are not considered into prioritization	The consultant pointed out that, by now, the project will cover the prioritized roads due to financial constraints, depending on the availability of funds, the project can be extended to other roads
2	Male	The project is genuine and very good for us, but how about the loss of land, crops, houses, etc	The consultant team suggested that they will make a list of people affected by the project, and apply the availablelaws and regulations in line with compensation. The RAP will investigate these property losses in detail.
3	Male	Raised a problem of road erosion due to heavy rains and ask what the project is planning to do	With the local authorities, the team explained that the project will bring proper drainage of the roads to facilitate the flow into natural water bodies and will adhere to the requirements of environmental protection.Embankments of the roads will be protected with grasses.
4	Male	Raised the issue of employment, he suggested that the local people	The consultant team explained that local people will be involved, and priority employment for locals will

		should be the first ones to be employed by project	be applied during feeder roads construction and maintenance. This will concern both skilled and unskilled people.
5	Female	Normally projects help vulnerable people, people with disabilities. what the project will be doing for them?	The project will benefit all people. The local people with ability to work will be employed by the project. However, the entitlements matrix contains allowances for vulnerable people to nominate a member of their household to take advantage of the project benefits on their behalf.
6	Male	The project is good, people are happy with it. What about the materials to be used inrehabilitation (gravel, stone)?	The project team explained that the feeder roads will be rehabilitated as gravel roads and according to the standards. The project will use the locally available materials for laterite, gravel and stones.
7	Male	Wishes to speed up the road rehabilitation project	This is likely to occur.
8	Female	Comment – If I lose my land, will you compensate for my assets?	The team explained that the land within the RoW together with all other assets incorporated on that land (houses, crops, trees, etc) will be compensated for in line with the law.
9	Female	Can anything be done to help disabled people get the jobs?	The project will consider employment for vulnerable people whenever possible. However, the available employment is mainly for jobs requiring enough physical energy that people with disability may have difficulty to accomplish.
10	Male	We have experienced such projects; at the beginning, they seem to be good, but during the implementation it becomes something else. They cut our banana, trees and other crops without compensation.	The consultant team explained that each project is unique, therefore the current one will fully comply with all the principles and laws as well as procedures related to compensation by all means.
11	Female	I appreciate the project, but I am wondering whether the project will support the fees related to land title modification after land acquisition.	The consultants pointed that this will be examined and taken care of, in line with the legal provisions. He urged the participants to look for titles of their properties, as these will constitute the ownership' proofs for compensation.
During public consultations, compensation and employment have been raised as participants' prime concerns. Based on ESIA requirements, the Consultant provided responses to the best satisfaction of participants.			

Source: Primary data generated through public consultation, August 2016

During public consultation following points have emerged as their recommendations:

- The PAPs and other stakeholders consulted are in favor of the project;
- The PAPs will prefer financial compensation for houses and other properties likely to be affected;
- Most of the PAPs are looking forward to get employed by the project, and hope the project implementation to start soon.

The signed attendance lists of people who participated in public consultation meetings and photos are presented in appendices of this report.

Figure 8: A Photographic View of Public Consultation in Nyaruguru District

5.3.5 Consultative Meeting with Nyungwe park authorities

The consultant met with the park Manager and eplained the project activities. Two roads, FR5 and FR6, are passing through the buffer zone of the Park on 10 km and 1.08 km respectively. The park manager advised the Project to avoid any damage to park biodiversity during works execution. He promised to provide the needed technical support for the conservation of wild animals and plants along the roads.

6 ENVIRONMENTAL AND SOCIAL IMPACTS

6.1 ENVIRONMENTAL IMPACTS

In pursuance of the global goals of nature conservation and protection of environment to which Rwanda is committed, the Government of Rwanda has initiated plans, schemes and actions to implement various legislations. The Organic Law of 2005 determining the modalities for protection, conservation and promotion of environment in Rwanda and the Ministerial Order of 2008 determining the requirements and procedures for conducting EIA are the most important legislation for environmental assessments in Rwanda. The Guidelines and procedures for EIA were issued in 2006 for development projects. The schedule of the notification has categorized the projects from environmental angles as per sectors. The roads/ highways have been kept in infrastructure and need environmental clearance prior to their implementation.

The present project is about reconstruction and modification/ expansion of feeder roads in Nyaruguru District, the Southern Province. Hence an EIA is required before construction of the project. The project is expected to impact a large number of people, therefore its social impacts have been more emphasized in the present report, making it an Environmental and Social Impact Assessment (ESIA).

With rapid strides in economic development, the need for rationalizing the development is imperative. In the process of development, there has been intensive use of natural resources; very often leading to ecological imbalance. In construction projects like this, involving wide ranging construction activity, conservation of flora and fauna is an important aspect of eco-development. The impacts of the project could be positive or negative. Both types of impacts have been studied and wherever possible, have been quantified. The potential impacts have been assessed in this chapter from the proposed development on environmental baseline conditions (refer to**Chapter 4**), while recommendations for environmental management and enhancement measures have been enumerated in **Chapter 7.** Both negative and positive impacts are categorized as direct or indirect.

6.2 IMPACT IDENTIFICATION

The potential environmental impacts depend on the location of the project and type and volume of the interventions due to proposed development. The project activities such as levelling, cutting, clearing of vegetation, felling the trees along the road, construction of culverts & bridges on rivers or swamps, setting up of labour camps, installation of con-

struction machinery and other related operations are bound to cause environmental impacts, either positive or negative. The impact to environment due to road project, can be minimized or avoided, if appropriate management measures are adopted during design, construction and operation phases. The identification of potential impacts is based on field inspection of existing road with due consideration of direct, indirect, cumulative, positive or negative and secondary impacts on environmental attributes. The impacts are presented for both positive and negative in nature for different phases of project cycle in the following sections.

6.3 POSITIVE IMPACTS

The positive impacts likely to result from the proposed project have been identified based on project description in Chapter 3 and the existing environmental conditions in Chapter 4. The current state of the road is challenging especially to the road users. Rehabilitation of Nyaruguru feeder road network will thus bring about many benefits. The identified positive impacts for different phases of the project cycle are discussed in the following sections.

6.3.1 Impact during Planning and Design phase

i) Employment opportunities

During the planning and design period, new jobs will be created for the skilled and unskilled manpower in the community to conduct topographical and geological investigations. A majority of unskilled labour will be sourced from the local residents. Indirect employment will be in the form of suppliers and other forms of sub-contracted works that will be required for planning and design of project components. Women and youth will also have an opportunity to secure employment.

ii) Skills transfer

The international consultant will associate with local partners. In the process of planning and design, the local technical manpower will work with the international experts. This process of working together will transfer design and planning tools, computer design software and other useful guideline which are used in similar topographical conditions in the world.

iii) Training

The international consultant will provide training to local counterparts for acquiring new skills likely to be necessary for the planning and design activities.

This training and trained manpower will go a long way in meeting the requirements of the country in the transport sector in general and the roads development in particular.

6.3.2 Impacts during Construction Phase

i) Employment Opportunities

The construction of feeder roads will use a labour-intensive approach. During the construction phase, it is estimated that about 500 people will be working as labour both skilled and unskilled. The majority of this labour will be unskilled, from which more than 400people will be sourced from the local residents and hence creating employment throughout the District. Indirect employment will be in the form of suppliers and other forms of sub-contracted works that will be required for the construction of project components.In addition new jobs will be created in the Government forthe implementation, monitoring and evaluation of the project. Women will also have an opportunity to secure employment.

ii) Enhancement of Rural Economy

As the construction works are spread throughout the District in rural areas, people in these areas will get an opportunity to work for the project. This will increase their income, therefore supporting the rural economy. Those who are involved in trade will have opportunities to supply construction materials for the project or the other items required for the work force working at site.

iii) Social Interaction

The National and International; local and regional manpower will be working together for the project. This interaction will enhance social interaction between the people from different places and social levels.

iv) Boost to Industrial Activities

During construction,locally made productswill be utilized such as cement and gravels. The consumption of these will give boost to industrial production of construction materials.

During construction, supply of construction materials, direct sale of household goods, consumables and foodstuffs to the workers will improve trade at local and regional levels in Rwanda. In addition, the transport sector will benefit from transport of materials from manufacturing site to construction site. This will provide direct and indirect employment.

v) Induced impacts of the project

Due to road construction activities, small businesses will be created/ enhanced. The selling of construction materials such as sand and stones will be developed in the project site. Other small businesses like mobile restaurants and pubs will be run to meet workers' food needs at work.

6.3.3 Impacts during Project Operation

i) Improved Transport System, Accessibility and Communication

It has been noted that the most of the roads in Nyaruguru District are presently in a such bad condition that they need rehabilitation to make them all-weather motorable. As a consequence to the poor road condition, investors in the transport industry have no incentive, hence the public transport system is underdeveloped and unreliable with only some buses plying the road at designated times in some sections of the road. Residents, therefore, have to use mostly the motocycles or seek other means of transport from unauthorized vehicles such as pick-ups and trucks. With the improvement of the road, transport will be improved both in terms of travel time, comfort, safety and lower costs associated with an increase in public service vehicles.

During operation, accessibility to the various public institutions and markets will be enhanced, in particular, accessibility to health centersand educational institutions. After rehabilitation and reconstruction of feeder road network, the condition of the road will improve and transportation of commodities to and from the project areas will become easy. This will contribute on long term basis for the socio-economic development of the project area. The improved road safety and reduction in road accidents as opposed to the current situation in which, accidents are quite rampant due to the rutty, rugged nature of the road, dust, ditches, mud and pools of water in rainy season etc. The feeder roads development will lead better and wider connection of the project area with the rest of the country, enhancing Nyaruguru District development in particular, and the whole country in general.

ii) Employment Opportunities

In the post construction phase, the project will provide social benefits in terms of direct employment by way of better commercial and industrial development of the area.Additionally, more people may be indirectly employed in allied activities and trade.

In the operation phase of the feeder roads project, more job opportunities will arise in various sectors such as the transport industry, the tourism sector, commerce and trade of agriculture products. Taken together, job creation will help to reduce the problem of unemployment with improvement in income for the workers' household and revenue for the country. Apart from additional employment opportunities in farming operations, access to nearby market, would also provide opportunity for marketing of farm products and farm inputs creating additional employment in the locality.

iii) Enhancement of Rural Economy (Agriculture and Trade)

The road will provide a stimulus growth to Nyaruguru District as well as improving trade with the other nearby Districts through faster transportation of agriculture products. The performance of this sector is likely to experience the greatest gain upon improvement of the road since majority of the population derive their livelihood from agriculture. The agriculture is expected to be the greatest beneficiary of the project. The poor road network was repeatedly cited as one of the major hindrances to the growth of the agriculture sector that accounts for 80 percent of employment in Rwanda. Road condition has led to low incomes for farmers and the subsequent inability of the District to increase the sector as required.

After rehabilitation and upgrading of the road, there is greater potential for the establishment of agro-processing plants to process the huge supply of agriculture produce. In the fieldwork survey, it was noted that a lot of agriculture products are sold in the city of Huye. Currently local farmers face a problem of market because of higher transportation costs. In addition, some of the agricultural goods like vegetables from the locality were of lower quality due to the longer transport time to markets.The market potential will be augmented by upgrading and rehabilitating access roads to city, thereby increasing incomes in agribusiness sector and raising the socio-economic status of local households. With the anticipated efficient, reliable and cheap transport, the following are likely to be achieved.

- Quick and easy transport of perishable farm produce such as vegetables and fruits to markets and livestock too on less price;
- Cheaper and available farm inputs and ease in provision of services to farmers;

- Easy access to bigger and better markets such as Kigali and in surrounding Districts, with a potential to export to the neighbouring Burundi;
- Improved marketing of agricultural products, thus higher prices.

It is likely that the farmers of most agricultural products in the area will improve depending on the commodity and the season. All the above impacts on this dominant sector will have indirect positive impacts on other sectors, especially trade and commerce, transportation, health and nutrition and education.

iv) Reduction in Length and Travel Time from Origin to Destination

The proposed feeder roads intersect with National Road 1 at number of places. On commissioning, the feeder roads, will improve connectivity between different places, provides faster access to Kigali resulting in reduction in vehicle expenses and travel time and facilitate the development of a new economic corridor.

v) Potential to Improve Drainage and its Environmental Benefits

The current drainage structures are mainly inadequate and / or in disrepair. Often the structures cannot accommodate high flows associated with flash floods in the wet seasons. In addition, soil depositions, debris and solid waste have also clogged several drainage structures where routine maintenance activity is inactive. The project will redesign, upgrade and reconstruct all these structures. The improved road drainage system and reconstruction of bridges will reduce erosion rate. On the roads embankments, the application of bioengineering measures in high erosion risk zone will reduce possible landslides from heavy rains.

vi) Skills Transfer and Training

Through local labour recruitment, the workers will have an opportunity to learn an array of skills that relate to road rehabilitation and reconstruction. These skills will be very important during regular maintenance that will be carried out during the project operation, and generally done by the local population. Improved transport will improve interaction with other communities outside the project area, that will also provide an opportunity for further learning and cultural exchange.

vii) Enhanced Social Interaction

The infrastructures for social services developed in the area are schools, health centres, water and energy. The expected rehabilitation/ upgrading of the feeder road will enhance access to existing social amenities and stimulate their growth as more people will be using them; ultimately adding to agricultural development. With the construction of feeder roads, the main artery for social interaction amongst towns and villages along the route shall be strengthened. The general quality of life along the route will be enhanced, spurring the District's development.

viii) Road Safety

The improvement of feeder roads will make travelling easy and safer, because theaccidents are quite rampant due to therutty, rugged nature of the feeder roads for the current situation. From the public consutlations, most of road accidents are caused by motocycles. Improved feeder roads will attract investments in public transport, therefore reducing the number of people using motocycles, thus improving road safety.

ix) Reduction in Green House Gases

During operation of improved feeder roads, the vehicles will operate closer to design speed which will help reduction of emission of hydrocarbons and carbon-monoxide from exhaust. Hence the emission reduction of carbon monoxide will decrease the green house gases at regional and global levels which will have positive impact locally and regionally.

x) Reduction in Fuel Consumption

The vehicles provide better fuel performance at optimum air to fuel ratio which is optimum around design speed. The feeder roads in Nyaruguru District are designed for 60 km per hour (maximum)[11] which is closer to design speed of vehicles. This will facilitate in less fuel consumption which will have less burden on exchequer and will be direct impact on country's economy.

xi) Promotion of tourism industry in the area

Nyungwe national park and the Kibeho Holy land are important areas found in Nyaruguru District for tourism industry.Nyungwe is neighbouring the project sites while Kibeho is located within the project site.

[11] Feasibility Study report

Nyungwe is a national park known for its vast and rich biodiversity, especially plant diversity while Kibeho is a sacred site, known for having hosted appearances of the Virgin Mary in 1980s.

Thousands of Christians from different corners of the country and abroad are visiting the area for religious pilgrimage. The development of road network in the district will facilitate access to both the holy land and national park, therefore promoting tourism industry in the area.

xii) Induced impacts of the project

The indicative feeder roads are passing through grouped settlements and small trading centers, poorly developed due to poor road conditions. It is expected to have new and improved constructions erected for business purposes. This will acquire agricultural land and convert it into urban settings.

6.4 NEGATIVE IMPACTS

Leopold matrix has been used to show possible interaction between developmental activities and a set of environmental characteristics. On top on X-axis, project cycle activities are considered; while on Y-axis, Valued Ecosystem Components (VEC) are taken to identify the impacts, through interaction method. The boxes are marked with possible impact during different phases of the project cycle. Impacts on environmental component due to project activities are summarized in **Table 31** and discussed in subsequent sections.

Table 31: Impact Matrix for Potential Environmental Impacts

Component Affected	Project Activity								
	Planning Phase	Construction Phase							Operation Phase
	Land Acquisition	Site clearance	Removing trees and vegetation	Contractor camps	Vehicles & Machines operation and maintenance	Quarries	Construction/modification of Roads	Construction Machinery	Operation
Soil	Loss of Agricultural land	Loss of crops, trees and other vegetation	Erosion and loss of top soil	Contamination from wastes	Contamination by fuel and lubricants; Compaction of soil	Increase in erosion, siltation and slope instability	Soil pollution	Pollution due to spills	Soil contamination due to surface runoff
Ground Water			Increased evaporation	Water extraction for drinking and other purposes	Water extraction for cleaning		Exploitation of water for construction		Maintenance of trees /shrubs
Surface water	Loss of water body	Change in water quality and siltation	Siltation Torrent run-off	Pollution from sanitary & other wastes	Contamination by fuel & lubricants	Water logging and mosquito breeding	Change in water quality and reduction of Ground Water recharge	Pollution due to spill into water bodies	Degradation due to spills & road runoff
Drainage		Change in natural drainage pattern	Change in natural drainage pattern	Change in drainage pattern due to disposal of solid wastes on soils	Change in natural drainage pattern due to spills	Change in drainage pattern	Interference with natural drainage and water logging		Cleaning & maintenance
Air Quality		Increase in	Reduced	Pollution due to	Dust & air pol-	Dust pollu-	Dust pollution	SPM, SO_2	Increase in

Component Affected	**Project Activity**								
	Planning Phase	**Construction Phase**							**Operation Phase**
	Land Acquisition	**Site clearance**	**Removing trees and vegetation**	**Contractor camps**	**Vehicles & Machines operation and maintenance**	**Quarries**	**Construction/modification of Roads**	**Construction Machinery**	**Operation**
		SPM	buffering of air pollution, change in climatic conditions	fuel burning	lution	tion			SPM, SO_2 and NO_X
Noise Quality		Increase in Noise level	Reduced buffering of Noise		Increase in Noise level	Vibration from blasting operations	Vibrators, mixing plant noise etc.	Increase in Noise	Increase in noise levels due to increased traffic.
Flora & Fauna		Loss of crops, trees and migration of wildlife	Loss of crops, trees and disturbance to wildlife	Cutting of trees for fuel burning			Loss of trees, crops and Disturbance of Wildlife		Collision with Wildlife
		increased potential for extraction of wildlife, timber and non-timber products	increased potential for extraction of wildlife, timber, and non-timber products	Tree cutting for firewood, dumping of waste within the park					increased potential for extraction of wildlife, timber, and non-timber products

Component Affected	**Project Activity**								
	Planning Phase	**Construction Phase**							**Operation Phase**
	Land Acquisition	**Site clearance**	**Removing trees and vegetation**	**Contractor camps**	**Vehicles & Machines operation and maintenance**	**Quarries**	**Construction/modification of Roads**	**Construction Machinery**	**Operation**
Socio-economic	Rehabilitation and Resettlement	Loss of Livelihood	Loss of forest and fruit trees	Transmission of Disease					
	Occupational health and safety	Possible child labour, gender based violence, gender unequity	Possible child labour, gender based violence, gender unequity						
									Increased potential for accidents from increased speeds
									Dangers to pedestrians if sidewalks lack

6.4.1 Impact during Planning Phase

i) Change of Land Use Pattern

The road development in the study area will definitely bring substantial change in the land use pattern as the road improvement/ construction will require additional land. It is estimated that on an average 10.5 m widening will require **95.61** ha land for the feeder roads improvement. The analysis of data has also indicated that about 80% of land on road side is under agriculture. Hence around 76 ha will be under agriculture. The land use change is presented in **Table 32.**

The land requirement for the road construction will change the land use permanently from agricultural/ built up land into road corridor. Though 95.61 ha would be required for widening the feeder road to 10.5 m RoW, only 10.09 ha will be permanently and irreversiblylost for the paved roads. The 10.09 ha land use change will be permanent and irreversible.

Table 32: Land Use Change

Feeder road No	Description	Average existing road width (m)*	Required road width (m)*	Required RoW width (m)*	Average additional for 6m road width (m)	Average additional width for the RoW (m)	Length (km)*	Additional area-acquired for the 6m width (ha)	Additional area-acquired for the RoW (ha)
FR1	Ndago- Cyahinda- Nyagisozi- Ngoma	6.10	6	10.5	-	4.40	20.100	0.00	8.84
FR2	Kibeho- Mata- Ruramba	6.50	6	10.5	-	4.00	17.800	0.00	7.12
FR3	Munini- Kanama- Gatunda- Remera	6.10	6	10.5	-	4.40	17.820	0.00	7.84
FR4	Giswi- Rugogwe- Kabere- Nshili Tea Factory- Kabere (Ruheru)	5.70	6	10.5	0.30	4.80	21.300	0.64	10.22
FR5	Muganza- Buruhukiro- Rubumburi- Rugerero- RDB Nyungwe	4.90	6	10.5	1.10	5.60	29.130	3.20	16.31
FR6	Rukore- Bigugu- Nyabimata	4.90	6	10.5	1.10	5.60	13.495	1.48	7.56
FR7	Ryabidandi- Viro- Akanyaru- Giswi	5.90	6	10.5	0.10	4.60	10.490	0.10	4.83
FR8	Sheke- Akanyaru- Cyahinda	5.90	6	10.5	0.10	4.60	8.560	0.09	3.94
FR9	Cyahinda- Rusenge	5.70	6	10.5	0.30	4.80	13.600	0.41	6.53
FR10	Huye- Rusenge- Ngera- Nyagisozi	5.90	6	10.5	0.10	4.60	11.300	0.11	5.20
FR11	Ruyenzi- Uwimbogo- Remera	3.40	6	10.5	2.60	7.10	14.960	3.89	10.62
FR13	Ndago- Akavuguto- Rusenge	5.70	6	10.5	0.30	4.80	5.205	0.16	2.50
FR14	Runyombyi (Ryagwiza)- Nteko- Kira-	6.70	6	10.5	-	3.80	10.800	0.00	4.10

	rangombe- Nkanda								
	Total				**0.52**	**4.91**	**194.560**	**10.09**	**95.61**

Source: Consultant's computation and (*) Feasibility report

6.4.2 Impact during Construction Phase

i) Change of Land Use due to Borrow/ Quarry Areasand road widening

About 250,000 m^3 of earth work is likely to be involved in up-gradation/ widening of feeder roads from excavation in rock and earth from borrow areas for wearing course and capping layer. Out of this, about 210,000 m^3 will be from borrow areas. The excavations of earth from rock in mining areas and borrow areas will require cutting of the rock and soils. If a depth of 4 m is taken for quarry/ mining, the land required will be 0.91 ha and for average depth of 2 m for borrow areas, the land required will be about 10.51 ha. The total area required for borrow areas will be about **11.5ha**, including 2.2 ha of public land and 8.3 ha of private land.

The borrow areas have been identified in the vicinity of the proposed roads to minimize/avoid additional transport costs. Twelve (12) burrow pits were identified as potential sites for the source of construction materials.The quarry areas are outside the project site/ROW and have not yet identified. This identification will be done prior to construction and will be covered by the construction ESMP to be prepared and submitted by the contractor to the SPIU.The following table illustrates the proposed borrow pits in Nyaruguru District feeder roads.

Table 33: Borrow pits areas in Nyaruguru District feeder roads

Label	Feeder Roads ID	Administrative location			Thickness (m)	Area (Ha)
		Sector	Cell	Village		
NRBP1	FR1, FR10	Ngoma	Kayonza	Gacumbi	6	0.3
NRBP2	FR2, FR1, FR13	Mata	Nyamabuye	Nyacyondo	3	0.7
NRBP3	FR3, FR4, FR5, FR13	Munini	Ntwali	Kabirizi	20	0.6
NRBP4*		Ngera	Nyanza	Kibingo	4	1
NRBP5	FR1, FR3, FR7,FR8, FR9, FR14	Cyahinda	Muhambara	Byanone	6	1.3
NRBP6	FR2	Ruramba	Nyarugano	Uruyanjye	15	2.0
NRBP7	FR5	Kivu	Rugerero	Rugerero	2	0.8
NRBP8	FR3, FR4, FR6, FR11	Busanze	Shororo	Runyami	20	1.4
NRBP9*		Ruramba	Ruramba	Ruramba	2	0.8
NRBP10	FR1, FR2, FR13	Mata	Nyamabuye	Nyacyondo	4	0.1

NRBP11	FR1, FR3, FR4, FR5, FR13	Munini	Ntwali	Ntwali	10	1.5
NRBP12	FR1, FR9, FR10, FR13	Rusenge	Bunge	Toraniro	4	1.0

Source: Feasibility study of indicative feeder roads in 5 Districts by Sheladia, June, 2016

*: Located at above 10 km distance from the indicative feeder roads

The excavated borrow pitsand stones quarries are required to be restored and reclaimed in a satisfactory manner on completion of burrow and quarry operations.Excavation of earth from borrow areas and stones from quarry areas may lead to undrained pits that create additional habitats for water borne disease vectors and possible safety issues for people and livestock (drowning in deep/steep pits). It may also lead to loss of topsoil and soil erosion problem during rains; affecting otherwise productive farm land and degrading the aesthetic views of the landcape.Most of the above impacts are of short duration and could be managed by the management plans. The proper management of borrow and quarry areas will be implemented during construction phase.This impact is a temporary and reversible change in land use pattern.

The pits reclaimation should be done in a way it leaves the site in a safe, stable, and non-polluting condition with no remaining plant, soils or stones unnecessary for post-operational use, prevents the establishment of stagnant water, erosion and supports vegetationgrowth over the long-term.After excavations, the surplus of excavated soils from roads, topsoil from land acquired for road widening as well as topsoil from burrow areas will be spread over the borrow pits to fill them. The organic materials will also be applied to improve the soil fertilityof the rehabilitated borrow areas, especially those under croplands, before handing them over to their respective owners and used for crop production. Trees or grasses will be planted after rehabilitation of borrow pits located in forest land or abandoned land. With regards to stone quarry sites, their closure and restauration should be done through reshaping the quarry pits, backfilling the pits using topsoils from within or outside the site and revegetating the areas. The use of indigenous trees species will be encouraged.

About 10.09 ha of area will be stripped for cleaning of road surface for the project work. Excavated earth material estimated at 1,500,000 m^3will be reused in the road construction or will be used to fill the low laying areas or fill borrow pits/ quarry areas, hence its disposal is not likely to have impact on the environment. However, this soil material

should never be disposed of into the wetlands. The acquired land for road widening will be permanently lost since it will be an integral part of the carriageway. This impact is permanent and irreversible. Compensatory measures will be planned for.

ii) Soil Loss

The soil loss will be in terms of soil erosion from the road corridor, borrow pits, quarries, and storage of material areas. In the areas of the District where the slopes are over 25%, the project may cause high risks of erosion and slope stability, which is in turn relevant to the design of the project and the conduct of operations such as excavation and drilling.**Figure 9** below shows that Nyaruguru District is among the country's high risk zones with respect to erosion caused by steep slopes. The soil erosion is likely to take place due to up-gradation and widening of project roads.

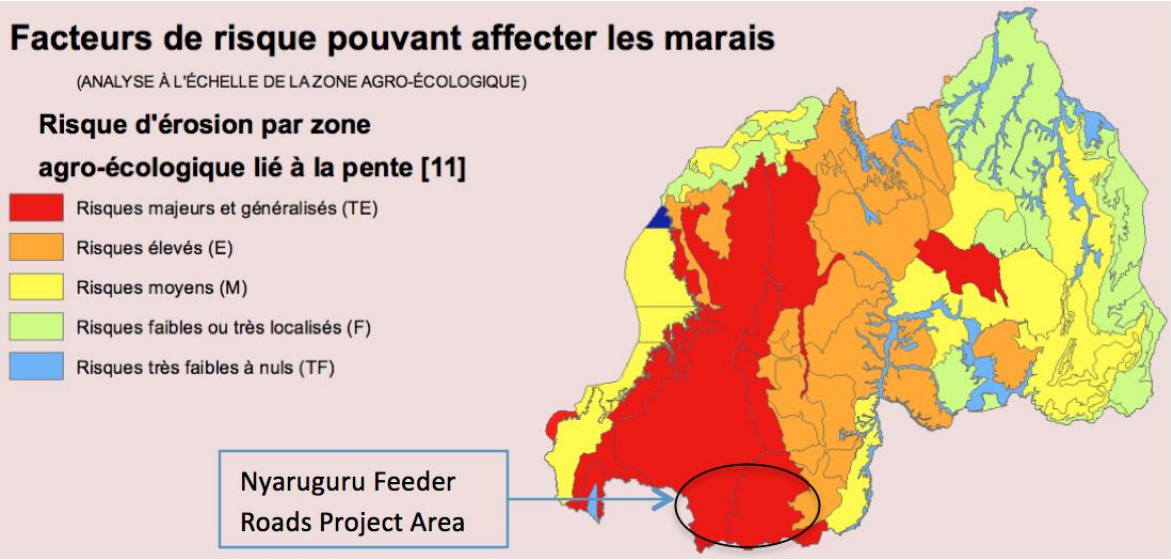

Figure 9: Map showing different erosion risk zones in Rwanda

The map is highlighted in different colors with the following meaning:

Red: *very high erosion risk zones*

Orange: *high erosion risk zones*

Yellow: *medium erosion risk zones*

Green: *low or localised erosion risk zones*

Blue: *very low or non erosion risk zones.*

Throughout the road rehabilitation works, heaps of soils could be washed away by rains causing damages downstream, including properties (crops, trees, houses, land, etc), loss of land productivity, pollution of receiving water bodies, etc. This is likely to happen during rainy season and is of short term duration and will be reversible.During the construction of Nyaruguru feeder roads, extra care should be taken while constructing roads crossing wetlands which might already be eroded; by avoiding the disposal of soil and/or other constructions materials into the wetlands.

The construction works during the great wet season (mid-March to mid-May) are likely to be stopped to prevent or minimize soil erosion. Any area that has topsoil and vegetation removed need to have measures in place prior to the rainy season to avoid erosion and siltation of wetlands and streams.In addition, heaps of soils can be properly disposed of before the coming of heavy rains and dumped into the borrow/ quarry areas for their backfilling.Around 15,127 m^3 of the topsoil from all areas shall be stripped to a specified depth of 150 mm and preserved properly. This top soil will be around77.75 m^3 per km. The stored topsoil will be utilized for the restoration of borrow areas and top dressing of the road embankments.

During the construction, embankment/slopes along sections of the indicative feeder roads might be prone to the soil erosion. Such embankments and slopes will need to be stabilized with grasses and engineering measures as soon as construction is over.Grasses on embankments and trees along the rehabilitated roads will be planted for erosion control.

iii) Soil Pollution

The soil pollution is likely to be caused by theinadequate disposal of waste material on the open ground. The waste likely to fall on the ground may be solid waste/ liquid waste from labour camps or spillage of oil and grease by construction machinery and equipments, especially during their maintenance. The impacts are of short duration and will be reversible with a proper management.

Appropriate waste disposal methods have to be adopted. Construction machinery and project vehicles should be maintained only in service stations and approved areas. Proper care should be taken while locating the above utilities/ facilities so as to minimize the soil pollution. A proper waste management system should be established.

In this regards, dustbins for collection of domestic wastes at the camp or construction site should be provided. The collected wastes should be disposed of in landfills approved by the District.

Construction materials will be required for the construction of road pavement, bridges and culverts, road side drains etc.

About 10-15% of the construction material is left behind by the contractor as construction waste/ spoils. The material required for construction is summarized in **Table 8** and reproduced in **Table 34** which may need disposal.

Table 34: Construction Spoils Need Disposal after Construction

S.No	Material	Construction Material (m^3)	Construction Spoils (m^3)
1	Concrete	25,201	2,502
2	Stone Masonry	32,134	3,213
3	Stone Riprap	4,223	422

Source: Consultant's computation based on feasibility report

Dumping of construction waste/ spoil in haphazard manner may cause surface and ground water pollution near the construction sites and breeding site for mosquitoes, hence, it is proposed to clean the area and dump/dispose the construction spoils at the dumping site specified by the local authority to avoid any adverse impact on health and well-being of people.

iv) Disruption in Drainage Pattern

The roads that intersect drainage basins generally modify the natural flow of surface water by concentrating the flow to certain points and increasing the velocity of flow. Depending upon the flow, these changes can contribute to flooding, soil erosion, channel modification, siltation of streams, properties damages, conflict over project beneficiaries, etc. These effects are often felt well beyond the immediate vicinity of the road. Proper cross drainage works on the alignments will be required. There is a number of major bridges, causeways and many culverts that will also need improvement. Critical points that need to be considered mostly include wetlands or water courses receiving the drainage, steep embankment slopes, road section where the drainage crosses the road, etc. Drainage pattern should well designed and constructed to channel water from road sides to appropriate outlets.

v) Water Pollution

Surface water bodies such as rivers, streams and wetlands are located within the project area. The indicative feeder roads are crossing a good number of water courses and wetlands. It is predicted that soils from roads and borrow / quarry areas especially during rainy season may be washed away and dumped into receiving water bodies or wetlands. This will ultimately impact the water quality of the surface water. Contamination of water bodies may also come from spilling of construction materials, oils and greases and paints during transportation and at the equipment yards.

But the quantity of such spills will be negligible. Construction of bridges/ culverts may also create water pollution and increase turbidity during construction phase. The short-term increase in runoff laden with sediment and nutrients may also occur due to the removal of trees, vegetative cover and top soil. The suspended sediments and the associated pollutants may get washed into these water bodies, leading to change in water quality.

Care however, needs to be taken to provide adequate sanitary facilities and drainage in the temporary colonies of the construction workers. The provision of adequate washing and mobile toilet facilities with septic tanks and appropriate refuse collection and disposal system should be made obligatory. The construction of checkdams or silt trap structures before discharging runoff water from roads into receiving water bodies (river, stream, etc) to minimize sediments loads.

vi) Increased road embankments' landslides

Many of the indicative feeder roads in Nyaruguru District traverse hilly areas and landslides are frequently observed in the area. The FR11 and FR13 are the only roads that are less prone to landslide. The identification of critical and highly unstable slopes was made and the cumulative total section length of 8.08 km from all indicative roads, except FR11 and FR13, was found to necessitate provision of soil retaining structures.The table below indicates the road length needing construction of stone masonry.

Table 35: Proposed Length of retaining walls

Feeder road No	Feeder Roads Name	Length (km)*	Length of retaining wall (km)
FR1	Ndago- Cyahinda- Nyagisozi- Ngoma	20.100	1.5
FR2	Kibeho- Mata- Ruramba	17.800	0.25

FR3	Munini- Kanama- Gatunda- Remera	17.820	1.0
FR4	Giswi- Rugogwe- Kabere- Nshili Tea Factory- Kabere (Ruheru)	21.300	1.5
FR5	Muganza- Buruhukiro- Rubumburi- Rugerero- RDB Nyungwe	29.130	0.5
FR6	Rukore- Bigugu- Nyabimata	13.495	1.0
FR7	Ryabidandi- Viro- Akanyaru- Giswi	10.490	0.03
FR8	Sheke- Akanyaru- Cyahinda	8.560	0.5
FR9	Cyahinda- Rusenge	13.600	0.3
FR10	Huye- Rusenge- Ngera- Nyagisozi	11.300	0.75
FR11	Ruyenzi- Uwimbogo- Remera	14.960	0.0
FR13	Ndago- Akavuguto- Rusenge	5.205	0.0
FR14	Runyombyi (Ryagwiza)- Nteko- Kirarangombe- Nkanda	10.800	**0.75**
	Total	**194.560**	**8.08**

Source: Feasibility study of indicative feeder roads in 5 Districts by Sheladia, June, 2016

Sliding of roads' embankments isexpected to increase during construction works in the rainy period, causing road closure, damages to properties downstream. etc.Therefore, the construction works should be done during dry periods or low intensity rainfall.The protection of 8.08 km of critical embankments slopes with stone masonary (see table 35 above) as well as stabilization of the remaining embankments slopes with grasses will be done soon after construction.In addition, the ditches in the upstream of the slopes with high landslide risks will be constructed to control runoff water causing embankment landsliding. Tree plantation programs should be combined with engineering measures to control erosion, especially under zones with critical slopes. The area proposed for tree planting is equal to 242 ha.

vii) Increased Water Demand

The water requirement will be increased during construction phase for both road construction and workers needs. About 500 people are estimated during peak period. The peak demand is estimated at about 35 KL/day. Water sources and quality, including surface water, is likely to be impacted due to road construction activities such as setting up of workers camp, transportation and storage of construction material. However, no conflict over water resources since the hydrologic network of the project area is very dense.

viii) Health and Safety

Health risks include disease hazards due to lack of sanitation facilities (water supply and human waste disposal) to the workers during construction both at construction site and at the contractor's camp. Unscientific disposal of waste from contractor's camp can lead to contamination of both ground and surface water. This could lead to outbreak of water borne diseases such as diarrhoea, dysentery, typhoid, etc. The solid waste generated in contractor's camp if not treated properly may cause leaching and environmental pollution.

The project will employ enough labour force for its timely completion. Communicable diseases like tuberculosis, malaria, etc. are therefore likely to be disseminated especially during peak demand for manpower. Different types of accidents at the site (injuries caused by handling of construction equipments, spills and leakage of hazardous materials, injuries from stepping on or using sharp objects, fires, accidents by vehicles, motocycles and bicycles, etc) are likely to increase due to rise in manpower and traffic.

Child labour, prostitutions or sexual offences, gender imbalance are also predicted due to increased employment opportunities. The impact will be of short duration and reversible, but can be of a high magnitude if not well managed.

Management measures including proper sanitation, waste disposal facilities, awaireness campaigns for the prevention of AIDS/HIV, sexually transmitted diseases and other communicable diseases, sensitization for health insurance will be needed at the project site. The provision of protective equipments to workers (helmets, boots, masks, etc) will also compulsery. The reinforcement of laws on child labour, sexual harassment/ prostitutions and gender equity should be done.

ix) Air Pollution

The impact of road transport on air environment is a factor of type of vehicle, fuel used and its capacity. The consultant has taken emission factor to estimate the pollution potential on air environment during construction and operation phases. It is also assumed that the quarry and borrow site will be closer to the road under construction to save on fuel and emission load on environment. During calculation density of soil and rock is taken as 1800 kg/m^3 and 2400 kg/m^3 respectively. The vehicle emission factors are summarized in Table below.

Table 36: Vehicles Emission Factors

Vehicle Type	Emission Factor (gm/km)				
	CO	HC	NOx	CO2	PM
Moped	0.81	0.5	0,29	20.1	0.01
Motor cycle	3.12	0.78	0.23	22.42	0.01
Passenger Car (Diesel)	0.06	0.08	0.28	148.8	0.015
Passenger Car (Petrol)	0.84	0.12	0.09	172.9	0.002
LCV	3.66	1.35	2.12	401.2	0.47
Trucks	6.0	0.37	9.30	762.4	1.24
Bus	3.2	-	11.0	-	-

Source: Emission Factor in Developing Countries (India) for vehicle Manufactured after 2000.

Although, in the construction phase, air quality impacts are of short duration, but it does not mean that these should not be considered. Consumption of diesel during construction activities will be the principal cause of incremental air pollution. Diesel powered trucks required for the haulage of earth and other construction materials and running of construction machinery at the construction yards are the major sources of air pollution.

The construction materials required for the project are about 40,000 m^3 of rock, 210,000 m^3 of earth and 25,000 m^3 of other construction materials. These have to be transported to site and will increase the traffic volume due to the material haulage and other construction activities during the period of major material transport. The dust emission, especially during dry seasons, will also increased due to intense traffic movement at the site. The air quality due to the movement of trucks will be impacted. The likely impact on air environment is presented in **Table 37.** The pollutants emitted during construction period of 12 months are estimated at 31 tons other than carbon-dioxide**.** The emission due to transportation of material will be spread into the atmosphere all over the road site vicinity. Due to high windturbulence in the atmosphere, rainfall, wide spread area and dispersion; the increase in ambient quality of any pollutant is estimated to be less than 1 µg/m^3 which is not significant.

Table 37: Emission during Construction (12 months)

S/No	Pollutant	Unit	Value Due to Transportation of				Total (Tons)
			Earth	Rock	Other Material	Passenger	
1	CO	Tons	5.04	2.88	3.00	0.02	10.94
2	HC	Tons	0.31	0.18	0.19	0.03	0.70
3	NOx	Tons	7.81	4.46	4.65	0.10	17.03

4	CO2	Tons	640.42	365.95	381.20	54.31	1,442
5	PM	Tons	1.04	0.60	0.62	0.01	2.26

Source: Consultant's computation based on emission factors

In order to provide an estimate of emissions of air pollutants at the construction yard, fuel consumption rates for major construction machinery were estimated.

The data on fuel utilization rates of the units expected to be in operation during the road construction are provided in **Table 38**.

During the period of maximum construction activity the fuel consumption at the construction yard is expected to be about 135 litre of diesel per hour.

Table 38: Fuel Consumption Rates for Construction Machinery

S. No.	Machines	Fuel Consumption (litre/h)
1	Cement Concrete Mixer	7
2	Generator	30
3	Bulldozer	20
4	Graders	12
5	Rollers	20
6	Excavators	20
7	Dumpers & Tippers	18
8	Water Tanker	8

Source: Based on Manufacturers Information

In a bid to reduce the effects of dust and exhaust fumes emission, it is proposed that the following measures are implemented:

- The contractor is required to use equipment and automobiles that have certification of good working conditions from "National Automobile inspection centre" to avoid exhaust fumes since automobiles in good condition will pollute less.
- FRDP project coordination on site and District will ensure that contractors will be doing routine maintenance, repair of trucks and machines. This would reduce on the exhaust fumes from the machines.
- The Contractor will spray water regularly (at least twice a day but more frequently in areas close to settlements) when clearing land and compacting roads to reduce the dust.

x) Noise Levels

The magnitude of impact during the construction phase will depend upon the types of the equipments used, the construction methods employed and the scheduling of the work. Noise associated with road development affects the environment through which road passes and has four main sources: a) vehicles; b) friction between vehicles and the road surface; c) driver behavior; and d) construction and maintenance activity.

Vehicle noise comes from the engine, transmission, exhaust, and suspension, and is greatest during acceleration, on upgrades, during engine braking, on rough roads, and in stop-and-go traffic conditions. Poor vehicle maintenance is a contributing factor to this noise source. Frictional noise from the contact between tires and pavement contributes significantly to overall traffic noise. The level depends on the type and condition of tires and pavement. Frictional noise is generally greatest at high speed and during quick braking. Drivers contribute to road noise by using their vehicles' horns, by playing loud music, and sudden braking or acceleration. Road construction and maintenance generally require the use of heavy machinery, and although these activities may be intermittent and localized, they nevertheless contribute sustained noise during equipment operation.

Construction activities are expected to produce noise levels in the range of 80-85 dB(A) at 15 m distance, which will decrease with increase in distance. Noise due to construction machinery is predicted as presented in **Table 39.** The noise levels will be with a limit of 55-65 dB(A) at a distance of 100-125 m from construction site.The expected noise levels due to operation of construction machinery at site are summarized in **Table 40**. The noise levels will decrease with distance.

Table 39: Noise Due to Construction Machinery

S. No.	Machine	Operation	Noise In dB(A)
1.	Dump Truck	Haul	83
2.	Compactor	Fill	81
3.	Dozer	Fill	85
4.	Excavation by Shovel	Cut	87
5.	Excavation by Caterpillar	Cut	87

Source: Consultant's own survey from other projects

Table 40: Noise Levels During Construction, dB (A)

Source	Dump Truck	Compactor	Dozer	Excavation by Shovel	Excavation by caterpillar
Noise Level dB(A)	83	81	85	87	87
Source Distance (m)	15	15	15	15	15
Noise Levels at Distance (m) from source					
20	78.5	76.5	80.5	82.5	82.5
25	76.1	74.1	78.1	80.1	80.1
30	74.0	72.0	76.0	78.0	78.0
35	72.1	70.1	74.1	76.1	76.1
40	70.5	68.5	72.5	74.5	74.5
45	69.0	67.0	71.0	73.0	73.0
50	67.5	65.5	69.5	71.5	71.5
55	66.2	64.2	68.2	70.2	70.2
60	65.0	63.0	67.0	69.0	69.0
75	61.5	59.5	63.5	65.5	65.5
100	56.5	54.5	58.5	60.5	60.5
125	54.6	52.6	56.6	58.6	58.6
150	53.0	51.0	55.0	57.0	57.0
175	51.7	49.7	53.7	55.7	55.7
200	50.5	48.5	52.5	54.5	54.5
225	49.5	47.5	51.5	53.5	53.5
250	48.6	46.6	50.6	52.6	52.6

Source: Consultant Measured at Source and Computed at Distances

The following measures can be suggested to minimize noise levels:

- Activities that create a lot of noise or irritations, such as; vibrations, heavy equipment moving earth, excavations, shall be restricted to normal working hours (7h00-17h00) to prevent noise for neighbours at night ;
- The contractor is required to use equipment and automobiles that have certification of good working conditions from “National Automobile inspection centre” to avoid noise.

xi) Loss of biodiversity

The FR5 and FR6 are passing through the buffer zone of the Nyungwe national park on 10 and 1.08 km distances, respectively.

The widening of the 10 km and 1.08 km road section to 6m carriageway width is likely to cause serious environmental impacts (loss of trees and other vegetation, erosion, etc).
The risks of introduction of invasive species into the forestthrough construction machines or labour force is high. In order to minimize adverse impacts on the park, the following is suggested:

(i) the road construction activity along the forest section should be limited within the existing carriage way(ie no road widening in that section);
(ii) the tree cutting, grass removal, wildlife poaching or introduction of new species, whether invasive or not, in the area should be avoided;
(iii) Proper management system of waste (construction wastes, domestic waste, etc) should be established to avoid their dumping in the area;
(iv) the field guide of the park shouldfully be involved in the management of that forest section.
(v) Awareness campaigns and enforcement of a worker's code of conduct for the protection of biodicersity,
(vi) Posting signposts especially in the protected zone, etc.

The total number of 156 forest trees (of more than 30cm of girth size) fall within the road corridor during project construction and are likely to be affected.Different types of vegetation plants, crops and agroforestry trees inclusive, will also be affected. This will lead to loss of habitat for birds. The tree planting programme after road construction in the project areas is planned to replace species that are likely to be affected. *Alnus spp, Grevillea spp, Pinus spp, Eucalyptus*, etc are some the species that can be used in the region.

None of the endangered plant or animal species will be affected by the project. The trees which will need to be cut can be easily reproduced and replanted in other spaces after the project is over.

xii) Road congestion or closure

Some road sections might be congested during construction as a result of construction works. Some other road sections may even experience total closure for a limited time because of the nature of undertaken works. This will create difficulties for the road users as they may need to take longer routes, therefore causing more costly and time consuming travels.

The application of traffic management measures and the preparation of alternative roads in case of road closure will minimize the road congestion in the project areas. The road closure or congestion may also cause inaccessibility to water by cattle as some of the roads are passing through pastures. The pathways for cattle should be planned for to avoid depriving cows of water.

xiii) Encroachment to physical cultural resources

The feeder roads FR2 and FR14 passes close to the Kibeho square and Nkanda memorial site respectively. Kibeho became a sacred site after hosting appearances of the Virgin Mary in 1980s and is currently visited by thousands of people, Christians and non Christians taken together, both for religious pilgrimage and tourism purposes. The widening of the road FR2 may acquire land from Kibeho square. Though Nkanda memorial site is outside of the RoW of FR 14 but it is not far and also needs to be protected.

In order to avoid affecting the sacred and memorial site by the road widening activities, (i) the road construction activity along the protected resources sections should be limited to the existing road width (ie no road widening in that section), and (ii) the physical cultural resources management plan (PCRMP) should be developed on both roads before the implemention of the activity. Roads designs should also take care of the proposed management plan. (iii) The Project should not damage any of both physical cultural heritage. However, the civil works will not start until the revised and updated ESIA(including a PCRMP acceptable to the Association) and final RAP have been submitted to the Bank, cleared, and disclosed and compensation paid.

The PCRMPshall comply with the national andinternational cultural heritage regulations (world bank policy on physical cultural resources),consult the local community and other key stakeholders on the proposed project. In case any unpredicted adverse impact occurs, the Project will immediately assess the nature and extent of the impacts, revise the ESMP to incorporate the proposed mitigation measures, avail required budget and implement additional programs, as appropriate, to avoid the impact, promote and enhance the conservation purpose of the protected cultural resources.

xiv) Encroachment into the Nature Reserves and Wildlife

The Nyungwe National Park is one of the protected natural habitat in Nyaruguru District. The feeder roads FR5and FR6 pass through the buffer zone of the Park on 10 km and 1.08 km respectively.

It is worthy to note that the forest buffer zone is also part of the protected area. The main environmental impactsare expected to occur on sections passing through the forest.

The road section passing through the forest should not be expanded. In addition, the existing law on the conservation of protected areas, buffer zone inclusive, should be reinforced. The tree cutting or waste dumping into the protected area should be avoided. A safe drainage system should also be set to control wetlands floodings or forest environment by roadside runoff water.The FR5 and FR6 forest sections are the critical areas for collisions with wildlife and speed reducing mechanisms including speed bumps, warning signposts and rumble strips and wildlife passes should be placed. Support for local environmental education and wildlife organizations can also be considered in the ESMP. Restoration activities should not include potentially invasive species of trees and grasses with a preference for native species as possible. The wetlands crossed by indicative feeder roads were all converted into agriculture.

xv) Wildlife accidents and passes

The Nyungwe forest accommodates a good number of wildlife, especially primates (mostly Monkeys, baboons and chimpanzees). However, these animals are not many in the forest buffer zone of the park. It is expected that the wildlife – vehicle collisions might increase in the forest sections of FR5 and FR6.

Though the number of primates in the buffer zone section is limited, road works are likely to present a danger to human safety, property damage as well as primates, living or passing in the RoW of the sections passing through the forest. The cutting of trees might also lead to destruction of nests and birds.

Enforcing speed reducing mechanisms (including limiting the vehicle speed to 20 km/hr maximum, placing speed bumps, rumble strips, etc), avoiding to blow horns in the forest section, establishing wildlife passes, an animal detection system within the project area, organizing awaireness campaigns for drivers and workers on the protection of wildlife, posting warning signposts, awaireness campaigns to drivers/ motocyclists/ bicyclists and pedestrians for pedestrians safety, support for local environmental education and wildlife organizations, etc are some of the mitigation measures.

xvi) Displacement of PAPs

The rehabilitation and upgrading of indicative feeders to 10.5 m width of road corridor is likely to affect people's assets and displacement. About 1980 families formed of 9,108 people are living or having properties within the 10.5 m road corridor.

It was found that the road widening is likely to cause the relocation of 178 houses and acquire 95.61 ha of land,including 10.09 ha likely to be permanently lost for road carriageway.

The land acquired for road widening is presented in Table 32 while details on PAPs will be presented in a standalone Resettlement Action Plan (RAP) for Nyaruguru feeder roads, currently under preparation. The compensation for affected communities accompagnied with a livelihood restoration program for relocated PAPs are among the mitigation measures.

xvii) Loss of water points

There are seven (7) public water taps that are likely to be affected by road construction activities, causing temporary inaccessibility and loss of drinking water to users.
The replacement and/or relocation of existing water points as well as construction of new water points, where needed, will be required to satisfy the water needs of the affected communities.

6.4.3 Impact during Operation Phase

i) Air Pollution

The extent of air pollution will depend upon i) the rate of vehicular emission and ii) the prevailing meteorological conditions.
The traffic data for the year 2016are available in Chapter 3 (Refer **Table 5**). The emission factors for vehicles have been used to estimate the ground level concentration near the feeder roads.

The available litterature has been used to predict the carbon monoxide and nitrogen oxides.There are assumptions that the increase in pollutants concentration will not be significant in the nex ten years. Air quality is likely to improve in the initial years after commissioning because of saving of fuel in the vehicular traffic riding on smooth and improved roads with much less interruption. But dust emissions are likely to increase during dry periods.

ii) Noise Levels

During the operation phase of the road, movement of heavy and light vehicles is expected to give rise to higher ambient noise levels. In order to quantify the project induced noise impacts with respect to existing noise levels, noise monitoring was carried out. It was observed that during the day time the noise levels at all the monitoring locations vary between 40 to 60 dB(A).

Assessment of noise impacts due to the project have been carried out using Highway Noise Model based on the guidelines suggested by Federal Highway Administration (FHWA). The details of the model and the model commutations are described below:

$$L(eq)(hi) = L(OE,i) + \left(\frac{10log}{S(i)T}\right)N(i) + \left(\frac{10log}{D}\right)15^{(1+\alpha)} + \delta s - 13$$

Where:

L(eq) (hi)	:	Equivalent noise level at hour (h) for the vehicle type (i);
L(OE,i)	:	Reference mean energy level for (i^{th}) type of vehicle;
N(i)	:	Number of vehicles of (i^{th}) class passing in time T,1 hour;
S(i)	:	Average speed for vehicle (i^{th}) class;
T	:	Time Duration for which L(eq) is desired (T= 1 hr);
D	:	Perpendicular distance(m) from the center line of traffic lane to observer;
α	:	Absorption characteristic factor;
δs	:	Shielding factor.

The vehicular noise emission levels vary significantly with speed. It therefore becomes necessary that speed dependency of the noise emissions for different categories of vehicles should be taken into account. In view of the above, speed related noise levels are considered for prediction. The maximum speed assumed for the present scenario is 40 km/hr.

Table 41shows noise emitted by different vehicle types. The computed results are summarized in **Table 42.** The results have indicated a maximum increase in noise level to the tune of 10 dB(A) being highest 65 dB(A) on the feeder roads specially in urban area near markets which is moderate. Otherwise in rural area it will be around 45 dB(A) during peak hours.

Table 41: Noise Emitted by Different Vehicle Types in dB(A)

Speed (Kmph)	Vehicle Type			
	Cars	**Trucks**	**Buses**	**2-Wheelars**
40	65.0	81.0	81.0	68.0

Table 42: Projected Noise Level on Feeder Road with Maximum Vehicles

Description	Feeder Road, dB(A)
Existing Maximum (dBA)	50
Total Projected (2026) dB(A)	60
Total Noise Exposure, dB (A)	60
Increase (dBA):	10
Impact :	None

Source: Consultant's computation from field survey

iii) Water Pollution

The sediments from the road drainage system may also negatively affect the receiving water bodies; this could be dealt with by incorporating check dams within the drainage system to retain the sediments and a regular maintainance of the system.

iv) Increased road embankments' landslides

All the indicative feeder roads in Nyaruguru District traverse hilly areas and landslides are frequently observed in the area.

The roads' embankments are prone to sliding, especially during rainy season. The protection of road slopes with vegetation, stone masonry and construction of water retention ditches along roads and regular maintenance of destroyed roads are some of the mitigation measures to minimize the sliding in the area.

v) Road safety

The road safety measures are essential both in construction and operation phases. Due to improved road conditions, traffic will be increased and speed limits are likely to be exceeded, thus leading to rise in road accidents. The mitigation measures include the following:

- Adhere to speed limits;
- Display signage on road indicating the problem.
- Wear helmet while driving two wheeler; and
- Awaireness campaigns to drivers/ bicyclists/ motorcyclists and pedestrians for pedestrians safety.

vi) Induced impacts of the project

Due to improved road accessibility in the area, the encroachment to forest plantations for charcoal making and firewood is likely to be increased, thus accentuating deforestation in the area. The hunting/ poaching of wildlife for meat (rabbits, etc) or other purposes is also likely to happen. The reinforcement of the law on protected areas, collaboration between institutions and awaireness campaigns for wildlife protection will be required to mitigate the induced adverse impacts.

6.5 IMPACTS ANALYSIS

Checklist is the list of environmental parameters or impact indicators, which the environmentalist is encouraged to consider when summarizing the potential impacts. A typical checklist identifying the anticipated environmental impacts due to the project activities are shown in **Table 43**. The impacts have been categorized and analyzed in the following manner:

i) Nature (positive/negative, direct/indirect);
ii) Magnitude (high, moderate, low);
iii) Extent/location (area/volume covered, distribution);
iv) Timing (during construction or operation, immediate; or delayed);
v) Duration (short term/long term, intermittent/continuous);
vi) Reversibility/irreversibility;
vii) Likelihood (probability, uncertainty); and
viii) Significance (local, regional, global)

Table 43: Impacts Analysis of feeder roads works

S. No.	Activity	Potential Impact	Nature	Magnitude	Extent/ Location	Timing/ Phase	Duration	Reversible /Irreversible	Likelihood	Significance
i)	Planning and Design of Roads	Skill Transfer & Training	Positive Direct	Low	Medium	Pre-Construction	Long Term		Probability	Regional
ii)	Site Acquisition for road construction	Change in land use/ Loss of Land, loss of properties on land	Negative Direct	Medium	Small Area/ Large Distribution	Pre-Construction	Long Term	Irreversible	Probability	Regional
iii)	Disposal of waste material, construction spoils, spill of oil and grease from construction machinery.	Soil Pollution	Negative Direct	Low	Small area/ Large Distribution	Construction	Short Term	Reversible	Probability	Local
iv)	Exposed surface due to widening of ROW, borrow pits, quarries site construction of bridges	Soil Loss/ Erosion on ROW	Negative Direct	Low	Large Distribution	Construction/ Operation	Long Term	Reversible	Probability	Local
		Soil Loss from Borrow/Quarry Areas	Negative Direct	Low	Large Distribution	Construction	Short Term	Reversible	Probability	Local
v)	Movement of Vehicles on adjoining productive land	Loss of soil fertility	Negative Direct	Low	Small area/ Large Distribution	Construction	Short Term	Reversible	Probability	Local
vi)	Construction of road, borrow areas and quarry sites	Change in Natural Drainage Pattern	Negative Direct	Low	Small area/ Large Distribution	Construction	Short Term	Reversible	Probability	Local
vii)	Runoff from roads, quarry site and borrow areas; construction of bridges and abutments on river and streams	Water Pollution	Negative Direct	Low	Small Distribution	Construction	Short Term	Reversible	Probability	Local
viii)	Disposal of waste	Health Risk due to WasteDisposal	Negative Direct	Low	Low	Construction	Short Term	Reversible	Probability	Local
ix)	Use of water in Construction and	Increased Water Demands	Negative Direct	Low	low	Construction	Short Term	Reversible	Probability	Local

S. No.	Activity	Potential Impact	Nature	Magnitude	Extent/ Location	Timing/ Phase	Duration	Reversible /Irreversible	Likelihood	Significance
	drinking									
x)	Movement of vehicles for construction works and then use of road	Air Quality	Negative Direct	Low	low	Construction/ Operation	Long Term	Reversible	Probability	Regional
		Increase in Green House Gases	Negative Direct	Low	low	Construction/ Operation	Long Term	Reversible	Probability	Regional
		Fuel Consumption	Negative Direct/ Indirect	Low	low	Construction/ Operation	Long Term	Irreversible	Probability	Regional
		Noise Levels	Negative Indirect	Low	low/ less area	Construction/ Operation	Long Term	Reversible	Probability	Regional
xi)	Acquisition of land for road widening	Loss of Trees	Negative Direct	Low	Moderate/ large area	Pre-Construction	Short Term	Reversible	Probability	Regional
xii)	Widening of Road, construction of bridges and culvers	Encroachment into water bodies/ marshy land	Negative Direct	Low	low/ less area	Construction	Short Term	Irreversible	Probability	Local
xiii)	Widening of Road,	Loss of Physical Cultural Resources	No Impact	Low	No area acquired	Construction	Short Term		Probability	Local
xiv)	Widening of Road,	Relocation of Physical Structure	Negative Direct	Low	Less area	Construction	Short Term	Reversible	Probability	Local
xv)	Construction and operation of road	Employment Opportunities	Positive Direct	Medium	Large Distribution	Construction/Operation	Long Term		Probability	Regional
		Child labor, GBV and sexual abuse	Negative Direct	Low	Less area	Construction	Short Term			Local
		Enhancement of Rural Economy	Positive Direct	Medium	Large Distribution /Permanent	Construction/Operation	Long Term		Probability	Regional
xvi)	Operation of road	Reduction in length and travel time	Positive Direct	Medium	Permanent	Operation	Long Term		Probability	Regional
		Enhanced Social Interaction	Positive Direct	Medium	Permanent	Construction/Operation	Long Term		Probability	Regional
xvii)	Construction of	Skill Transfer and	Positive	Medium	Permanent	Construc-	Long		Probability	Regional

S. No.	Activity	Potential Impact	Nature	Magnitude	Extent/ Location	Timing/ Phase	Duration	Reversible /Irreversible	Likelihood	Significance
	roads, bridges and culverts and Operation of road	Training	Direct			tion/Operation	Term			
xviii)	Side cutting for road widening	Land Slides	Negative	Low	Temporary	Construction	Short Term	Reversible	Probability	Local
xix)	Construction Activities	Workers Safety	Negative	Low	Temporary	Construction	Short Term	Reversible	Probability	Local
xx)	Employment of outside labour	Health Safety (Transmission of STD, HIV/AIDS	Negative	Low	Temporary/ Permanent	Construction	Short Term	Reversible	Probability	Local

The roads rehabilitation works is likely to have social impacts including land acquisition of 95.61 ha, relocation of 178 houses and 1980 affected families. These social impacts are considered Medium becausenone of the project affected households (PAH) will leave his plot due to project activities. The people likely to be relocated will not leave their plots; they will rather move at some distances from the RoW within the same plot. In addition, the loss of land due to road works will not render the remaining area unusable and PAPs losing their assets will be compensated for. Not only the borrow pits will be rehabilitated using surplus from RoW and topsoils from both borrow area but also the soil fertility will be restored through organic materials application soon after the murram extraction.

7 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN, MITIGATION AND ENHANCEMENT MEASURES

7.1 MANAGEMENT PLANS

Conservation, protection and preservation of environment have always been a primary consideration in Rwanda ethos, culture and traditions. In order to meet people's requirements in transportation sector, up-gradation/ modification/ construction of feeder roads are planned which affects the ecology and the environment of project area. The impacts due to project on different attributes of environment are discussed and presented in Chapter 6. Management of Environment by provision of necessary safeguards in planning of the project itself can lead to reduction of adverse impacts due to project. This chapter spells out the set of measures to be undertaken during project construction and operation to reduce or mitigate or bring down the adverse environmental impacts to acceptable levels based on the proposed Environmental Management Plan. Mitigation measures are actions that are intended to avoid, alleviate or reduce environmental impacts on the environment. These measures include generic and site-specific measures based on the results of the impact assessment and measures/guidelines for roads set by the Rwandan Government and the World Bank's Safeguard Policies, including the WB General Environmental Health and Safety Guidelines.

The most reliable way to ensure that the plan will be integrated into the overall project planning and implementation is to establish the plan as a component of the project. This will ensure that it receives funding and supervision along with the other investment components. For optimal integration of ESMP into the project, there should be investment links for:

- Funding,
- Management and Training, and
- Monitoring.

The purpose of the first link is to ensure that proposed actions are adequately financed. The second link helps in embedding training, technical assistance, staffing and other institutional strengthening items in the mitigation measures to implement the overall management plan.

The third link provides a critical path for implementation and enables sponsors and the funding agency to evaluate the success of mitigation measures as part of project supervision, and as a means to improve future projects. For every issue discussed for above measures, the implementing agency as well as staffing, equipment, phasing and budgeting have been presented as far as possible. All required funds will be channelled through the executing agency.

The mitigation measures are set forth to maximise positive impacts and minimise negative impacts as a result of the proposed feeder roads. The following general mitigation measures will be applied:

- Cut material shall be temporarily and properly stored along the roadside to prevent it eroding into the streams and part of cut materialwill be reused in the road levelling activities while the remaining will be used in the borrow pits rehabilitation activites.
- Stabilization of roadsides, quarry and borrow areas by replanting grasses and trees to minimize erosion;
- Rehabilitation works are highly recommended to be implemented during the dry season;
- Excavated areas should be restored immediately after excavation to limit the exposure of loose soils, thus minimizing soil erosion;
- Land clearing should be limited to only those areas necessary for the road rehabilitation and upgrading of the project feeder roads;
- Installation of check dams, silt traps and oil and grease interceptors wherever necessary to avoid water pollution;
- Cross drainage works at regular interval in flood prone areas with adequate size to meet flood requirements specially minor bridges;
- Provision of water supply and sanitation facilities in construction camps;
- Provision of top-covered trucks carrying earth to avoid air dust pollution;
- Proper disposal of solid waste generated from construction activities as construction spoils and domestic solid waste from house activities; and
- Revegetating steep slopes of rehabilitated feeder roads and tree plantation on side of feeder roads especially on steep landscapes to reduce landslides and accidental risks, to reduce air-pollution and to improve the visual quality of the road.

7.2 PROPOSED MITIGATION MEASURES IN DIFFERENT PROJECT PHASES

Based on project description Chapter 3, Environmental Baseline Data Chapter 4 and Environmental Impacts Chapter 6, it is proposed to prepare the environmental management plans to mitigate or reduce negative impacts. Based on impacts, environmental management plan has been prepared by adopting mitigation measures for negative impacts and are presented for different phases in **Table 44.**

Table 44: ESMP during Project planning, construction and operation Phases

Activity	Adverse impacts	Mitigation measures	Implementation schedule	Responsibility	Estimated cost (Frw)
PROJECT PLANNING AND DESIGN					
Selection of feeder roads	Conflict over project beneficiaries	Involve all the stakeholders in roadsselection (organizing meeting, sites visits with stake-holders)	Planning stage	Districts Authorities (Mayor or his representative), Opinion leaders, farmers' or-ganizations Local community, MINAGRI/ FRDP Coordinator or his reprsentative	1,000,000
Selection of bor-row pits/quarry areas	Conflict over project beneficiaries	Consultation with affected communities	Feasibility study stage	District road Engineer & Envi-ronmental Officer, MINAGRI/FRDP Engineer and Environmental Specialist Contractor	1,000,000
	Loss of properties (crops, trees, hous-es, etc)	Compensatefor lost assets as per the Rwanda Expropriation Law and WB policy on Involun-tary Resettlement	Feasibility study stage	Contractor District road Engineer & land officer MINAGRI/FRDP Environmen-tal Specialist	5,000,000
		Minimize the number of borrow pits by increasing the free haul distance in BOQ;	Feasibility study stage	Contractor	0
Road realignment	Loss of properties (land, houses & crops)	Involve all the stakeholders in roadsselection	Planning stage	District road Engineer Contractor	0

Activity	Adverse impacts	Mitigation measures	Implementation schedule	Responsibility	Estimated cost (Frw)
		Integrate representatives of PAPs in the Project	Planning stage	District road Engineer Contractor MINAGRI/FRDP social safe-guards specialist	0
		Compensatefor lost assets as per the Rwanda Expropriation Law and WB policy on Involun-tary Resettlement Integrate representatives of PAPs in the Project	Planning stage	- District - MINAGRI/FRDP	Included in compensation cost above
Subproject de-sign			Feasibility study stage	MINAGRI/FRDP road Engineer Contractor	0
PROJECT CONSTRUCTION PHASE					
Borrow pits/quarry sites exploitation	- Loss of topsoil and soil erosion affecting productive farm land and landscape aes-thetics; - Stagnant water in undrained borrow pits/quarry areas creating habitat for water borne disease vectors and possible safety issues for people and livestock	Establishing a detailed borrow pit / quarry management plan	Construction Phase	- Contractor Environmental & Social Safeguards Expert; - Environmental & Social Safe-guards Expert of the Supervis-ing Firm - District Environmental Officer - MINAGRI/ FRDP Environ-mental Specialist	2,500,000
		Proper implementation of the borrow pit / stone quarry management plan			
		Reshaping, transport and spreading over topsoils in the pits on 11.5 ha for rehabilitation	Construction Phase	- Contractors Engineer and Environmental & Social Safe-guards Expert; -Resident Engineer & Envi-ronmental & Social Safeguards Expert of the Supervising Firm	46,000,000

Activity	Adverse impacts	Mitigation measures	Implementation schedule	Responsibility	Estimated cost (Frw)
		Planting of trees and grasses and maintenance for 1.5 years	Construction Phase	- Contractors Environmental &Social Safeguards Expert; -Environmental & Social Safeguards Expert of the Supervising Firm -District Environmental Officer - District Agronomist - MINAGRI/ FRDP Environmental Specialist	19,250,000
	Safety risks at the borrow/quarry sites (accidents,	Design borrow pits/ quarry sites safety measures	Construction phase	Contractor's Engineer and Environmental & Social Safeguards Expert; -Environmental & Social Safeguards Expert of the Supervising Firm	0
		Posting of safety signposts and guards at the site	Construction phase	Contractor's Engineer and Environmental & Social Safeguards Expert; -Environmental & Social Safeguards Expert of the Supervising Firm	5,000,000
Earthworks (Road construction and Camp site installation)	Loss of beneficiaries' properties (land, trees, crops, houses & other structures)	Compensation for lost properties	Construction phase	- Contractors Environmental & Social Safeguards Expert; -Environmental & Social Safeguards Expert of the Supervising Firm- District Environmen-	250,000,000

Activity	Adverse impacts	Mitigation measures	Implementation schedule	Responsibility	Estimated cost (Frw)
				tal OfficerDistrict Agronomist - MINAGRI/ FRDP Social safeguards Specialist	
	Soil erosion causing water quality degradation and property damages	Avoid earthworks during heavy rains (mid-March to mid-May);	Construction works schedule	Contractor District Road Engineer MINAGRI/FRDP Engineer	0
		Disposal of unused stockpiled topsoils before rains	Construction phase	Contractor Engineer & Social/ Environmental safeguards Expert	20,000,000
		Protection of road embankments/ slopes with vegetation to reduce landslides	Construction phase	- Contractors Environmental & Social Safeguards Expert; -Environmental & Social Safeguards Expert of the Supervising Firm- District Environmental OfficerDistrict Agronomist - MINAGRI/ FRDP Environmental Specialist	50,000,000
		Install proper road drainage and check dams, silt traps where necessary to reduce silts	Construction phase	Contractor	100,000,000
	Soil pollution	Maintenance of motorized machinery and equipments in service stations	Construction phase	Contractor	10,000,000
		Provision of dustbins for waste collection	Construction phase	Contractor	1,000,000
		Cleaning of the site and dispose of the construction spoils at the dumping site approved by the District	Construction phase	-Contractor Engineer & Social/ Environmental safeguards Expert -Resident Engineer and Social/	Included in the above budget for borrow/quarry management plan

Activity	Adverse impacts	Mitigation measures	Implementation schedule	Responsibility	Estimated cost (Frw)
				Environmental safeguards Expert, Supervising Firm -District Engineer and Environmental Officer -MINAGRI/FRDP Environmentalist	
	Disruption in drainage pattern	Proper design of drainage canals	Feasibility study phase	Contractor	5,000,000
		Construction of drainage canals as per the designs	Construction phase	Contractor District road Engineer FRDP Engineer	0
	Water pollution	Provision of sanitary facilities to workers	Construction phase	- Contractor Engineer & Environmental & Safeguards Expert - Resident Engineer & Environmental & Safeguards Expert, Supervising Firm - District Environmental Officer - MINAGRI/FRDP Environmentalist	5,000,000
		Construction of checkdams or silt trap structures to minimize sediments loads before discharging roadside runoff into receiving water body	Construction phase	- Contractor Engineer - Resident Engineer - District road Engineer - MINAGRI/FRDP Engineer	50,000,000
	Increased road embankments' landslides	Construction works should be done during dry periods or low intensity rainfall	Construction phase	- Contractor Engineer - Resident Engineer - District road Engineer - MINAGRI/FRDP Engineer	

Activity	Adverse impacts	Mitigation measures	Implementation schedule	Responsibility	Estimated cost (Frw)
		Construction of stone masonry on 8.08 km with critical road embankment slopes	Construction phase	Contractor Engineer - Resident Engineer - District road Engineer - MINAGRI/FRDP Engineer	100,000,000
		Construction of diversion ditches in the upstream of the slopes with high landslide risks to control runoff water causing embankment sliding	Construction phase	- Contractor Engineer - Resident Engineer - District road Engineer - MINAGRI/FRDP Engineer	100,000,000
		Tree planting on 242 ha	Construction phase	Contractor Environmentalist - Resident Environmentalist - District Environmentalist - MINAGRI/FRDP Environmentalist	
	Wildlife accidents & passes	- Avoiding poaching, - Enforcing speed reducing mechanisms, - Avoiding to blow horns in the forest section, - Posting animal safety signposts - Awaireness campaigns for drivers and workers on the protection of wildlife, - establishing an animal detection system within the project area,	Construction phase	• Contractor • Supervising Firm • MINAGRI/FRDP • RDB • District authority	2,000,000

Activity	Adverse impacts	Mitigation measures	Implementation schedule	Responsibility	Estimated cost (Frw)
		- Awaireness campaigns to drivers/ motocyclists/ bicyclists and pedestrians for pedestrians safety, - support for local environmental education and wildlife organizations			
	Health risks	Developing a health and safety management plan	At the start of the construction phase	Contractor Engineer & Environmental & Safeguards Expert -Resident Engineer & Environmental & Safeguards Expert, Supervising Firm	2,300,000
		Provision of sanitary facilities (toilet, water, etc)	Construction phase	-Contractor Engineer & Environmental & Safeguards Expert -Resident Engineer & Environmental & Safeguards Expert, Supervising Firm -District Environmental Officer -MINAGRI/FRDP Environmentalist	Included in Water pollution Cost above
		Awareness campains for the prevention of communicable diseases, STDs, etc	Construction phase	- Contractor Environmental & Safeguards Expert; - Supervising firm Environmental & Safeguards Expert; - District Health Centers staff - MINAGRI/FRDP Environmen-	200,000

Activity	Adverse impacts	Mitigation measures	Implementation schedule	Responsibility	Estimated cost (Frw)
				talist	
		Use a field guide and information from the park department to find out what wildlife lives in the area	Construction phase	- Contractor Environmental & Safeguards Expert; - Supervising firm Environmental & Safeguards Expert; -RDB field Guide	200,000
		Provision of protective equipments to workers	Construction phase	-Contractor Engineer & Environmental & Safeguards Expert -Resident Engineer & Environmental & Safeguards Expert, Supervising Firm -District Environmental Officer -MINAGRI/FRDP Environmentalist	5,000,000
		Availing well equipped First Aid facility	Construction phase	Contractor	5,200,000
		Provision of medical insurance to workers	Construction phase	Contractor Workers	0
		Reinforcement of the laws on child labour, sexual harassment/ prostitutions and gender equity	Construction phase	Contractor District Environmental Officer District Social protection officer District Road Engineer FRDP Environmentalist & social safeguards specialist	0
	Increase of Gender based violence cases, prostitutions and	Reinforcement of the laws on child labour, sexual harassment/ prostitutions and gender equity	Construction phase	- Contractor Environmental & social safeguards Expert - Supervising firm Environmen-	0

Activity	Adverse impacts	Mitigation measures	Implementation schedule	Responsibility	Estimated cost (Frw)
	use of child labour			tal & social safeguards Expert - District Environmental Officer - District Social protection officer - District Road Engineer -MINAGRI/FRDP Environmentalist & social safeguards specialist	
		Awaireness meetings on GBV, child labour, prostitutions preventions	Construction phase	- Contractor Environmental & social safeguards Expert - Supervising firm Environmental & social safeguards Expert - District Social protection officer -MINAGRI/FRDP Social safeguards specialist	1,000,000
		Awaireness programs on child protection through close collaboration with existing Child protection Committees within the communityand capacity building for those committees	Construction phase	- MINAGRI/FRDP Social safeguards Specialist, - District Social protection officer	2,000,000
	Other subproject management issues	Discussion meeting to resolve issues raised	Once two weeks during the Construction phase	- Supervising Firm - Contractors - Community	0
	Air pollution due to dust and exhaust fumes	Spray water regularly when constructing roads to reduce the dust	Construction phase	Contractor's Engineer Supervising firm Engineer District Environmental Officer	92,060,000

Activity	Adverse impacts	Mitigation measures	Implementation schedule	Responsibility	Estimated cost (Frw)
				MINAGRI/FRDP Environmentalist	
		Use equipments and automobiles with certification of good working conditions from "National Automobile inspection centre" to avoid exhaust fumes	Construction phase	Contractor Environmentalist & social safeguards Expert Supervising Firm Environmentalist & social safeguards Expert District Environmental Officer MINAGRI/FRDP Environmentalist	0
		Routine maintenance, repair of trucks and machines by the contractor	Construction phase	Contractor	15,000,000
	Noise Pollution	Restriction of activities creating lots of noise or irritations to normal working hours (7h00-17h00) to prevent noise for neighbours at night	Construction phase	- Contractor Engineer & Environmental & Safeguards Expert - Environmental & Safeguards Expert, Supervising Firm - District Environmental Officer - District Road Engineer MINAGRI/FRDP Environmentalist &Engineer	0
		Use equipments and automobiles with certification of good working conditions from "National Automobile inspection centre" to avoid noise	Construction phase	- Contractor Engineer & Environmental & Safeguards Expert - Environmental & Safeguards Expert, Supervising Firm - District Environmental Officer - District Road Engineer	0

Activity	Adverse impacts	Mitigation measures	Implementation schedule	Responsibility	Estimated cost (Frw)
				MINAGRI/FRDP Environmentalist &Engineer	
	Loss of flora and fauna habitat	Limiting the construction activity along the FR5 and FR6 forest section to the existing road width	Construction phase	Contractor Engineer, Supervising firm Engineer MINAGRI/FRDP Engineers RDB	0
		Reinforcement of the law on the conservation of protected areas	Construction phase	- Contractor Environmental & Safeguards Expert - Supervising Firm's Environmental & Safeguards Expert, - District authorities - MINAGRI/FRDP Environmentalist -RDB	0
		- Awaireness campaigns for the protection of biodiversity, - Posting warning signposts especially in the protected zone	Construction phase	- Contractor Environmental & Safeguards Expert - Supervising Firm's Environmental & Safeguards Expert, - District authorities - MINAGRI/FRDP Environmentalis	50,000
		Tree planting programme to replace affected trees	Construction phase	- Contractor Environmental & Safeguards Expert - Supervising Firm's Environmental & Safeguards Expert, - District Environmental Officer MINAGRI/FRDP Environmentalist	46,000,000

Activity	Adverse impacts	Mitigation measures	Implementation schedule	Responsibility	Estimated cost (Frw)
		Compensation for lost assets	Construction phase	- Contractors Environmental & Social Safeguards Expert; -Environmental & Social Safeguards Expert of the Supervising Firm - District Environmental Officer - MINAGRI/ FRDP Social safeguards Specialist	Included in the cost for lost assets above
	Road congestion /closure	Application of traffic management measures	Construction phase	- Contractor's Engineer - District Road Engineer - MINAGRI/FRDP Engineer	0
		Preparation of alternative roads in case of roads closure	Construction phase	- Contractor's Engineer - District Road Engineer - MINAGRI/FRDP Engineer	10,000,000
	Encroachment to physical cultural resources	Developing Physical Cultural Resources Management Plan (PCRMP)	Construction phase	- Contractors Environmental & Social Safeguards Expert; -Environmental & Social Safeguards Expert of the Supervising Firm- District Environmental Officer - MINAGRI/ FRDP Social safeguards Specialist - RDB field guide	5,000,000
		Chance find procedures	Construction phase	- Contractor's Environmental & Social Safeguards Expert; -Environmental & Social Safeguards Expert of the Supervising Firm	5,000,000

Activity	Adverse impacts	Mitigation measures	Implementation schedule	Responsibility	Estimated cost (Frw)
				- District Environmental Officer - MINAGRI/ FRDP Social safeguards Specialist	
	Loss of water points	Relocation and construction of new water points	Construction phase	- Contractor's Environmental & Social Safeguards Expert; -Environmental & Social Safeguards Expert of the Supervising Firm - District Environmental Officer - MINAGRI/ FRDP Social safeguards Specialist	5,000,000
	Non compliance with safeguards in camps site	Implementing the recent WB guidelines regarding worker camps	Construction phase	Environmental & Social Safeguards Expert of the Supervising Firm - District Environmental Officer - MINAGRI/ FRDP Social safeguards Specialist	0
PROJECT OPERATION PHASE					
Fast moving vehicles bringing noise and dust	Air pollution causing health risks due to dust and exhaust gas from vehicles	Provision of speed restriction measures (speed limit signs, bumps) near villages and special facilities (schools, health posts, markets)	Operation phase	District Road Engineer	0
	Noise pollution causing health risks due to noise from vehicles	Provision of speed restriction measures (speed limit signs, bumps) near villages and special facilities (schools, health posts, markets)	Operation phase	District Road Engineer	0

Activity	Adverse impacts	Mitigation measures	Implementation schedule	Responsibility	Estimated cost (Frw)
		Adhere to speed limits	Operation phase	Roads users	0
Road safety	Reduced traffic safety due to improved roads, inducing drivers to exceed the speed limits and cause accidents (mostly to pedestrians)	Provide traffic control signage prominently at the entrance and throughout populated village areas	Operation phase	District Road Engineer	10,000,000
		Provision of speed bumps in the vicinity of populated areas like villages, schools, markets, health posts, etc.	Operation phase	District Road Engineer	5,000,000
		Wear helmets when driving two wheeler	Operation phase	Road users	0
		Community awareness meetings on traffic safety issues	Operation phase	District Authorities National Police	10,000,000
Heavy rains causing embankments landslides, bringing debris and clogging the drainage system and roads	Water pollution and Property damages	Regular maintenance of the road drainage system	Operation phase	Local Community Association (LCAs) District Road Engineer	50,000,000
	Landslides of roads embankments	Protection of slopes with vegetation and regular maintenance of the embankments and its upstream part	Operation phase	Local Community Association (LCAs) District Road Engineer	
TOTAL					**974,110,000**

The total cost for the ESMP implementation from planning to operational phase is estimated to 974,110,000 Frw. This includes the estimated the compensation cost.

7.3 SPECIFIC ISSUES WITH ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

i) Road Embankments

All necessary actions will be taken to ensure embankment stabilisation, including the selection of less erodable material, and good compaction, particularly around bridges and culverts. Contract documents will specify that final forming and re-vegetation must be completed as soon as possible following fill placement to facilitate regeneration of a stabilising ground cover. Embankment slopes and road cuts are required to be stabilised by re-vegetation with unpalatable (grazing resistant) plant species, placement of fibre mats, or other appropriate technologies. Installation of drainage structure and rising of road formation level may create bare slopes that will be stabilised before the onset of the monsoon. Discharge zones from drainage structures will be furnished with riprap to reduce erosion when required. Down drains/chutes will be lined with rip-rap/masonry or concrete to prevent erosion. Construction in erosion and flood prone areas will be restricted to the dry season.

ii) Soils Erosion due to Land Clearing

Since the proposed feeder roads will be a rehabilitationof existing rural roads, the land likely to be acquired is the agriculture land. The entire stretches of the alignments are subjected to erosion of varied degree. This area shall be treated through environmental measures. Mitigation measures include careful planning and timing of cut-and fill operations and re-vegetation,proper management of borrow pits/ quarry areas, adequate management of surplus soil from the road, maintenance of drainage pattern, etc. In general, construction works shall be stopped during the heavy rains. Cost involved to prevent erosion has been included in the actual construction cost.

iii) Quarries and Crushers

It is appropriate to give consideration to the environmental implications in selection of quarry sources since poorly run operations create dust problems, contribute to noise pollution, ignore safety of their employees, or cause the loss of natural resources. To ensure adequate mitigation of potential adverse impacts, only licensed quarrying operations are to be used for material sources. Efforts should be made to use material commonly found along the roadway as construction material.

iv) Borrow Pits

Borrow areas will be located outside the RoW. Borrow areas shall preferably be indicative from high land and/or waste land. Although locations of the borrow areas are negotiated between contractor, landowners and the District. The excavation and restoration of the borrow areas and their surroundings, in an environmentally sound manner to the satisfaction of the Supervising Engineer, is required before final acceptance and payment under the terms of the contract. All the borrow areas will be properly dressed maintaining drainage to outwards. The surplus of soils from the RoW and and topsoils from borrow/quarry sites should be used to backfill the borrow area. Topsoil from the opening of borrow pits from agriculture land shall be saved and reused in re-vegetating the pits to the satisfaction of the Engineer. Additional borrow pits will not be opened without the restoration of those areas no longer in use.

v) Water Quality

The proposed project will not alter the existing water quality on a permanent basis, but during the construction phase, extent of surface runoff and silt load may increase giving rise to a negative impact on receiving natural bodies especially the marshy, streams, and rivers. The water will be consumed/ utilized and not likely to pose serious water pollution problems. However, additional water supply provision needs to be made in water supply system. To prevent the water pollution from the construction site following measures will be taken:

- Silt fencing through checkdam construction to prevent sediments from the construction site into the nearby water resources;
- Sedimentation chamber to remove the sediments from road side runoff to avoid entry in nearby water courses;
- Oil interceptor for the removal of oil and grease from point sources during construction as well as during operation.

vi) Cross Drainage

Adequate sizes of drainage structures at regular intervals in flood-prone areas and at crossing points (e.g. intermittent streams) are essential. Adequately sized drainage channels to accommodate 25-year flood in the case of culverts and minor bridges and 50-year floods in the case of major bridges may be established for design purpose. Downstream slopes will be stabilized with concrete, or walls to avoid erosion.

Water Supply and Sanitation: Water supply will be needed both for the labour camp and for construction activities. In addition, public health facilities, such as sanitation and toilets will be required in contractor's camp. Water supply provision may be made at 70 litres of water per person per day for such locations. Water should be treated well before use and should be brought up to drinking water standards. It is recommended that water should be treated by conventional water treatment process like sedimentation, filtration and chlorination so as to render it safe for drinking and other purposes. This will help in reduction of water borne diseases among the labour force. Collection and safe disposal of human wastes are among the most critical problems of environmental health. Individual sewerage disposal system by way of septic tank could be adopted for sewage from contractor's Labour Camp. The capacities for septic tanks serving individual dwellings are indicated in **Table 45**. It will be the responsibility of the contractor to provide proper water supply and sanitation facilities.

Table 45: Capacity of Septic Tanks for Individual Dwellings

S/No.	Max persons served	Liquid capacity of tank (liters)	Recommended dimensions (m)			
			Width	Length	Liquid depth	Total depth
1	8	5,000	1.22	2.60	1.37	1.68
2	10	5,900	1.22	3.05	1.37	1.68

vii) Air Quality

During construction period the impact on air quality is mainly due to the material movement. The latter affects air quality over a large area, though, not in significant levels. There is an increase in the dust levels all along the haul roads, the borrow areas and dumping areas. The emissions from the construction machinery are the source of ambient air pollution during the actual construction. Continuous use of generators, bulldozers, rollers, crane, trucks etc. give rise to the ambient levels. The mitigation measures are as follows:

- In order to curb the increased fugitive dust emissions in the area due to vehicular movement and raw material transport, provisions should be made for sprinkling of water on the haul roads in the area. Sprinkling of water should be carried out at least once a day on a regular basis during the entire construction period.

Special attention should be given to all the haul roads passing through residential areas in the region. Daily inspection at haul roads and at construction site should be carried out to ensure removal of construction debris to the landfill sites;

- It should be ensured that the dust emissions from the quarries do not exceed the standard;
- Covered trucks shall be used for transportation of materials prone to fugitive dust emissions. Additionally materials which may collect on the horizontal surfaces of these trucks during loading should be removed before transportation;
- Idling of delivery trucks or other equipments should not be permitted when not in active use;
- The emission levels from diesel vehicles being used should be checked on monthly basis and brought to the required levels of emission standards;
- Proper care should be taken for storage of furnace oil, diesel, petrol etc;
- Work schedule and the operation time of construction machinery should be suitably modified to exercise a control on ambient air quality standards;
- To ensure the efficacy of the mitigation measures suggested, air quality monitoring shall be carried out as per environmental monitoring plan;
- As soon as the construction activity is over the surplus earth should be utilized to fill up the low lying areas, if any;
- The ambient air quality levels in future years will increase due to increase in traffic. The mitigation measures are suggested as under;
- It should be made compulsory by government authorities for all vehicles to adhere to the engine maintenance schedule and standards to reduce the air pollution due to vehicular emissions;
- Planting of trees all along the road can reduce 30% of the concentration of pollutants at ground levels. It is therefore recommended that the area available along the project road should be used to develop green belt.

viii) Noise Quality

Noise is also important for the construction and operational phases. During the construction phase, there would be an increase in ambient noise levels due to construction ma-

chinery operation and movement of construction vehicles. Following mitigation measures may be adopted:

- Construction yard shall be established at least 200 m away from any residential area. This will allow the noise to attenuate.
- Special acoustic enclosures should be provided for individual noise generating equipments. Enclosures may be provided by way of noise shields, which can be either brick masonry structure or any other physical barrier which is effective in adequate attenuation of noise levels. A 3 m structure made up of brick and mud with internal plastering and of non-reflecting surface will be very effective in this regard.
- Noise measurement should be conducted during construction to assess the prevailing noise levels. Earplugs should be provided to those workers who will be working very close to noise generating construction machinery.
- The exposure of workers to high noise levels especially, near the construction site needs to be minimized during construction period. This could be achieved by: Job rotation, Protective devices, Noise barriers. Stationery construction equipment should not be located near human habitation in particular schools, hospitals and institutions.
- Noise levels from loading and unloading can be reduced by usage of various types of cranes and by placing materials on sand or on the beds of sandy bags.
- Use of noisy construction equipment should not be permitted during night hours near residential areas or sensitive areas.

ix) Sensitive receptors

The sensitive receptors along Nyaruguru feeder roads include Nyungwe National Parks, wetlands, physical resources, houses and communities likely to be affected, land acquired, etc. The Subproject is likely to affect 1980 families, counting 9108 people and cause the relocation of 178 houses. Details on affected people (PAPs), land acquisition, affected properties, houses inclusive will be presented in a standalone Resettlement Action Plan (RAP). The information on other sensitive receptors (national parks, physical resources and wetlands) and how close or far these receptors are to the RoW is presented in Annex 8. The mitigation measures for the protection of the park and identified physical cultural resources were discussed above.

x) Tree Plantation in the RoW

The cutting of the 156 trees would be done carefully so to meet required safety standards of accommodating alignment widening and upgrading the conditions of adjacent areas. We recommend avoiding any fire usage for cleaning operations, mainly in the zone bordering Nyungwe National Park, to avoid fire hazards. Those trees should be replaced after the project activities, and we suggest tripling the number of removed trees, by reintroducing indigenous species wherever possible. Thus, as part of the reforestation compensatory approach, around 470 seedlingsshould be planted, and the choice of the species must meet the ecological conditions of the area.

xi) Human Health and Safety

The Project will have no significant impact on disease transmission or other health factors. Positive health impacts will include improved access to health care facilities and quicker response time in emergency situations. No additional mitigation actions related to health are warranted. Mitigation related to potential safety impacts will include improved road standards, and improved signage. The construction camps will be fenced off using chain-link fencing to prevent unauthorised entry. Chain link is commercially available in rolls and can be raised on site along the perimeter of the construction camps, vehicle-parking areas and any other areas where temporary enclosure is required. The chain-link fencing will ensure that visual continuity is intact.

The road safety measures are essential both in construction and operation phases. The mitigation measures include:

- Adhere to speed limits;
- Wear helmet while driving two wheeler; and
- Display signage on road indicating the problem.

Efforts need to be made to employ local labour to avoid the transmission of **STD, HIV/AIDS.** In addition the manpower shall be tested and treated for these disorders before employment to avoid further risk to fellow workers.

xii) Hill/ Mountain Side Environmental Conservation

The hilly landscape in the project area, slope erosion by runoff is serious risk to any investment in the roads development sector. The Government and private land owners already have soil conservation measures in place.

But with the widening of road some disturbances are likely to take place. This may create landslides. Hence following measures are recommended:

- Cutting road side hills should be minimum;
- Focus on implementing a comprehensive soil erosion control practices all along the road in hilly landscape in order to fight against erosion;
- The erosion control measures currently being implemented include constructing anti-erosion structures (bench terraces and drainage system) along the steep slopes;
- The outfall of the drainage shall also be looked into while designing the drainage;
- The valley side of the road shall also be protected by environmental enhancement measures such as plantation of trees, rip-rapping and grass soling.

xiii) River and Marshland Protection

The feeder roads are crossing at number of places through marshland and river zone. These are likely to be effected due to water pollution and physical disturbances during construction. Following measures may be adopted for protection of these resources:

- The minor and major bridges shall be constructed to accommodate the 25 and 50 years floods; otherwise it will accelerated sedimentation and clogging of the marshland during the rainy season;
- During construction the work of foundations may be separated from the stream flow by creating the construction enclosure;
- The all side of embankment should be protected by stone pitching, grass soling or riprap methods to avoid erosion as soon as construction work is over.

xiv) Fuel Provisions in Contractors Camp

The contractor shall provide the cooking gas in the contractor camp to reduce pressure on the cutting of trees from the area. However, it will be appropriate to employ local labour on site. This will also decrease the fuel requirements in the camps.

7.3.1 Restoration of Facilities

The facilities available on road side and/or right of way are reported in chapter 4. The electrical pole and water tanks need to be shifted out of the road corridor.

However efforts shall be made that during construction that these civic facilities such as water supply and sanitation, electricity supply should remain in operation. In addition, safe passage shall be provided by creating appropriate diversions to schools, churches, mosques, health centres and memorial sites. It will be appropriate if people can be deputed to help in crossing at these sites.

7.3.2 Design Considerations during Detailed Engineering

The incorporation of environmental considerations from the stage of design, avoids number of environmental impacts. Hence it is proposed to include the following in the project designs:

i) The embankments, road layout shall match with the landscape of the area especially at embankments, bridges sites, near water bodies, villages, memorials, etc.

ii) The mergers of feeder roads with other feeder road and/or with national roads shall be as per technical requirements. The designs should take into consideration of possibility of accidents, turn around, slopes, etc.

iii) The minor and major bridges on rivers / or streams shall be designed to accommodate 25 and 50 years flood respectively.

iv) The transport policy advocates cross drainage works at every 250 m. The outfall of these cross drainage should be connected to natural drainage system for final disposal of storm water to stream.

v) There are sites where feeder roads are having less width and impact is likely on both sides, design should locate the facility from central line of the road.

vi) The site for contractors camp, quarry and borrow pits shall be identified well in advance to avoid major impacts. These sites shall be at least 200 m from settlement, away from water bodies and closer to the feeder roads.

7.3.3 Environmental and Social Management Issues in Tender Document

In order to have environmental and social compliance and also physical cultural resources, it is proposed to include the following in the tender document:

- Contractor shall establish the machinery yard and labour camp on location/ place approved by FRDP; the contractor have to make his own arrangements for water supply, sanitation, solid waste management, health check up, canteen, fuel and light;

- Contractor shall use approved quarry and borrow pits for construction material and close these as soon as work is over; the exposed surface likely to be eroded may be brought in the notice of resident engineer;
- The machinery and vehicles shall meet international noise and emission standards; the oil and grease spill shall be collected for safe disposal to avoid water and soil pollution;
- The sites and work place should not pollute the water sources, protect trees forests, ecology and physical cultural resources; relocate the civic facilities and provide guidance for diversions if any;
- The environmental management plans / items shall be conducted as specified in the Bill of Quantities;
- The site monitoring shall be conducted as specified in the bill of quantities along with required frequency, the results of monitoring shall be keep for record and shall be submitted to FRDP in quarterly report;
- The PCR Management shall also be included in the document along with the conditions such as 'chance find' and authority to be informed such as Genocide Commission;
- The contractor shall extend the facilities to his employees as indicated in section 6.6.

7.4 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN IMPLEMENTATION

Institutional strengthening will be undertaken to achieve the goals of the project including sound environmental management.This EMP will be implemented by the several institutions mentioned below who are directly or indirectly involved in the project under the following sub-headings:

- Organization and Staffing;
- Implementation and budget
- Environmental Training;
- Monitoring and Reporting; and
- Record-keeping.

7.4.1 Organization and Staffing

World Bank

The **World Bank** is the financier of the project including monitoring and evaluation of the implementation of the ESMP within the budget of **Rwanda Feeder Road Development Project (FRDP).** The main role of the Bank is to ensure that compliance is achieved as per the requirements of the ESMP.

MINAGRI

Ministry of Agriculture and Animal Resources (MINAGRI) through the FRDP is the lead agency in the implementation of this ESMP and the project. The role of the FRDP is to implement mitigation measures, building the capacity of other actors in SPIU, and in environmental management. The SPIU co-ordinator will be the focal point for training in FRDP and will liaise with the ministry of agriculture and animal resources for technical support. The capacity building activities should be through hands-on experience approach. The project should establish one capacity building road which will act as the field school. The role of MINAGRI will be to ensure that the roads, bridges and drainages are constructed according to the specifications of international technical and safety standards.

MININFRA/RTDA

The Ministry of Infrastructure (MININFRA) through RTDA will provide technical support and oversee the project implementation.

RDB and REMA

RDB will issue an ESIA certificate of approval, authorizing FRDP to start civil works while REMA will oversee the Project compliance with national environmental regulations.

District

The project will be implemented by the District.It will closely work with MINAGRI/FRDP to follow up the civil works and compliance with environmental and social safeguards.

Contractor

The Contractor shall prepare a Construction ESMP (CESMP) based on this ESMP and final road alignments and design prior to the commencement of civil works.

The CESMP will include a detailed PCR Management Plan, which will be submitted by the Contractor to the Supervision Consultant and MINAGRI for review and approval.

No civil works shall commence until a CESMP has been approved by MINAGRI.The Contractor shall hire an Environmental Specialist and Social Development Specialist to implement the CESMP and PCR Management Plan.

Supervision Consultant/Firm

A Supervision Firm/Consultant shall be hired to supervise the implementation of the CESMP by the Contractor.

7.4.2 Implementation and budget

MINAGRI has the required capacity to implement the environmental and social management plans and monitoring programs in Nyaruguru District. The District also has in its core staff the environmental and social safeguard officers (District Environmental Officer and District Social Protection Officer).

In addition, the Supervision firm will add to the capacity to manage the processes in the plan. In case required, expert opinion should be sought from government agencies or specialist consultants. Moreover the contracting firms that will be constructing the feeder roads will also use their capacity for environmental and social protection. The ESIA has made provisions for training and the individual capacity may be enhanced through specialized module in the required field.

MINAGRI will designate one of its officers to act as Environmental and Social Safety Officer (EO), to formally address environmental and social issues on a routine basis, who will have an oversight of environmental aspects of the construction contracts, including the enforcement of all monitoring provisions, the locations of construction and labour camps, etc. Before the commencement of construction, the designated EO will receive training in the environmental and social issues associated with road construction and maintenance projects. The designated EO will further organise the training.

The main duties of the designated EO will include:

- Review of bids to ensure their adherence to the environmental and social specifications and the requirements of the Environmental and Social Management Plan (ESMP);

- Collection and dissemination of relevant environmental documents including amendments to environmental protection acts issued by REMA;
- Co-ordination with government departments on environmental and social issues and obtaining the necessary clearances from the regulatory authorities;
- Monitoring the environmental aspects during construction to ensure that the environmental requirements of the contract and the mitigation measures proposed in the ESMP are implemented;
- Supervising contractors and preparation of environmental and social input to the quarterly progress report.

The project will closely work with RDB, REMA, MININFRA/RTDA and District staff to ensure the adequate implementation and monitoring of safeguards. The cost for the implementation and monitoring the ESMP proposed for Nyaruguru feeder roads project is presented below.

Table 46: Bills of Quantities and Cost Estimates for Environmental and Social Management Plan

S/No	Activity	Unit	Quantity	Frequency	Rate	Total (RWF)
A	**Project Planning and design Phase**					
1	Meetings/ site visits for beneficiaries' involvement in selection of feeder roads	Number	13	Once per road before works	LS	1,000,000
2	Consultations with affected communities	Number	14	Once per road before works	LS	1,000,000
3	Compensation of assets to be lost during the selection of borrow/quarry areas and roads realignment	Assets		Once	LS	5,000,000
SUBTOTAL A						**7,000,000**
B	**Project Construction Phase**					
4	Employing Environmental & Social & Health and Safety Experts of Contractors & Supervising firms	Number	7	Six Lots, one contractor's expert per lot and One Expert from the Supervising firm for all lots for 12 months	1,000,000	84,000,000
5	Developing and implementing a PCR management plans	report	1	Once before the construction works	LS	5,000,000
6	Implementing Chance and find procedures	report	1	Whenever identified	LS	5,000,000
7	Developing detailed borrow pits/ quarry management plans	report	1	Once after confirmation of the borrow/quarry area selection	LS	2,500,000
8	Reshaping, transport and spreading	ha	11.5	Once at the completion	4,000,000	46,000,000

S/No	Activity	Unit	Quantity	Frequency	Rate	Total (RWF)
	over topsoils in the pits			of excavations		
9	Tree and grass plantation in bor-row/quarry areas and maintenance for 3 years	Number	7,700	Up to Three Years	2,500	19,250,000
10	Tree plantation upstream the critical embankment slopes	ha	242	Once, and maintenance to be done by land own-ers	250,000	60,500,000
11	Posting of safety sign posts	Number	100	Once and as required	100,000	10,000,000
12	Disposal of unused stockpiled topsoils before rains	m^3	180,000	depending on available materials	LS	20,000,000
13	Protection of roads embankment with vegetation	km	50	as required	1,000,000	50,000,000
14	Proper design &Construction of drain-age systems, checkdams and silt traps and 8.08 km retaining walls	km		where required	LS	200,000,000
15	Maintenance of motorized machinery & equipements in service stations	Number	50	regularily	LS	10,000,000
16	Solid Waste container for collection	Number	40	One every 5 km,	100,000	4,000,000
17	Provision of sanitary facilities to work-ers	number of workers	maximum 500		LS	5,000,000
18	Sewage disposal during construction (Septic Tank & Soak pit) + Emptying	Number	30	One every 10 km, at least 2 for each road	200,000	6,000,000
19	Awaireness campaigns for preventing communicable diseases	Meeting	2/ road	Monthly	LS	500,000
20	Wildlife protection and Awaireness campaigns for protection of the Park	meeting		weekly	LS	2,000,000

S/No	Activity	Unit	Quantity	Frequency	Rate	Total (RWF)
21	Provision of protective equipments and clothing	number of workers	maximum 500	Continuous	LS	5,000,000
22	Provision of first aid facilities	Number	14	One per road	LS	5,200,000
23	Water sprayer/ Watering for dust suppression	km	195	As and When Required, mostly once a day	100,000	19,500,000
24	Routine maintenance, repair of trucks and machines	Number	50	As required	LS	15,000,000
25	Construction of alternative roads in case of roads closure	km		When required	LS	10,000,000
26	Construction of water points	Number	2	once	LS	5,000,000
27	Awaireness programs on child protection through close collaboration with existing Child protection Committees within the community and capacity building for those committees	Number	60	Continuous	LS	2,000,000
	Sub-Total B					**430,950,000**
C	**Project Construction Phase**					
27	Capacity building of district staff & local communities	Number	50	Twice a year	LS	20,000,000
28	Provision of traffic control signage prominently at the entrance & throughout populated areas		Where required	Once	LS	10,000,000
29	Provision of speed bumps in the vicinity of populated areas		Where required	Once	LS	5,000,000
30	Awaireness meetings on traffic safety	Number	at least 10	At least two meetings per	LS	10,000,000

S/No	Activity	Unit	Quantity	Frequency	Rate	Total (RWF)
	issues			road		
31	Tree Plantation on Road Side for Enhancement Measure	Number	5500	Plantation & Up to 3 years Management	2,500	13,750,000
32	Regular maintenance of the road drainage system					50,000,000
	Sub-Total C					**108,750,000**
	Total (A+B+C)					**546,700,000**
	Contingencies (10% of A+B+C)					**54,670,000**
	TOTAL					**601,370,000**

7.4.3 Environmental and Social Training

The training program will cover measurement techniques in the field, tools for the prediction of pollutants, reforestation methods and procedures, conservation of water bodies including marshlands, etc. Immediate short-term training will be required for the Project in-charge and designated Environmental Officer to raise the level of environmental awareness. The training institutions, the institutions of high learning in Rwanda (universities) and the World Bank's Economic Development Institute (Environment and Natural Resources Division), conducts regular training and access to their resources may be sought. The need for additional and specialised training will be examined and appropriate training will be undertaken as required. Training of personnel to be deployed on the proposed project during construction and operation, with regard to environmental requirements should be the integral part of the planning. The project authority should be asked to submit a detailed programme for training of personnel and implementation with regard to the environmental requirements. Apart from the training, such programme should include guidelines for safety, methods of disaster prevention, action required in case of emergency, fire protection, environmental risk analysis etc. Capacity to quantitatively monitor water sediments or turbidity (by suitable portable test equipment) and noise is always advantageous, but monitoring will primarily involve ensuring that actions taken are in accordance with contract and specification clauses, and specified mitigation measures. Some awareness training will be provided to the contractor personnel to ensure that this occurs effectively. The provision of training has been made in cost estimates for environmental training **(Refer to Chapter 8).**

7.4.4 Monitoring and Reporting Procedures

The baseline data should be collected before the project begins. This will help in monitoring and controlling environmental impacts caused by the development of the project. The project in charge and designated EO will visually assess contractor's practices and, if high pollutant levels are suspected, will direct the contractor to Rwanda Standards Board (RSB) or other laboratories to verify measurements on a routine basis. Photographic records will be established to provide useful environmental monitoring tools. A full record will be kept as part of normal contract monitoring. All applicable regulations need to be enforced by the Project In charge and designated EO. Under the Environment Organic Law (2005) water quality discharge standards, air pollution emission standards and noise standards have been established. It is a legal obligation of the Contractor that any discharges from the work sites meet these standards.

Steps will be taken by the Project Incharge and designated EO to ensure that regular monitoring of water quality parameters such as pH, suspended solids, turbidity, Magnesium, oil and grease be carried out as provided in the contract. Regular monitoring of noise and dust will also be carried out as provided in the environmental monitoring program.The monitoring of accident frequency as compared to baseline will also be done.

Throughout the construction period of feeder roads'activities, the Contractor and the Supervising firm will both provide the monthly progress report on the subproject compliance with environmental and social safeguards. The report will be submitted to the MINAGRI/SPIU FRDP for review and approval. The Project Enironmental Officer will prepare periodic environmental and social consolidated reports (three month progress report) on the monitoring progress of the feeder roads project inthe district. These reports should be forwarded to REMA and World Bank for information.

7.4.5 Record Keeping

Monitoring form should be devised for documentation, analysis and record of parameter. The form should focus attention on environmental issues and provide feedback for the future stages of the work. Mitigation and enhancement measures adopted in final design will be explicitly under the bill of quantities (BOQ) so that performance and completion is readily documented. Daily project diaries would record environmental problems (spills, dust, noise, etc.) as well as safety incidents and will be retained as part of accepted modern contract management and summarized in Quarterly Environmental Reports.

7.4.6 Implementation Schedule

The most important aspects of the implementation are the appointment of the Environmental Officer to oversee the implementation of the environmental mitigation measures incorporated in the design and contract specifications. Development and delivery of an environmental training program for indicative staff and Project coordinators responsible for overseeing the construction contracts can commence immediately thereafter. This will be an ongoing process. Contracts will be awarded over a period of time stretching over many months. Schedule for Implementation of Environmental Management Plan(EMP) is given in **Table 47.**

Table 47: Schedule for Implementation of ESMP

S/N	Activity	Frequency and/or Implementation Date
1	Appoint Environmental Officer	Date to be determined
2	Initiate First Training Program	Date to be determined
3	Ongoing Training	As required
4	Check Monitoring	Quarterly
5	Prepare Environmental Reports	Quarterly
6	Construction Supervision	During Construction
7	Roadside Environment Safety and Non-Motorised Transport Policy Development	Long-Term
8	Development of Compensatory Habitats Policy	Long-Term
9	Set up an Environmental Unit	Long-Term

Source: Consultant Proposal

7.5 CONSTRUCTION MANAGEMENT GUIDELINES

In order to avoid major environmental issue, it will be appropriate to follow construction management guidelines:

- Access roads should not be constructed near water bodies. If at all it is necessary to construct them, then a buffer strip should be provided to prevent water pollution.
- In order to avoid congestion of road during construction, traffic shall be diverted to other roads with sign boards and information.
- Water Supply, sewerage and drainage lines likely to be affected need to be diverted suitably without affecting the supply system.
- People working/living near feeder roads should be made aware about possibility of high noise, hazards and other information in the Right of Way.
- There may be damage to surface and sub-surface drainage and also rotting and mixing of top soil. To avoid this, it is essential to retain original surface contours as far as possible and minimize the earth work involved.

- As far as possible, care should be taken to compact all loose soil before end of work every day and avoid work during rainy season. This will help control erosion of soil.
- Care must be exercised not to spill fuel by keeping vehicle/equipment in a well maintained condition. Special attention should be given to oil seals of equipment/vehicle involved. Maintenance should be done in automobile service stations and other approved service areas. In case of accidental oil spills, proper clean-up should be conducted by skilled technicians.
- It is necessary to check the noise generated during construction. The equipment and vehicles should be in good working condition to allow for minimum generation of noise.
- The occupational noise levels during 8-hour work shift should not exceed 85 dB(A). The public exposure should be limited to 55 dB(A) during day time(6AM - 9PM) and 45 dB(A) during night time (9PM - 6AM).
- Use of electrical equipment should be preferred over pneumatic ones in order to minimize noise generation,

First aid: At every workplace, a readily available first aid unit including an adequate supply of sterilized dressing material and appliances will be provided. Workplaces remote and far away from regular hospital will have indoor health units with one bed for every 250 workers. Suitable transport will be provided to facilitate taking of injured or ill person (s) to the nearest applicable hospital.

Setting up of Construction site: The contractor may follow the guidelines to identify the location of the construction equipment site.

1. A minimum of 1 km away from any major settlement or village,
2. A minimum of 300 m away from major surface water course or body,
3. On non-agricultural lands, as far as possible, and
4. Safety measures to Workers during construction.

Risk from Operations: The implementing agency is required to comply with all the precautions as required for the safety of the workmen. The contractor will supply all necessary safety appliances such as safety goggles, helmets, masks, etc., to the workers and staff. The contractor has to comply with all regulation regarding safe scaffolding, ladders, working platforms, gangway, excavation, and trenches.

Workers Camps: All temporary accommodation must be constructed and maintained in such a fashion that uncontaminated water is available for drinking, cooking and washing; Adequate washing and bathing places shall be provided, and kept in clean and drained condition; Construction camps people shall be adequately provided with health care; drains and ditches should be treated with bleaching power on a regular basis.

Shelter at Workplace: At every workplace, shelter place shall be provided free of cost, for meals and for rest, and separately for use of women labourers. The height of shelter shall not be less than 3 m from floor level to lowest part of the roof. Sheds shall be kept clean and the space provided shall be on the basis of at least 0.5 sq. m per head.

Canteen Facilities: A cooked food canteen on a moderate scale shall be provided for the benefit of workers wherever it is considered necessary. The contractor shall conform generally to sanitary requirements of local medical, health and municipal authorities and at all times adopt such precautions as may be necessary to prevent soil pollution of the site.

Day Creche Facilities: At every construction site, provision of a day creche shall be worked out so as to enable women to leave behind their children while working.

8 ENVIRONMENTAL AND SOCIAL MONITORING PLAN

8.1 ENVIRONMENTAL AND SOCIAL MONITORING

Environmental and social monitoring programme is a vital process of any environmental management. This helps in signalling the potential problems resulting from the proposed project and will allow for prompt implementation of effective corrective measures. The environmental monitoring will be required during construction and operational phases. The following parameters shall be monitored:

- Water Quality,
- Air Quality,
- Noise levels, and
- Soil conservation,
- Accident frequency
- Socio-economic Conditions; and
- Reforestation.

A matrix has been developed for monitoring of impacts to facilitate the monitoring frame work which includes the following:

- Parameters to be monitored,
- Indicators,
- Method used for verification,
- Frequency of monitoring,
- Responsibility, and
- Costs involved.

Table 48 summarizes the above monitoring program. The bills of quantities (BOQ) have been prepared for environmental and social management plans along with costs involved are presented in **Table 46.**

8.2 TOTAL ENVIRONMENTAL AND SOCIAL MONITORING COSTS

The environmental and social monitoring costs is estimated as **44,870,000 RWF** (including contingencies 10%).

Table 48: Environmental and Social Monitoring Program

S/No	Adverse Impact	Parameter to be Monitored	Indicator	Method	Frequency	Responsibility	Cost Estimates (RWF)
1	Loss of properties (houses, trees, crops, etc)	Compensation for lost assets	Lists of PAPs & their affected assets, Lists of paid PAPs	Site visits for meeting with PAPs and cross-checking at the Banks	Continous	District authorities, MINAGRI/FRDP Social safeguards Specialist	2,000,000
2	Grievances raised by affected families	Complaints raised by PAPs	Number of complaints recorded	Meetings, site visits	As and when required	Grievance redress committees, District	0
3	Water Pollution	Water quality (DO, Ca,Mg, TSS, Turbidity, Coli form Count)	Nutrient and sediments loads	Bi-annually during wet seasons	Once every wet season	FRDP	3,000,000
4	Soil Pollution	Soil Chemical properties,	Soil nutrient loads	Soil sampling and laboratory analysis	As and when required	FRDP	1,500,000
5	Loss of trees	Tree species along roads and other identified areas	Number / area of planted trees	Field observations	Once in a month for 3 years	FRDP Environmentalist District PAPs	8,000,000

S/No	Adverse Impact	Parameter to be Monitored	Indicator	Method	Frequency	Responsibility	Cost Estimates (RWF)
6	Safety hazards	safety at the site	Incidences, accidents, diseases,	Review and evaluation of incidences, accidents register, diseases records,	continuous	MINAGRI/ FRDP District	4,700,000
		Accidents frequency	Nbr of accidents per month	Review of police records on roads accidents	Continuous	National Police District MINAGRI/FRDP	1,500,000
7	Low capacity of beneficiaries in the implementation of safeguards	Capacity/skills in environmental and social management	training reports, number of trained staff	Training of District Environmental Officers and other officers involved in environmental and social management	Twice a Year	MINAGRI/FRDP MINALOC Districts	20,000,000
	Total						**40,700,000**
	Contigency (10%)						**4,070,000**
	Total						**44,770,000**

8.3 GRIEVANCE REDRESS MECHANISMS

The grievance redress committee, composed of representatives from the participating District, MINAGRI/FRDP, Contractor and Supervising firm as well as affected comminities willbe created to supervise the safeguards compliance throughout the project implementation period and resolve related issues/ conflicts. This committee will ensure that all affected people are fully informed of the process for expressing dissatisfaction and for seeking redress, and will issue warnings about the consequences of failure to lodge their complaints in time.Sub-comittees will also be created at the feeder road level and will be Sector based. These sub-comittees will work under the coordination of the Subproject Committee.

It is encouraged to resolve the issues at Cell, Sector or District levels, as they are aware of and involved in the whole process. If the grievance is not resolved in this way, the dissatisfied party can refer the matter to the competent court. Local courts should be used. If not resolved then the high court or court of appeal of Rwanda remains an avenue for voicing and resolving these complaints.

MINAGRI/RFRDP will follow up the aggrieved PAP at each level to ensure that the grievances are resolved. Each sector should identify one PAP to work with MINAGRI/FRDP and the local leaders to ensure that the grievances are attended to in time.

9 DISCLOSURE OF ENVIRONMENTAL SAFEGUARDS INSTRUMENTS

The Ministry of Agriculture and Animal Resources will disclose this ESIA/ESMP report by making copies available at its head office and in District / Sectors/ Cell project is situated. The copies shall also be made available to the local government's agencies (REMA, RDB, etc), the Environmental and Social Group and other stakeholders. The Government of Rwanda will also authorize the World Bank to disclose this ESIA/ESMP electronically through its InfoShop.

10 CONCLUSION AND RECOMMENDATIONS

10.1 CONCLUSION

Based on Project Description (Chapter-3)**,** Environmental Baseline Data (Chapter-4), Environmental Impacts (Chapter-6) and Environmental Mitigation Measures (Chapter-7), the following conclusions are drawn:

i) The feeder roads are mostly in hilly terrain in the district of Nyaruguru. A feasibility study was done for a total of 194.56 km of feeder roads, and anenvironmental and social impact assessment study was conducted to establish en environmental and social management plan.

ii) The project area is about 160 km from Kigali and may be reached by road via National Road 3 and National Road 5. The integration of these roads with National Roads will help in economic development of the region. One of the important aims of rehabilitating Nyaruguru district feeder Roads is to provide access to the rural areas and to improve quality of life of local community. This will enable to fulfil the goal of vision 2020, EDPRS II and other development programs to a large extends. Apart of this aim, the feeder road will help improve social and cultural environment and development of other sectors like agriculture, commerce and trade. Hence the proposed feeder road rehabilitation will play an important role in economical growth and reduction of the poverty. Educational, cultural and health centres will have an easy access thus making improved living standards and quality life of the people.

iii) The cost of the interventions to improve the feeder roads has been reproduced from the feasibility report. The total cost of construction to improve of 194.56 km of feeder roads amount to US$ 22.082 million, the average cost per km amounts to US$ 113,497. The planned activities include: rehabilitation / maintenance of drainage, bridges and carriageway. The environmental and social management and monitoring costs are estimated to **RWF 646,140,000** (including 10% Contingencies) which is 3.6% of project costs. The estimates do not include compensation costs.

iv) It is estimated that 156 trees are likely to be cut for expansion of feeder roads. An inventory of these trees has been made.

It is proposed, to plant a little more than trees cut; hence 200 trees will be planted at suitable locations along the feeder roads. In addition about 5500 trees will be planted on road side as an environmental enhancement measure and also to protect the valley side erosion. Ditches will be constructed to protect critical embankments slopes and tree planting program on 242 ha is planned for. In addition, the borrow area and quarry sites will also be vegetated to prevent erosion. About 11.5ha of tree plantation will be done at these sites.

v) The major positive achievements of feeder road project are:
   - The road network in the District with national road linking with other Districts, mainly Huye, Gisagara, Nyamagabe and Rusizi.
   - Development of social and cultural environment of not only influence area but also the surrounding Districts.
   - Development will stimulate ancillary projects in agriculture and allied areas which will improve economical status of the local population;
   - More employment of people during construction and operation phases;
   - Less travel time to schools, health centre and markets.
   - Development of potential socio-economic centres, enhancement of rural economy and improved transport system,
   - Skill Transfer and Training,
   - Potential to improve drainage, road safety and reduction in green house gases.

vi) The project is planning appropriate drainage pattern which will reduce the erosion rate in the different catchments. The underground utilities such as water pipeline, valve chambers etc. are likely to be relocated. Income generation of the rural population will be greatly enhanced through creating new avenues like trade commerce and other small agro processing industries.

vii) The environmental and social mitigation measures as stipulated in ESMP shall be monitored during implementation of the feeder road project. In order to perform monitoring of ESMP, the construction company shall monitor the plans in the supervision of the experienced monitoring laboratory or Company.

viii) The noise and air quality of the project area is within the permissible limits. With the increase in traffic the maximum increase in noise level anticipated in the pro-

ject area will be about 10 dB(A) as estimated based on field measurements. The change in air quality will be insignificant. The overall impact on air and noise quality during construction is limited to site and of short duration and can be mitigated.

ix) The labour camps shall be established away from the forests and wetlands to avoid the problem of deforestation and water pollution.

x) The environmental monitoring will be required before the start of the construction and during the construction and operation phases. The following parameters need to be monitored: Water Quality, Air Quality, Noise quality, and Soils. The parameters will be as specified in monitoring program in chapter 8.

xi) During public consultation, few recommendation were drawn are :i) Involve local communities in all stages of project planning and development, ii) Permanent communication between project initiators and local authorities, iii) All people whose properties have been affected by the project have to be compensated for their assets, iv) During construction, first priority should be given to local people for employment of skilled and unskilled manpower.

10.2 Recommendations

In view of above it could be concluded that project will bring benefit to the people of the area. The negative impacts are within the manageable limits and can be mitigated with the proposed management plans and hence project may be implemented.

ANNEXURES

Annexure 1 : Study Team

S/No	Name of the Expert	Specialization
1	Pr. Jean Bosco Gashagaza	Environmentalist / Team Leader
2	Mr. Samuel NSHUTIYAYESU	Ecologist / Natural Resources Management Specialist
3	Eng. Naila UMUBYEYI	Water Resources Management Specialist
4	Dr. Balinda RUTEBUKA	Sociology Specialist

Annexure 2: Tolerance Limits for Discharged of Domestic Wastewater

S. No.	Parameter	Limits Treated	Methods of Test
1	TDS mg/l	<1500	ISO 6107-2:1989
2	TSS mg/l	<50	ISO 11923:1997
3	ph	5-9	ISO 10523:1994
4	Nitrates mg/l	20	ISO 5663:1984, ISO 6778:1984, ISO7890-3:1988
	Nitrites mg/l	2	ISO 6777:1984
	Total Nitrogen	30	ISO 11905
5	Total phosphorus mg/l	5	ISO 6878:2004
6	Temperature variation of Treated water compare to ambi-ent Temperature of water ^{0}c	<3	Thermometer
7	BOD_5 mg/l	< 50	ISO 5815-2:2003
8	COD mg/l	< 250	ISO 6060:1989
9	Faecal Coli forms mg/l	400	ISO 4831:2006
10	Oil and grease mg/l	<10	ISO 9377-2:2000
11	Chlorine mg/l	<2	ISO 7393
12	Sulphate mg/l	500	ISO 22743
13	Color Pt-Co	200	ISO 7887

Annexure 3: Permissible Limits for Industrial Waste Water Discharge

S/N	Parameter	Permissible Limit	Test Method
1.	Temperature increase ^{0}C	<3	Thermometer
2.	Total suspended solids mg/l	50.0	ISO .11923:1997
3.	Total Dissolved Solids mg/l	2000.0	ISO 7868:1985
4.	Oil and *grease*mg/l	10 0	ISO 9377-2:2000
5.	BOD_5 mg/l (20 ^{0}C)	50.0	ISO 5815-2:2003
6.	COD mg/l	250 0	ISO 6060:1989
7.	Faecal Coli forms MPN/I00ml	400	ISO 4831:2006
8.	Ammonia (as N**)** mg/l	20.0	ISO 6778:1984
9.	Arsenic mg/l	0.01	ISO 11969 1996
10.	Benzene mg/l	0.1	ISO 11423-2:1997
11.	Cadmium mg/l	0.01	ISO 5961:1994
12.	Hexavalent Chromium mg/l	0.05	ISO 23913:2006
13.	Copper mg/l	3.0	ISO 8288:1986
14.	Cyanide mg/l	0.1	ISO 6703-1:1984
15.	Iron mg/i	3.5	ISO 6332:1988
16.	Lead mg/l	0.1	ISO 8288:1986
17.	Mercury mg/l	0.0002	ISO 5666:1999
18.	Nickel mg/l	3.0	ISO 8288:1986
19.	Phenol mg/l	0.2	ISO 8165-1:1992
20.	Sulphide mg/l	1.0	ISO 13358:1997
21.	Zinc mg/l	5.0	ISO 8288:1986
22.	pH	5-9	ISO 10523:1994

Annexure 4: Ambiant Air Quality Tolerance Limits

S/N	Pollutant	Time weighted average	Land Use Area			Test Methods
			Industrial Area	Residential Rural & other Area	Controlled area	ISO 4221-1980
1	**Sulphur oxides(SOx);**	Annual Average*	80µg/m3	60µg/m3	15 µg/m3	-
		24 hours**	125 µg/m3	80µg/m3	30µg/m3	
2	**Oxides of Nitrogen (NOx)**	Annual Average*	80µg/m3	60ug/m3	15µg/m3	-
		8 hours				
3	**Suspended particulate matter(SPM)**	Annual Average	360µg/m3	140µg/m3	70µg/m3	ISO 9835:1993
		24 Hours	500µg/m3	200µg/m3	100µg/m3	
4	**Respirable particulate matter(<10um)(RPM)**	Annual Average	70µg/m3	50µg/m3	50µg/m3	ISO 9835;1993
		24 Hours	150µg/Nm3	100µg/Nm3	75µg/Nm3	
5	**MP2.6**	Annual Average	35µg/m3	-	-	ISO 9835;1993
		24 Hours	75µg/m3			
6	**Carbon monocide(CO)/ Carbon dioxide(CO_2)**	8hours**	5.0mg/m3	2.0mg/m3	1.0mg/m3	ISO 4224:2000

Annexure 5: Noise Exposure Limits

Area Code	Category Area	Limits in dB (A) Maximum	
		Day time 06:00 – 21:00	***Night time*** 21:00 – 06:00
A	Industrial Area	75.0	70.0
B	Commercial Area	65.0	55.0
C	Residential Area	55.0	45.0
D	Silence Zone	50.0	40.0

Source: Rwanda Standards Board **RS 236:2014**

Annexure 6: List of Participants in Public Consutlation Meetings

MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: NYARUGURU / BUSANZE SECTOR Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
1	Nibakure Angeri	Runyombyi	FR3	0789772402	Umuhinzi	
2	Ntabamurita Fausita	Runyombyi	FR3	-	Umuhinzi	
3	Mukaluguru Sofera	Runyombyi	FR3	0786657304	Umuhinzi	
4	Sinzinkayo Emanuel	Runyombyi	FR3	-	Umuhinzi	
5	Hiyodusaba Peterone	Runyombyi	FR3.	-	Umuhinzi	
6	Mukandabigwi Geneviève	Runyombyi	FR3	-	Umuhinzi	
7	Uwimbabazi Zayasi	Runyombyi	FR3	-	Umuhinzi	
8	Mushimiyimana Angesi	Runyombyi	FR3	-	Umuhinzi	
9	Mukagasarabwe Jakina	Runyombyi	FR3	-	Umuhinzi	
10	Ndikubwabo Donatire	Runyombyi	FR3	-	Umuhinzi	
11	Munyeshyaka Ziyomaze	Runyombyi	FR3	-	Umuhinzi	
12	Ntabyenda Vitari	Runyombyi	FR3	-	Umuhinzi	
13	Kankindi Tereza	Runyombyi	FR3	-	Umuhinzi	
14	Havugimana Bosco	Runyombyi	FR3	-	Umuhinzi	
15	Mucabyimana Emanuel	Runyombyi	FR3	-	Umuhinzi	

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S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
1	Nsengiyumva Appolinaire	Runyombyi	FR3	0782200993	Umuhinzi	[signature]
2	Uzaratwisayo Savellina	Runyombyi	FR3		Umuhinzi	[signature]
3	Ntibirindwa Innocent	Runyombyi	FR3	0786612615	umuhinzi	[signature]
4	Mukanyarwaya Vitaligna	Runyombyi	FR3		umuhinzi	[signature]
5	Nyonsaba Marisella	Runyombyi	FR3		Umuhinzi	[signature]
6	Mukamabano Beatirisa	Runyombyi	FR3		Muhinzi	[signature]
7	Nyiramisenga Marsiana	Runyombyi	FR3		Umuhinzi	[signature]
8	Musigaro Constant	Runyombyi	FR3		umuhinzi	[signature]
9	Hategekimana Appolotari	Runyombyi	FR3		umuhinzi	[signature]
10	Mukakimani Serafina	Runyombyi	FR3		Umuhinzi	[signature]
11	Birimana Bernard	Runyombyi	FR3		Umuhinzi	[signature]
12	Kambanda Celestin	Runyombyi	FR3		umuhinzi	[signature]
13	Nyonsaba Veritina	Runyombyi	FR3		umuhinzi	[signature]
14	Kamugwera Serafina	Runyombyi	FR3		Umuhinzi	[signature]
15	Mukandekezi Marselina	Runyombyi	FR3		Umuhinzi	[signature]

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ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell RUNYOMBYI	Rd No.	Phone No.	Occupation	Signature
1	MUREKWERANTWALI Fidele	Ryabusagara	FR3		Umuhinzi	[signature]
2	Mukandasi Sitelija	Ryabusagara	FR3		Umuhinzi	[signature]
3	Mpozenyimana Emmanuel	Ryabusagara	FR3		Umuhinzi	[signature]
4	Barasa[illegible] Augustin	Ryabusagara	FR3		Umuhinzi	[signature]
5	Wikuze Rawbuza	Ryabusagara	FR3		Umuhinzi	[signature]
6	Ndabimenye Vital	〃	FR3		Umuhinzi	[signature]
7	Karangwa Vincent	Ryabusagara	FR3		Umuhinzi	[signature]
8	Mukashilala Gobudyse	Ryabusagara	FR3		Umuhinzi	[signature]
9	Mukangurw Sitefani	Ryabusagara	FR3		Umuhinzi	[signature]
10	Rutabilumpoza Tyangi	〃	FR3		Umuhinzi	[signature]
11	Usabimana Bosco	〃	FR3		Umuhinzi	[signature]
12	Kabaliza Vital	Ryabusagara	FR3		Umuhinzi	[signature]
13	Nsengiyumva Yezifonja	〃	FR3	0439551817 0722651935	Umurezi	[signature]
14	DUSABE Emmanuel	〃	FR3	0782689873 0725972385		[signature]
15	Nirere Godilwa		FR3		Umuhinzi	[signature]

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Intercontinental Consultants and Technocrats Pvt Ltd (India)
ALN Consultants Ltd (Rwanda)

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ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
1.	Sebahutu Celestin	Runyombyi	FR3		UMUHINZI	
2.	Kwizera Fidele	//	FR3	07826353800	//	
3.	NKURIKIYUMUKIZA J.Bosco	//	FR3	07	//	
4.	IYAKAREMYE Romain	//	FR3	07	//	
5.	NEMEYIMANA Patrice	//	FR3	//	//	
6.	HABARAbashaka	//	FR3	0783128??	//	
7.	NSANZUMUHIRE Fabrisius	//	FR3	//	//	
8.	MUKABEBA Becila	//	FR3	//	//	
9.	NTAMWETE Radisius	//	FR3	//	//	
10.	NIZEYIMANA Francois	//	FR3	//	//	
11.	NYIRADAHINDE	Runyombyi	FR3	//	//	
12.	AKIMANA Gloriose	//	FR3	078?9??828	ITERAMBERE	
13.	NYIRAMINANI Beatrice	//	FR3	//	UMUHINZI	
14.	NIKONEZE Adela	//	FR3	//	//	
15.	Burundwi Marita	//	FR3	//	//	

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ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
1.	BASEKANA Visent	RUNYOMBYI	FR3		UMUHINZI	
2.	NSHIMIYIMANA Jean	〃	FR3		〃	
3.	HAVUGIMANA Frank	〃	FR3		〃	
4.	NTAMUHANGA Mark	〃	FR3		〃	
5.	MUKAMURENZI Saraphin	〃	FR3		〃	
6.	MUKAMISHA Stephanie	〃	FR3		〃	
7.	NTAWUKURIRYAYO Venant	〃	FR3		〃	
8.	MUKANGOGA Seraphina	〃	FR3		〃	
9.	NZABAMWITA Zakias	〃	FR3		〃	
10.	MYAMONI J.M.V.	〃	FR3		〃	
11.	NIYIJABAHIGA Juvenal	〃	FR3		〃	
12.	BARARUTANA J.	〃	FR3		〃	
13.	MUKARUNGO Stephanie	〃	FR3		〃	
14.	MUKAREMERA Irène	〃	FR3		〃	
15.	MUKAMUSEGUZI Anon	〃	FR3		〃	

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ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
1	NIYITEGEKA Fabien	Lunyinya	FR 14		farming	[signature]
2	MUKAMANA Seraphine	"	FR 14		"	
3	NDORIMANA Gregoire	"	FR 14		"	[signature]
4	KAYIRANGA Bernard	"	FR 14		"	[signature]
5	[illegible] Seraphine	"	FR 14		"	[signature]
6	NYIRIMANA Seraphine	"	FR 14		"	[signature]
7	TWIZEYIMANA Vanisi	"	FR 14		"	[signature]
8	Nyirabarigira Judith	"	FR 14		"	[signature]
9	NYIRASENI Euphrasie	"	FR 14		"	[signature]
10	MUKANGARAMBE Seraphine	"	FR 14		"	[signature]
11	MUKAKAMARI Marie	"	FR 14		"	[signature]
12	NTIHANI Benjamin	"	FR 14		"	[signature]
13	NSENGUMUREMYI Ange	"	FR 14		"	[signature]
14	NSABIMANA Sai	"	FR 14		"	[signature]
15	NKULIKIYUMUKIZA Eric	"	FR 14		"	[signature]

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District: NYARUGURU / BUSANZE SECTOR Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
01.	MUKAGASANA Valerie	RUNYOMBYI	FR 14	0782033611	Umuhinzi	
02.	NSABIMANA Esdrass	RUNYOMBYI	FR 14		Umuhinzi	
03.	NYIRANTIZA Pauline	RUNYOMBYI	FR 14		Umuhinzi	
04.	NYINKAMIYE Esperence	RUNYOMBYI	FR 14		Umuhinzi	
05.	NYIRINKINDI Félicien	RUNYOMBYI	FR 14		Umucuruzi	
06.	SHARANKIKA Anastasie	RUNYOMBYI	FR 14		Umuhinzi	
07.	MUKANDEKEZI Vénantie	RUNYOMBYI	FR 14		Umuhinzi	
08.	NSABIMANA Bénel	RUNYOMBYI	FR 14		Umuhinzi	
09.	MUKAMURENZI Appolinarie	RUNYOMBYI	FR 14		Umuhinzi	
10.	NYIRASHUMBUSHA Annonciata	RUNYOMBYI	FR 14		Umuhinzi	
11.	MUKANDANGA Beline	RUNYOMBYI	FR 14		Umuhinzi	
12.	MUKAMANA Pélediane	RUNYOMBYI	FR 14		Umuhinzi	
13.	MUKANDEKEZI Vénantie	RUNYOMBYI	FR 14			
14.	NSHIMIYE Triphose	RUNYOMBYI	FR 14	0739320814	Chauffeur Rg	
15.	KWIZERA Augustavo	RUNYOMBYI	FR 14		Chauffeur Rg	

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Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: Nyaruguru / Busanze Secteur Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
1.	Rushimabigwi Jean Bosco	RUNYOMBYI	R14	0786310595	Umwanamaza buhinzi	
2.	Bizabinzira Vianney	RUNYOMBYI	R14	—	umuhinzi	
3.	Hitimana Celestin	RUNYOMBYI	R14	0782200032	umuhinzi	
4.	Nshimana Berardine	RUNYOMBYI	R14	0785441234	umuhinzi	
5	Mukaneza Anuarite	RUNYOMBYI	R14	0725009688	umuhinzi	
6	Niyonambaje Jeannette	RUNYOMBYI	R14	0722260595	umuhinzi	
7	Nduwimana Juvenal	RUNYOMBYI	R14	—	umuhinzi	
8	Munyaneza Gemus	RUNYOMBYI	R14	0722564725	umuhinzi	
9	Nsengerantwari Yve	RUNYOMBYI	R14	—	umuhinzi	
10	Nsanzimana Martin	RUNYOMBYI	R14	—	umuhinzi	
11	Bizimana J. Damascene	Runyombyi	R14	—	umuhinzi	
12.	Mukantabana Pelagie	Runyombyi	R14	-	umuhinzi	
13.	Ntabareshya Margarithe	Runyombyi	R14	—	umuhinzi	
14	Niyonsenga Frederic	Runyombyi	R14	—	umuhinzi	
15	Mukeshimana Claudette	RUNYOMBYI	R14	—	umuhinzi	

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Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: Nyaruguru Busanze Sector Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
1.	Nikoubenimana Frideric	Runyombyi	RN	0785468935	Chef de village	[signature]
2.	Nzeyimana Viyane	Runyombyi	RN	0782945838	Umunyamabanga	[signature]
3	Hakizimana Martin	Runyombyi	RN	-	Umuhinzi	[signature]
4.	Ntabazi Emanuel	Runyombyi	RN	-	Umuhinzi	[signature]
5.	Mukampazaye Patien	Runyombyi	RN	-	Umuhinzi	[signature]
6	Mukamuzima Emerita	Runyombyi	RN	-	Umuhinzi	[signature]
7.	Kabaganwa Erina	Runyombyi	RN	-	Umuhinzi	[signature]
8.	Nyandwi Serafina	Runyombyi	RN	-	Umuhinzi	[signature]
9	Mukabuyenge Mariseri	Runyombyi	RN	-	Umuhinzi	[signature]
10.	Mukankindi Siteri	Runyombyi	RN	-	Umuhinzi	[signature]
11.	Ngiruwonsanga Juyo	Runyombyi	RN	-	Umuhinzi	[signature]
12.	Kankindi Anasitaziyo	Runyombyi	RN	-	Umuhinzi	[signature]
13	Mukamusoni Matilda	Runyombyi	RN	-	Umuhinzi	[signature]
14	Tuyishimire Positivo	Runyombyi	RN	-	Umuhinzi	[signature]
15.	Gumyuzane Magdalida	Runyombyi	RN	-	Umuhinzi	[signature]

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District: NYARUGURU / BURANZE SECTOR Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
16.	Ntiruwonsanga Tuyfuro	Runyombyi	RN	–	Umuhinzi	
17.	Mukandekezi Dalisida	Runyombyi	RN	-	Umuhinzi	
18.	Nyirabahizi Evelina	Runyombyi	R 14	-	Umuhinzi	
19	Nyirarimpaniza Dayatiris	Runyombyi	RN	-	Umuhinzi	
20	Mukarusagara Esiperans	Runyombyi	RN	-	Umuhinzi	
21	Habimeza Leonaridi	Runyombyi	RN	-	Umuhinzi	
22	Nsabimana Mediyatiri	Runyombyi	RN	-	Umuhinzi	
23	Mukagaka Veritine	Runyombyi	R 14	-	Umuhinzi	
24	Niyongirenga Frederic	Runyombyi	RN	-	Umuhinzi	
25	Nahayo Yohani	Runyombyi	RN	-	Umuhinzi	
26.	Nyiragawuka Mariseri	Runyombyi	R 14	-	Umuhinzi	
27	Nsabimana Anastaz	Runyombyi	RN	-	Umuhinzi	
28	Sinzinkayo Emanuel	Runyombyi	RN	-	Umuhinzi	
29	Mukapashugi Dancilla	Runyombyi	RN	-	Umuhinzi	
30	Ayingeneye Shatali	Runyombyi	RN	-	Umuhinzi	

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ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
1.	Marie Maniraki	Runzoneyi	R14	0787158403	chef de village	[signature]
2.	Mutabaterandera	Runzoneyi	R14		umuhinzi	[signature]
3.	Ntawete Sitanislas	Runzoneyi	R14		umuhinzi	[signature]
4.	MINANI Marisero	RUNZONEYI	R14		umuhinzi	[signature]
5.	Nyandwi Faustin	RUNZONEYI	R14		umuhinzi	[signature]
6.	Mukanyarwiserera Anjeric	Runyombyi	R14		umuhinzi	[signature]
7.	Ndayizeye Isayas	Runyombyi	R14		umuhinzi	[signature]
8	Nzeyahagaye Filipe	Runyombyi	R14	0782200037	umucuruzi	[signature]
9.	Mujyenga Vincent	Runyombyi	R14		umuhinzi	[signature]
10	Ndayishimiye Vicent	Runyombyi	R14		umuhinzi	[signature]
11	Habyarimana Felicien	Runyombyi	R14		umuhinzi	[signature]
12	Nyamurenzi Virjona	Runyombyi	R14		umuhinzi	[signature]
13	Mukagatarayakarara	Runyombyi	R14		umuhinzi	[signature]
14	Kankindi Annociata	Runyombyi	R14		umuhinzi	[signature]
15	Nsengandwi Kanyamu	Runyombyi	R14	0737813582	umuhinzi	[signature]

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: NYARUGURU / Busanze Sector Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
1	NYIRANSAGUYE Alice	Runyombyi Busanze	FR14	0728938701	Umuhinzi	[signature]
2	NEMEYIMANA Patrice	Runyombyi	FR14		Umuhinzi	[signature]
3	MUKANYAMWASA Drigonne	"	FR14		Umuhinzi	[signature]
4	RUGENERA Emmanuel	"	FR14		"	[signature]
5	IYAKAREMYE Pascasiano	"	FR14	0737493077	"	[signature]
6.	MANIRAKIZA Innocent	"	FR14		"	[signature]
7.	SEBAHANI Silas	"	FR14		"	[signature]
8	SHUMBUSHA Zeveriyana	"	FR14		"	[signature]
9.	NSATUABA Silvestri	"	FR14		"	[signature]
10.	NIYONTEZE Anisita	"	FR14		"	[signature]
11.	CYIZA Berthilda		FR14		"	[signature]
12	NIJI ROZA Dativa	"	FR14		"	[signature]
13	NYIRANAGUYE Maricelina	"	FR14		"	[signature]
14	MUKANGARAMBE Yosepha	"	FR14		"	[signature]
15	KWIZERA charles	"	FR14		"	[signature]

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: NYARUGURU / RUHEREZE SECTOR Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
1	NUNYAKAYANGA J Bosco	Runyombyi	FR14	0727162547	chef de village	
2.	NKUNDAZERA Vanisto	"	FR14		UMUHINZI	
3	BAKUNDUKIZE Thomasi	"	FR14		UMUHINZI	
4.	MBARUBUKEYE Anastasi	"	FR14		" "	
5.	NIYONGISABA Bosthusi	"	FR14		" "	
6.	SENGAYUMVA Sesostor	"	FR14		" "	
7	HAKAMBINEZA Emmanuel	"	FR14		" "	
8	MUGABIZIMA Adela	"	FR14		"	
9.	NSANBABAGANWA Faustayne	"	FR14		"	
10.	NTAGONANYIRAZE Vitariana	"	FR14		"	
11.	NDIKANISHA Angelique	"	FR14		"	
12.	MUSHIMANAMAKE Anamal	"	FR14		"	
13.	NYIRAREFAKOMAYE Fazi	"	FR14		"	
14	NYIRANABIMANA Susana	"	FR14		"	
15.	MUKAMOUTIYE Ananiat	"	FR14		"	

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: NYARUGURU / BUSANZE SECTOR Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
1.	Mushimiyimana Violette	Kinyo ...	FR14	0788551027	ES of cell	
2.	Dusabe odette	-11-	FR14		UMUHINZI	
3.	NYIRISHAKA Vincent	-11-	FR14		〃	
4.	NIYOBUHUNGIRO Liberata	-11-	FR14		〃	
5.	MUKESHIMANA Gaudine	-11-	FR14		〃	
6.	MUJAWAYEZU Dancille	-11-	FR14		〃	
7.	MUKAKARISA Generation	-11-	FR14		〃	
8.	NYIRUSHWA Seraphine	-11-	FR14		〃	
9.	NYAMANI Patricia	-11-	FR14		〃	
10.	MUKANZABIYE Donatien	-11-	FR14		〃	
11.	BASABOSE Euphrasie	-11-	FR14		〃	
12.	SEBANANA Innocent	-11-	FR14		〃	
13.	KANZIGA Fredance	-11-	FR14		〃	
14.	SHUMBUSHA Lucien	-11-	FR14		〃	
15.	NYIRAMANA Susana	-11-	FR14		〃	

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

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District: NYARUGURU / BUSANZE SECTOR Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
01	BISENGIMANA Mathieu	Runyombyi	FR14	0788423729	Perezida w'abahinzi	
2.	ABAHUMDANYSE Domina	Runyombyi	FR14	0782200001	Umujyanama w'abagore	
3.	DUSABE Nalia	Runyombyi	FR14		Umutahira(Cnf)	
4.	MUKARUBAYIZA Daphrose	Runyombyi	FR14		Ubuhinzi	
5.	NYIRINKINDI Sebastien	Runyombyi	FR14	0787163679	Umwubatsi	
6.	SIBOMANA Emmanuel	Runyombyi	FR14	0785113530	Umuhinzi	
7.	NGEZAHAYO Anastasia	Runyombyi	FR14	0726641868	"	
8.	NTAMWETE Visenti	Runyombyi	FR14		"	
9.	NYIRAMAHIRWE Josephine	Runyombyi	FR14		"	
10	MUSABYIMANA Lorano	Runyombyi	FR14	0786093411	"	
11	UWAYISABA Etienne	Runyombyi	FR14	AA	Umuhuzi	
12	GAHIZI Viator	Runyombyi	FR14		Umuhinzi	
13	NSHIMIYIMANA J. Pierre		FR14		"	
14	TWAGIRUMANA Felix	Runyombyi	FR14	0788352272	CNS Coordinator	
15.	ZINAKWINSHA Seraphine	Runyombyi	FR14		Umuhinzi	

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Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: Nyaruguru / Busanze sector Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
1	Mukandinda Vestine	Runyombyi	R14	0782695805	Muhereko	
2	Nyirazeneye Jeannette	"	R14		Umuhinzi	
3	Mukandahiro Marcelle	"	R14		Umuhinzi	
4	Mugwaneza Boniface	"	R14	0782629943	Umuhinzi	
5	Bizimuremyi Jean Bosco	"	R14		Umuhinzi	
6	Nyirarango Josephine	"	R14		Umuhinzi	
7	Mukansoneye Saverina	"	R14		Umuhinzi	
8	Mukashema Berthilde	"	R14		Umuhinzi	
9	Camfizi Beatrice	"	R14		Umuhinzi	
10	Sindikubwabo Silas	"	R14		Umuhinzi	
11	Mugwaneza Calixte	"	R14		Umuhinzi	
12	Ndashimye Paul	"	R14		Umuhinzi	
13	Yambabariye Innocent	"	R14		Umuhinzi	
14	Ndizeye Xavier	"	R14		Umuhinzi	
15	Mukambanda Bonifride	"	R14		Umuhinzi	

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: NYARUGURU / RUHEREZE SECTOR Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
1	Hakizimana Visenti	Runyombyi	FR 14	0737760618	Chef de village	[signature]
2	Nkurunziza Fesito	Runyombyi	FR 14		Umuhinzi	[signature]
3	Mukamusoso Keremotene	Runyombyi	FR 14		Umuhinzi	[signature]
4	Ishimwimana Fausso	Runyombyi	FR 14		Umuhinzi	[signature]
5	Uwimpuhwe Beyoto	Runyombyi	FR 14	0788100080	imborehamyiza	[signature]
6	Musabyimana Rufosino	Runyombyi	FR 14		Umuhinzi	[signature]
7	Mbonimpoye Dorotea	Runyombyi	FR 14	0782043723	Umuhinzi	[signature]
8	Mukamanzi Serafina	Runyombyi	FR 14		Umuhinzi	[signature]
9	Gampisi Siritositia	Runyombyi	FR 14		Umuhinzi	[signature]
10	Sibomana Rozana	Runyombyi	FR 14		Umuhinzi	[signature]
11	Ndolato Vosenti	Runyombyi	FR 14		Umuhinzi	[signature]
12	Semuzima Sinilero	Runyombyi	FR 14		Umuhinzi	[signature]
13	Niragirude Voto	Runyombyi	FR 14		Umuhinzi	[signature]
14	Kabego Meremiyo	Runyombyi	FR 14		Umuhinzi	[signature]
15	Mukeshema Jeni	Runyombyi	FR 14		Umuhinzi	[signature]

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

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District: NYARUGURU/RANGE FEEDER Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
01.	NDAYENGA Jean de Dieu	RUNYOMBYI	FR 14	0788688107	Chairman RC	
02.	HABIMANA Daciol	RUNYOMBYI	FR 14	0783858851	Chief of village	
03.	SEKIDENDE Xavier	RUNYOMBYI	FR 14	0788200069	Umudugudu	
04.	KAYITESA André	RUNYOMBYI	FR 14		Umudugudu	
05.	NIYONGISABA Marceline	RUNYOMBYI	FR 14		Umudugudu	
06.	NYIRASAFARI Agnès	RUNYOMBYI	FR 14	0726441735	Umudugudu	
07.	RUKERATABARO Innocent	RUNYOMBYI	FR 14		Umudugudu	
08.	MUNYANEZA Albert	RUNYOMBYI	FR 14		Umudugudu	
09.	NYIRAMUHIRE Judith	RUNYOMBYI	FR 14		Umudugudu	
10.	NSENGIYUMVA Vincent	RUNYOMBYI	FR 14		Umudugudu	
11.	BIZIMANA Salathiel	RUNYOMBYI	FR 14		Umudugudu	
12.	NIYONSABA Eric	RUNYOMBYI	FR 14		Umudugudu	
13.	SIMBAYOBENE Collette	RUNYOMBYI	FR 14		Umudugudu	
14.	NZIGAMASABO Martin	RUNYOMBYI	FR 14		Umudugudu	
15.	NYIRASHYAKA Elizabeth	RUNYOMBYI	FR 14		Umudugudu	

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: NYARUGURU / BUSANZE SECTOR Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
01	NYIRASIKUBWABO Cathilin	RUNYOMBYI	FR14		Umuhinzi	[signature]
02	NIBAREZE Donatila	RUNYOMBYI	FR14		Umuhinzi	[signature]
03	UWABABWIRA Melecian	RUNYOMBYI	FR14		Umuhinzi	[signature]
04	MUKUTABARI Cécile	RUNYOMBYI	FR14		Umuhinzi	[signature]
05	MUKAHIGIRO Jeannette	RUNYOMBYI	FR14		Umuhinzi	[signature]
06	NIKUZE Violette	RUNYOMBYI	FR14		Umuhinzi	[signature]
07	KAMUGEMA Anastasie	RUNYOMBYI	FR14		Umuhinzi	[signature]
08	RUGUMI Emmanuel	RUNYOMBYI	FR14		Umuhinzi	[signature]
09	NYIRANKUNDA Consolée	RUNYOMBYI	FR14		Umuhinzi	[signature]
10	RUGYAVANZ Pascal	RUNYOMBYI	FR14		Umuhinzi	[signature]
11	MBARUSHIMANA Augustin	RUNYOMBYI	FR14	0783441683	Umuhinzi	[signature]
12	MUKANKUBURA Annonciata	RUNYOMBYI	FR14		Umuhinzi	[signature]
13	NYIRAHABIMANA Alphonsine	RUNYOMBYI	FR14		Umuhinzi	[signature]
14	NYIRAMUGIRE Judithe	RUNYOMBYI	FR14		Umuhinzi	[signature]
15	MUHAWENIMANA Frédéric	RUNYOMBYI	FR14		Umuhinzi	[signature]

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BUSANZE SECTOR

District: NYARUGURU / RUNYOMBYI Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell RUNYOMBYI	Rd No.	Phone No.	Occupation	Signature
16	Mukampunda Mariette	Ryabusagara	FR 14		Umuhinzi	
17	Mbonimpaye Vestine	"	FR 14		Umuhinzi	
18	Nyirazeyimana Rose	"	FR 14		Umworozi	
19	Sibomana Joseph	Ryabusagara	FR 14		Umuhinzi	
20	Mukandamage Fausta	"	FR 14		Umuhinzi	
21	Mansabona Vincent	"	FR 14		Umuhinzi	
22	Kuzwaba Basilisa	"	FR 14		"	
23	Ntezeyezu Vincent	Ryabusagara	FR 14		"	
24	Ntakirutimana Silasi	Ryabusagara	FR 14		"	
25	Nyirarumu Joseph		FR 14			
26	Sekamandwa Anastaze	Ryabusagara	FR 14		Umuhinzi	
27	Nyirabanyi-Udomba	"	FR 14		Umuhinzi	
28	Mutunzi Pesimon	Ryabusagara	FR 14		Umuhinzi	
29	Gasimbo Emanuel	Ryabusagara	FR 14		Umuhinzi	
			FR 14			

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: NYARUGURU / CYAHINDA / NYAGISOZI Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
91	UWISIZE Jean Claude	Muzoza	FR7	0788799279	Sedo	
92	Manirafasha Clementine	Nyagisozi	FR10	0726245609	Umuhinzi	
93	Ngamije Faransua	Nkanka	FR7		Umuhinzi	
94	Bakundukiziranyeza Kristofo	Nyagisozi	FR10		Umuhinzi	
95	Kwamtila M. Laplean	Cyahinda	FR9	0785581602	Ptetaired	
96	Mukashema Claudine	Nkakwa	FR7	0783467304	ES of cell	
97	Kanyamibwa Liberée	Rutobwe	FR7	-	Umuhinzi	
98	Sebaganji Oswaldo	Cyahinda	FR9	-	Hinzi	
99	Murabatinfi Saveri	Cyahinda	FR9		Umuhinzi	
100	Uwobirumdiye Narcisse	Nyagisozi	FR10	-	Umuhinzi	
101	Musabende Emmanuel	Cyahinda	FR9	-	Umuhinzi	
102	Nzeyimana Callixte	Cyahinda	FR9	-	Umuhinzi	
103	Niyimana Sylvestre	Cyahinda	FR9	078772842	Umuhinzi	
104	Nyamwasa JMV	Cyahinda	FR9		Umuhinzi	
105	Ndahimana Apolinaire	Nyagisozi	FR10	0787008652	Umuhinzi	

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Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: NYARUGURU / NYAGISOZI / CYAHINDA Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
76	MANIRAKIZA Callixte	Nyagisozi	FR10	0788774783	Exec. in cell	[signature]
77	Munyaneza Célestin	Nyagisozi	FR10	0782744541	Village leader	[signature]
78	Uwayezu Chaban	Rubona	FR10	0789363652	Umuhinzi	[signature]
79	Mukamunana Monique	Cyahinda	FR9	0789268271	E/S of cell	[signature]
80	Nirere Espérance	NYAGISOZI	FR10	0785056598	umuhinzi	[signature]
81	MUREKATETE Jacqueline	NYAGISOZI	FR10	0723160099	umuhinzi	[signature]
82	Byukusenge M. Claire	Nyagisozi	FR10	0784833679	Umuhinzi	[signature]
83	MUKAMURENZI MONICA	NYAGISOZI	FR10	0727435487	UMUHINZI	[signature]
84	Nyirandabashimiye	Nyagisozi	FR10		umuhinzi	[signature]
85	NAHIMANA Eugenie	NYAGISOZI	FR10		UMUHINZI	[signature]
86	MUKAMBABAZI Zecky	Nyagisozi	FR10	0722183124	UMUHINZI	[signature]
87	MUKARUTABANA Anonciata	NYAGISOZI	FR10	0727872799	UMUHINZI	[signature]
88	Mukakutera Aurelia	Gahinda	FR9		umuhinzi	[signature]
89	Uwizeyimana Beatrice	Gahinda	FR9		umuhinzi	[signature]
90	GASANA Modeste	NYAGISOZI	FR10	0783118727	S/Ed	[signature]

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ALN Consultants Ltd (Rwanda)

MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

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ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
61	Uzabilinda Emmanuel	Nyagisozi	FR10	0781613335		[signature]
62	Habyiyingeru Innocent	Nyagisozi	FR10	0783615820	President w'inyangamugayo	[signature]
63	Sharangabo Marcel	Cyahinda	FR9	0788596495	Umwarimu	[signature]
64	Ntirimana Vincent	Cyahinda	FR3	-	Umuhinzi	[signature]
65	Mukamurama Leticia	Nyagisozi	FR10	0783182407	Umuhinzi	[signature]
66	Dusabe Flane	Nyagisozi	FR10	-	Umuhinzi	[signature]
67	Rwagaju Justin	Nyagisozi	FR10	-	Umuhinzi	[signature]
68	Bugabo Faust	Nyagisozi	FR10	-	Umuhinzi	[signature]
69	Nkuli Apolinaire	Cyahinda	FR3	-	Umuhinzi	[signature]
70	Mwenteri Justin	Nyagisozi	FR10	-	Umuhinzi	[signature]
71	Munana Jacques	Nyagisozi	FR10	0782517603	Umuhinzi	[signature]
72	Uwimana Emilie Rose	Nyagisozi	FR10	0788338229	Umuhinzi	[signature]
73	Uwikunda Odette	Nyagisozi	FR10	0787642610	HPA Ushinzwe	[signature]
74	Bitegimbabazi Reverien	Nyagisozi	FR10	07...	Umuhinzi	[signature]
75	Vankunzi Jeannette	Agatovu	FR10	0782437206	[illegible]	[signature]

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ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
46	Nyabyenda Alphonse	Mwoya	FR1	0784765903	Umuhinzi	[signature]
47	Hitimana Emmanuel	Nyagisozi	FR10	—	umuhinzi	[signature]
48	Nsabimana Viateri	Nyagisozi	FR10	0786246831	umuhinzi	[signature]
49	NDABAKENGA Innocent	MWOYA	FR1	—	Umuhinzi	[signature]
50	SEBAZUNGU François	NYAGISOZI	FR10	—	Umuhinzi	[signature]
51	NSABIMANA Vincent	NYAGISOZI	FR10	—	Umuhinzi	[signature]
52	NAZINA Ignance	NYAGISOZI	FR10	—	Umuhinzi	[signature]
53	MUKENGERANTWALI Immaculée	Nyagisozi	FR10	0786375178	Umuhinzi	[signature]
54	RUBABUKA Augustin	NYAGISOZI	FR10	—	Umuhinzi	[signature]
55	Rwanguhinde charles	Nyagisozi	FR10	— —	Umuhinzi	[signature]
56	Nyabyenda Jdamuni	Nyagisozi	FR10	0732613062	umuhinzi	[signature]
57	Ndayisenga juvenal	Nyagisozi	FR10	0782422764	Umuhinzi	[signature]
58	Bizimana Disimas	Nyagisozi	FR10	0732577999	Umuhinzi	[signature]
59	Kabalisa viateur	Nyagisozi	FR10	0721524522	umuhinzi	[signature]
60	Rwagitare J.M.V	Gyahinda	FR9	0786914611	Umuhinzi	[signature]

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District: NYARUGURU | RUSENGE Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
	NTIGANIRA Donot	RARANZIGE	FR13	0727057691	Chef de village	
	NYIRAHABIMANA Anatolie	RARANZIGE	FR13	–	umuhinzi	
	GASIRABO Charles	RARANZIGE	FR13	–	umuhinzi	
	NYIRANGENDO Angera	RARANZIGE	FR13	–	umuhinzi	
	MUKAMBABAZI Joseline	RARANZIGE	FR13	0784117110	umuhinzi	
	MUKAGAHAMANYI Seraphine	RARANZIGE	FR13	0784202760	umuhinzi	
	KUNDANIKUZE Pelagie	RARANZIGE	FR9	–	umuhinzi	
	NYIRAHORANA Francine	RARANZIGE	FR9	–	umuhinzi	
	NYILIBAMBE Cécile	RARANZIGE	FR9	–	umuhinzi	
	NIYONSABA Frolide	RARANZIGE	FR13	–	umuhinzi	
	NYIRASIKUBWABO Alisa	RARANZIGE	FR13	–	umuhinzi	
	NYIRARWASA Francine	RARANZIGE	FR3	–	umuhinzi	
	NYIRANEZA Grâce	RARANZIGE	FR13		umuhinzi	
	UWITONZE Evelin	RARANZIGE	FR13		umuhinzi	
	NYIRANEZA Annociata	RARANZIGE	FR13		umuhinzi	

MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: NYARUGURU / KIBEHO Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
	Mukambabazi Liberée	Mpanda	FR2	0784344531		
	Bihayiki Solange	"	FR2	-		
	Nyiraminani Saveline	"	FR2	-		
	Mukanduhura Specioza	"	FR2	-		
	Musabe Jeanine	"	FR2	-		
	Mukabaraza Amosiatha	"	FR2	-		
	Mukanteyimana Jeannette	"	FR2	0739538410		
	Nyiramana Claudine	"	FR2	-		
	Nyiraneshimana Malita	"	FR2	-		
	Akimana Donatha	"	FR2	-		
	Muhorali Françoise	"	FR2	0784642587		
	Karatatse Theophine	"	FR2	-		
	Nsengiye Venansiya	"	FR2	-		
			FR2			
			FR2			

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: Nyaruguru / Kibeho Date: 24/03/016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
1	Kayitare Idelphonse	Mpanda	FR2		Umwalimu	[signature]
2	Mukandekezi Vestine	Mpanda	FR2		Umuhinzi	[signature]
3	Sintukamazina Selva	Mpanda	FR2		Nzi	[signature]
4	Ukitomana Flancine	Mpanda	FR2	0725443030	Nzi	[signature]
~~5~~	~~[illegible] Vey~~		FR2			
5	Ruzindana Desire	Mpanda	FR2		Nzi	[signature]
6	Nsengiyumva Siperiano	Mpanda	FR2		Nzi	[signature]
7	Sebikina Nausica	Mpanda	FR2		Nzi	[signature]
8	Nikuze Jacqueline	Mpanda	FR2		Nzi	[signature]
9	Nyirimana Celarine	Mpanda	FR2		Nzi	[signature]
10	M. [illegible] Jordand	Mpanda	FR2		Nzi	[signature]
11	Kayiteni Clodine	Mpanda	FR2		Nzi	[signature]
12	Nikuze Feriste	Mpanda	FR2		Nzi	[signature]
13	Musabyimana Placie	Mpanda	FR2		Nzi	
14	Mukayiranga Christine	Mpanda	FR2		Nzi	[signature]
15	Murecyezi Isai	Mpanda	FR2		Nzi	

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: NYARUGURU/KIBEHO Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
1	Bampire Verarie	M'Panda			N2i	
2	Uwimana Jacqueline	M'Panda	FR2		N2i	
3	Ntagungirimana	M'Panda	FR2		N2i	
4	Gatete Nasarie	M'Panda	FR2		N2i	
5	Karamberi Innocent	M'Panda	FR2		N2i	
6	Rutayisire Jean	M'Panda	FR2		N2i	
7	Mr. Shimana Innocent	M'Panda	FR2		N2i	

MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: NYARUGURU/RUHENGE Date: 24/07/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
	Mutuyemungabo Venuste	Raranzige Rusenge	FR9	0725390327	Umuhinzi	[signature]
	Niyitegeka Vedaste	Raranzige Rusenge	FR9	0728598839	Umuhinzi	[signature]
	Kumuwitsa Venuste	Raranzige Rusenge	FR9		umuhinzi	[signature]
	NGIRANGABAYIRA	Raranzige Rusenge	FR9		Umuhinzi	[signature]
	MUSABYIMANA Zella	Raranzige Rusenge	FR9		Umuhinzi	[signature]
	MUNYANEZA Venuste	Raranzige Rusenge	FR13		Umuhinzi	[signature]
	Munezero Straton	Raranzige Rusenge	FR13		Umuhinzi	[signature]
	Habimana Simon	Raranzige Rusenge	FR13		Umuhinzi	[signature]
	NIZEYIMANA Fransois	Raranzige	FR13	[illegible]	Umuhinzi	[signature]
	Uwimbabazi Clodine	Raranzige	FR13		umuhinzi	[signature]
	Ndatimana Emanuel	"	FR9		umuhinzi	[signature]
	Nyirabahizi Anastasie	"	FR9		umuhinzi	[signature]
	Uwiramahoro Vestine	"	FR9		umuhinzi	
	Ukeshimana Jean	"	FR9	"		[signature]
	MUNYANEZA Thomas	"	FR9	"		[signature]

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: Nyaruguru / Rusenge Date: le 24/8/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
1	MINANI Vedaste	Rusenge/Raranzige	FR13	0794957614	Umuhinzi	[signature]
2	NYABYENDA Charles	Rusenge / Raranzige	FR13		Umuhinzi	[signature]
3	M. MUKENGANA Euphrasie	Raranzige	FR13		Umuhinzi	[signature]
4	MUKARUREGO Joseph	Raranzige	FR13	0723274812	Umuhinzi	[signature]
5	UWIBAMBANJE Vianuta	Raranzige	FR13		Umuhinzi	[signature]
6	USABABERA Laurent	Raranzige	FR13		Umuhinzi	[signature]
7	MUKASINE Liberata	Raranzige	FR13		Umuhinzi	[signature]
8	HABIMANA Emmanuel	Raranzige	FR13		Umuhinzi	[signature]
9	KANANI Seraphine	Raranzige	FR13		Umuhinzi	[signature]
10	MUTUMWINKA Selapie	Raranzige	FR13		Umuhinzi	[signature]
11	KARANGWA Ernest	Raranzige	FR13	0789983124	K/c 4 OV	[signature]
12	Nzeyimana Jean Claude	Raranzige	FR13	0788317741	Umuhinzi	[signature]
13	MAZONA Stratan	RARANZIGE	FR9	0735400465	Umuhinzi	[signature]
14	Mukanti Donatille	MARIBA	FR9	0782374849	Umuhinzi	[signature]
15	NTIGANIRA Jonat	RARANZIGE	FR9	0782057651	umuhinzi	[signature]

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: Nyaruguru / Rusenge   Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
1.	Mukamana Francine	Rusenge/Raranzige	FR13		Umuhinzi	
2.	Kayitesi Donata	Raranzige Rusenge	FR13		umuhinzi	
3.	Mukantage Makurata	Raranzige Rusenge	FR13		umuhinzi	
4.	Uwayenza Maria	Raranzige Rusenge	FR13		umuhinzi	
5.	Berisiro Nyirakoje	Raranzige Rusenge	FR13		umuhinzi	
6.	Kabaganwa Beyota	Raranzige Rusenge	FR13		umuhinzi	
7.	Karemera Wotari	Raranzige Rusenge	FR13		umuhinzi	
8.	Mukayuhi Serafiya	Raranzige Rusenge	FR13		umuhinzi	
9.	Ndagijimana Fidele	Raranzige Rusenge	FR13		umuhinzi	
10.	Rutagisire Vigatoli	Raranzige Rusenge	FR13		umuhinzi	
11	Sabimana Inonsa	Raranzige Rusenge	FR13		umuhinzi	
12.	Sengimana Andereya	Raranzige Rusenge	FR13		umuhinzi	
13	Mukarutonga Odeta	Raranzige Rusenge	FR13	0782382446	umuhinzi	
14.	Hacumana Sipiriyoni	Raranzige Rusenge	FR13		umuhinzi	

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Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: Nyaruguru / RUSENGE Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
	MUNYENTWALI Vianney	Raranzige	FR9	.	Umuhinzi	[signature]
	Rwabutanga Charles	Raranzige	FR9		Umuhinzi	[signature]
	Kadoge Jayansi	Raranzige	FR9		Umuhinzi	[signature]
	Rwamahunga Innosa	Raranzige	FR13	0786410079	Hinzi	[signature]
	Hategekimana André	Raranzige	FR13	0727157703	Hinzi	[signature]
	Rumyange Gerigal	Raranzige	FR13		"	[signature]
	Nyiraminani Donate	Raranzige	FR13		"	[signature]
	Ntihimpimana Theodore	" "	FR13		"	[signature]
	Bihogiki Aphorodis	" "	FR13		"	[signature]
	Ntiseruma Domathil	" "	FR13		"	[signature]
	Nyiranzeyimana V.	" "	FR13		"	[signature]
	Rundenere Viatel	" "	FR13		"	[signature]
	Umurisa Thiophile	" "	FR13		"	[signature]
	Uwitonze Claudine	" "	FR13		"	[signature]
	Nyiratabaro Alpho	" "	FR13		"	[signature]

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: NYARUGURU / RUSENGE Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
	Mukamisha Fòrecite	Raranzige	FR13		Umuhinzi	
	Mukamanzi Viktoria	Raranzige	FR13		" "	
	Mugabekazi Beatta	" "	FR13		" "	
	Muhawenimana Robert	" "	FR13		" "	
	Murekezi Izayas	" "	FR9		" "	
	Muhagakwerere Fransin	" "	FR9		" "	
	Mukashyaka Donatha	" "	FR9		" "	
	Kabeamuka Vianney	" "	FR9		" "	
	Mumporwa Donatha	" "	FR9		" "	
	Mukabasingavenerand	" "	FR9		" "	
	Dusingizemariya Dati	" "	FR13		" "	
	Sebatware Berenard	" "	FR13		" "	
	Nshokeyingoma Jonas	" "	FR13		" "	
	Habumugisha Gaston	" "	FR13		" "	
	Mukamusoni Joseph	" "	FR13		" "	

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: Nyaruguru / Rusenge Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
	Yokuze Veronika	Raranziye	FR13	Raranzige		
	Uwambayinkindi Sitifa	"	FR13	"		
	Kubwimana Anamiyosi	"	FR9	"		
	Ngabire Epifaniya	"	FR9	"		
	Nijonsaba Siperansiya	"	FR9	"		
	Nyirakanyiga Benjamiya	"	FR9	"		
	Mukabagomariya Beyata	"	FR9	-		
	Ncabire Serange	"	FR9	-		
	Rukundo Emmanuel	[illegible]	FR2	-	SEDO/cell	
	MIYONDORA Alice	Raranzige	FR9	-	SEDO/cell	
	NSABIMANA J. Paul	RARANZIGE	FR9	0782327653	HINZI	
	UWIMANA ANGELIQUE	" "	FR9	0783104273	HINZI	
	ZANINKA CLAUDINE	" "	FR9	07[illegible]12220	" "	

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: NYARUGURU / RUSENGE Date: 24/08/2015

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
1	Mukanyomwero Donatille	Raranzige	FR13		Umuhinzi	[signature]
2	Nyirahongayire Donatille	Raranzige	FR13		Umuhinzi	[signature]
3	Nyirandorongo Donati	"	FR13	0785760158	"	[signature]
4	Mukantwari Eveline	"	FR13		"	[signature]
5	Gakima Alex	"	FR13		"	[signature]
6	Bizimana Charles	"	FR13		"	[signature]
7	Niyonsenga Joscof	Mariba	FR13	0783393195 / 0723208156	[illegible]	[signature]
8	Rwihangana Evariste	Raranzige	FR13	0785167074	Umuhinzi	[signature]
9	Gyakole Jean d'	"	FR13	0787669375	"	[signature]
10	Nubondo [illegible]	"	FR13		"	[signature]
11	Mukeshimana Bernadette	"	FR13		"	[signature]
12	Mukeshimana Coroza	"	FR13		"	[signature]
13	Augabara Viane	"	FR13		"	[signature]

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: NYARUGURU/NYAGISOZI Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
31	NGIZWENAYO Emmanuel	NKAKWA	FR7	0785482762	Umujyanama	
32	UWIMANA Edouard	MARABA	FR10	0788572659	Umuhinzi	
33	NKAMANA Venantie	MWOYA	FR1	—	Umuhinzi	
34	Uwizeyimana Mathare	NYAGISOZI	FR10	0788617718	Chief of village	
35	Sibomana Emmanuel	Cyahinda	FR9		Umuhinzi	
36	NYABENDA Vianney	MWOYA	FR1	0786779462	Umuhinzi	
37	NIZEYIMANA Pascal	MWOYA	FR1	0727553413	Umuhinzi	
38	NDAYISENGA Joseph	NYAGISOZI	FR10	0785659317	Umuhinzi	
39	NYABSENDA Augustin	NKAKWA	FR7	0781065352	Umuhinzi	
40	NSENGIYUMVA Wenceslas	NKAKWA	FR7	—	Umuhinzi	
41	MUTAGANIRA Appolinaire	NYAGISOZI	FR10	0789407958	Umuhinzi	
42	MUTUNGEYE Innocent	CYAHINDA	FR9	—	Umuhinzi	
43	NDAYISABA Gratien	NYAGISOZI	FR10	—	Umuhinzi	
44	SIBOMANA Vincent	MWOYA	FR1	—	Umuhinzi	
45	URAMBYE Vianney	MWOYA	FR1	—	Umuhinzi	

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: NYARUGURU/NYAGISOZI Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
16	NZAGIBWAMI Thadée	NYAGISOZI	FR10	–	umuhinzi	[signature]
17	Nzaramba Célestin	Nyagisozi	FR10	–	umuhinzi	[signature]
18	NIYONGEREKI Innocent	NYAGISOZI	FR10	–	umuhinzi	[signature]
19	Nyirabasami Grâce	NYAGISOZI	FR10	–	umuhinzi	[signature]
20	Mungonyiriza Devota	Nyagisozi	FR10	0782436543	umuhinzi	[signature]
21	Mukamurera Vestine	"	FR10	–	umuhinzi	[signature]
22	Yamuragiye Josline	"	FR10	–	umuhinzi	[signature]
23	Mukangwije Jozefa	"	FR10	–	umuhinzi	[signature]
24	M. Sabo Beatha	Cyahinda	FR9	0723464089	umuhinzi	[signature]
25	Mukabalera Prosipela	Gasasa	FR9	–	umuhinzi	[signature]
26	Nyiraminani Yosefina	Nyagisozi	FR10	–	umuhinzi	[signature]
27	Uwimana Immaculée	Cyahinda	FR9	0727438754	"	[signature]
28	Mukagashongore Sitefani	"	FR9	–	umuhinzi	[signature]
29	Niyonzaba Adela	Nyagisozi	FR10	–	umuhinzi	[signature]
30	Nyiraminani Sifiko	Cyahinda	FR9	–	umuhinzi	[signature]

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Intercontinental Consultants and Technocrats Pvt Ltd (India)
ALN Consultants Ltd (Rwanda)

MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: Nyaruguru CS/Nyagisozi Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
1	KWITONDA Déodatus	NYAGISOZI	FR10	0788826703	Agronome	[signature]
2	KOMEZURUKUNDO Léo	NYAGISOZI	FR10	0788847729	Umuhinzi	[signature]
3	MUKANTWALI Eugénie	MWOYA	FR1	0782422173	Umurezi	[signature]
4	MACUMUYIMIGABO Husson	NAKABA	FR10	0788556104	Umuhinzi	[signature]
5	Bamboraj Antoine	NYAKABA	FR10	0788907219	Umuhinzi	[signature]
6	Kayitare Damascène	Nyagisozi	FR10	0783071897	Umuhinzi	[signature]
7	Hakizimana Claude	Nkakwa	FR7	0785485880	Umuhinzi	[signature]
8	Gashugi Juvénal	Nkakwa	FR7	0791144410	Umuhinzi	[signature]
9	HABUMUGISHA Zachée	NKAKWA	FR7	0784733207	Umucuruzi	[signature]
10	Ndayisaba Innocent	Nkakwa	FR7	0785976092	Umuhinzi	[signature]
11	MUKABANKWAYA Félicité	Cyahinda	FR9	0783475813	Umuhinzi	[signature]
12	BUTERA EVARISTI	NKAKWA	FR7	-	Umuhinzi	[signature]
13	MUKARUSHEMA Viviane	Nkakwa	FR7	-	Umuhinzi	[signature]
14	MARIBORI NYESI	NKAKWA	FR7	-	Umuhinzi	[signature]
15	HABIYAMBERE J. Kolode	NKAKWA	FR7	-	Umuhinzi	[signature]

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: NYARUGURU/KIBEHO Date: 24/11/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
	Kanamugire	Mpanda	FR2		Umuhinzi	[signature]
	Rwindoun Charles	Mpanda	FR2	0788200194	Umuhinzi	[signature]
	Sibomana Pascal	Mpanda	FR2		Umuhinzi	[signature]
	Rutamoll Pleo	Mpanda	FR2	0787291081	Umucuruzi	[signature]
	Biziyaremye	Mubuga	FR1	......	Umuhinzi	[signature]

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: Nyaruguru / Kibeho Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
	Mukarurego Immaculée	Mpanda	FR2	-	Umuhinzi	
	Mutabazi Evaliste	"	FR2	-	Umuhinzi	
	Rwamahuba Vianney	"	FR2		Umuhinzi	
	Mukandori pauline	"	FR2		Umuhinzi	
	Uwamumpoleza yaqueline	"	FR2		"	
	Uzabakiriho Jenovieve	"	FR2		"	
	Nikobatuyejean Bosco	"	FR2		"	
	Kayitesi Donata	"	FR2		"	
	Nyandwi Francina	"	FR2	0735999573	Umuhinzi	
	Mukanyamunsa Angelique	"	FR2	0737662706	Umuhinzi	
	Habinshuti Viateur	"	FR2	-	Umuhinzi	
	Mukamuvara Francine	"	FR2	-	"	
	Mukashyaka Béatha	"	FR2	-	"	
	MUREKATETE Tereza	"	FR2	-	Umuhinzi	
	Nkuze Francina	"	FR2	-	"	

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: Nyaruguru / Kibeho Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
	HABAKURAMA Esperance	Mpanda	FR 2	0788981648	Umuhinzi	
	KABARENZI Donatha	Mpanda	FR 2	0784895352	Umuhinzi	
	KAMPORORO Rebunenia	Mpanda	FR 2	-	Umuhinzi	
	Uwitonze Athanasi	Mpanda	FR 2	-	Umuhinzi	
	Munyakayanza Tabunini	Mpanda	FR 2	-	Umuhinzi	
	Mukahirimo Leonile	Mpanda	FR 2	-	Umuhinzi	
	Nyirabuhuku Francine	Mpanda	FR 2		Umuhinzi	
	Ushizimpumu John	Mpanda	FR 2		Umuhinzi	
	Mbwiwemaza Marco	Mpanda	FR 2		Umuhinzi	
	Imfabine Donatha	Mpanda	FR 2	0725170998	Umuhinzi	
	Bifitimana Delphine	Mpanda	FR 2		Umuhinzi	
	Mukabaziyo Joselyne	Mpanda	FR 2		Umuhinzi	
	Sebantu Viany	Mpanda	FR 2		Umuhinzi	
	Hagabimana Innocent	Mpanda	FR 2		Umuhinzi	
	Gatete Emmanuel	Mpanda	FR 2		Umuhinzi	

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: NYARUGURU / KIBEHO Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
	BUGINGO JONAS	MPanda	FR2	0788395880	Umuhinzi	[signature]
	Nyabyenda Moise	Mpanda	FR2		Umuhinzi	[signature]
	Nzirorera Immaculee	Mpanda	FR2		umuhinzi	[signature]
	Gasasira Emmanuel	Mpanda	FR2		umuhinzi	[signature]
	Kalisa Joseph	Mpanda	FR2	0723319583	N2i	[signature]
	Nshimiyimana Theo	Mpanda	FR2		N2i	[signature]
	Nyirabakunzi Felicite	Mpanda	FR2		N2i	[signature]
	Sebanani Fidele	Mpanda	FR2	0327263lo	N2i	[signature]
	Uwambajimana Regine	Mpanda	FR2		N2i	[signature]
	Barakagira Theresa	Mpanda	FR2		N2i	[signature]
	Ruremire Ngodimana	Mpanda	FR2		N2i	[signature]
	Rukakabahunga Gaspard	Mpanda	FR2		N2i	[signature]
	Kabandana Bagpord	Mpanda	FR2		N2i	[signature]
	Habyarimana Samuel	Mpanda	FR2		N2i	[signature]
	Ntabomvura Francois	Mpanda	FR2		N2i	[signature]

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: Nyaruguru / Kibeho Date: 24/08/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
1	Uwamahoro Margethe	Mpanda			Umuhinzi	[signature]
2	Murecyezi Gaspard	Mpanda	FR2	0726178357	Umuhinzi	[signature]
3	Hacyimana Evariste	Mpanda	FR2	0788390607	Umuhinzi	[signature]
4	Mugeshimana Marthe	Mpanda	FR2		Umuhinzi	
5	Nikiza Olive	Mpanda	FR2		Nzi	[signature]
6	Byiringiro Flecien	Mpanda	FR2		Nzi	[signature]
7	Nsabimana Vedaste	Mpanda	FR2	0725323113	Nzi	[signature]
8	Musonera Theresse	Mpanda	FR2		Nzi	
9	Karambizi Onesphore	Mpanda	FR2		Nzi	
10	Rindiro Pascal	Mpanda	FR2		Nzi	[signature]
11	Hategekimana Thiogene	Mpanda	FR2		Nzi	[signature]
12	Ndikumana Daniel	Mpanda	FR2		Nzi	[signature]
13	Nyirarwimana Marie	Mpanda	FR2		Nzi	[signature]
14	Mukamuhana Gertrude	Mpanda	FR2		Nzi	[signature]
15	Mukisoni Josephine	Mpanda	FR2		Nzi	[signature]
16	Nyirabarame Venantie	Mpanda	FR2		Nzi	[signature]

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MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES / RWANDA FEEDER ROADS DEVOLOPMENT PROJECT

Preparation of the Environmental & Social Impact Assessment / Environmental & Social Management Plan & Pre-Resettlement Action plan

District: Nyaruguru / Kibeho Date: 24/03/2016

ATTENDANCE LIST FOR PUBLIC CONSULTATION MEETINGS

S/N	Names	Cell	Rd No.	Phone No.	Occupation	Signature
1	Ntezirizaza Vernent	MPanda			Umuhinzi	
2	Nyiramana Christine	MPanda	FR2		Umuhinzi	
3	Semana Samuel	MPanda	FR2		Umuhinzi	
4	Mamaganishe Beatrice	MPanda	FR2		Umuhinzi	
5	Mukantabana Christine	MPanda	FR2		Umuhinzi	
6	M. Lariza Divonne	MPanda	FR2		N2i	
7	M. remera Domitire	MPanda	FR2		N2i	
8	Nyaminani Laurent	MPanda	FR2	0726555211	N2i	
9	Bucyana Viannney	MPanda	FR2		N2i	
10	M. rushema Jenevieve	MPanda	FR2		N2i	
11	Rudgira Jean	MPanda	FR2		N2i	
12	Nyiragore Anastasie	MPanda	FR2		N2i	
13	Uwitonze Francine	MPanda	FR2		N2i	
14	Furaha Alexi	MPanda	FR2	0722501894	N2i	
15	Niyonteze Goretthe	MPanda	FR2	0733130972	N2i	
16	Gatarayiha Mohamedi	MPanda	FR2		N2i	

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Annex 7: Interim checklist - Review of E&S Implementation in T&I Bank-financed Works Contracts

Project Name	
Project Number	
Country	
Contract Name	
Contract Duration and completion date	
Implementing Agency	
Review Date	

No	Measure	Current Status (Please elaborate rather than a "Yes/No"- approach)
Contractual Arrangements on site		
1	Is there a full-time Employer's Representative (ER) on site at all times? If not frequency of visits?	
2	Years of experience of the ER?	
3	Name of Supervision Consulting Firm (SC)	
4	Does SC TOR require oversight over ESMP, RAP, HIV/AIDS awareness implementation?	
5.	If yes, to the above, does the SC contract provide sufficient resources?	
6.	If yes, to the above, does the works contract provide sufficient resources to implement all activities? Are they provisional sums or budgeted activities?	
7	Name of SC Team Leader The Resident Engineer - RE)	
8	Years of experience of RE	
9	Does the Employer have an Environmental Unit – if yes, how many full-time technical staff are employed?	
10	Does the Employer have an Social Unit – if yes, how many full-time technical staff are employed	
Contract Reports and Instruments		
11	Does the Bank receive Monthly Progress Reports from the RE on schedule?	
12	ESMP in place, and cleared, being	

	implemented and documented in the MPRs? Provide dates of submission and clearance and any sequencing of works to accommodate clearance process.	
13	Is the ESMP an integral part of the contractors contract with clear activities and costs?	
14	RAP or ARAP, if required, completed and RAP or ARAP completion Report cleared? Provide dates of submission and clearance and any sequencing of works to accommodate clearance process.	
15	Is there any additional expropriation which will require a RAP amendment?	
16	Contractor's Health and Safety Management Plan in place and approved by ER, and implementation documented in the MPR?	
17	Any Citizen engagement activities under implementation?	
18	Any Gender-based activities and/or data collection in place	
19	Contractor's Traffic Management Plan in place, cleared by RE, and being implemented?	
20	HIV/AIDS Awareness/STI mitigation measures in place?	
21	Who is HIV/AIDS service provider? Are they registered with the National Aids Commission?	
Site arrangements		
22	Grievance Redress System in place?	
23	Contractor/Cs/ER combined Meetings with affected communities undertaken and how regularly?	
24	Number of contractor's staff provided with site accommodation.	
25	Distance of contractor's base camp vis-à-vis towns, villages, centers of population and environmentally sensitive areas.	
26	Percentage of staff recruited from the Project Impact Area vs. brought from outside.	
27	Condition of site accommodation and	

	amenities provided.	
28	Do out-of-area workers receive any allowances additional to their salary/wages? If so, please describe.	
29	Wages paid to casual and permanent works and their compliance with local labor laws.	
30	Compliance with local working hours and site safety laws for contractor's workers.	
31	Are Contractor's staff wearing issued personal protection equipment?	
32	Emergency contact numbers for Contractor/ ER shown in conspicuous place?	

Annex 8: Sensitive receptors along the RoW of indicative feeder roads

NO	ROAD NAME	Length (km)	Sensitive receptors			
			National park	Wetland	Cultural Resources	Remarks
1	NDAGO-CYAHINDA-NYAGISOZI-NGOMA	20.10		Agatobwe & Rongi		The road is very far from the Nyungwe National Park and crossed wetlands that were converted into agriculture.
2	KIBEHO-MATA-RURAMBA	17.80			Kibeho	The road is very far from the Nyungwe National Park but the religious site of Kibeho is very close to the RoW (less than 10 m from the RoW)
3	MUNINI-KAMANA-GISWI-GATUNDA-REMERA	17.82		Giswi		The road is very far from the Park and crossed wetland is dominated with seasonal food crops
4	GISWI-RUGWOGWE-KABERE-NSHILI TEA FACTORY-KABERE (RUHERU)	21.30	Nyungwe	Giswi		The road is far from Nyungwe National Park. The wetland is dominated with seasonal food crops (maize, beans, etc)
5	MUGANZA-BURUHUKIRO-RUBUMBURI- RUGERERO-RDB (NYUNGWE)	29.13	Nyungwe	Giswi		The road is passing through the buffer zone of Nyungwe National Park on 10km. The wetland is dominated with seasonal food crops (maize, beans, etc)
6	MUNINI-MUGANZA-RUKORE-BIGUGU-NYABIMATA	13.50		Bigugu & Akagano		The road is passing through the buffer zone of Nyungwe National Park on 1.08 km and crossed wetlands were converted into agriculture
7	RYABIDANDI-VIRO-AKANYARU-GISWI	10.49				The road is very far from the Nyungwe National Park and no wetland is crossed
8	SHEKE- AKANYARU-CYAHINDA	8.56		Akanyaru		The road is very far from the Nyungwe National Park and passes near Akanyaru wetland which was converted into agriculture
9	RUSENGE-CYAHINDA	13.60		Agatobwe & Kigogo		The road is very far from the Nyungwe National Park and crossed wetlands that were converted into agriculture
10	HUYE-RUSENGE-NGERA-NYAGISOZI	11.30		Agatobwe		The road is very far from the Nyungwe National Park and crossed wetlands that were converted into agriculture
11	RUYENZI-UWIMBOGO-REMERA	14.96				The road is relatively far from the Nyungwe National Park and passes through Nshili tea plantation
13	NDAGO-AKAVUGUTO-RUSENGE	5.21		Rwoganyoni & Akavuguto		The road is very far from the Nyungwe National Park and crossed wetlands that were converted into agriculture
14	RUN-YOMBYI(RYAGWIZA)-NTEKO- KIRARAN-GOMBE-NKANDA	10.80		Simbuka	Nkanda	The road is relatively far from the Nyungwe National Park and crossed wetlands that were converted into agriculture. The Genocide memorial site is at 10 – 20 m from the RoW.

Annex 8: Sensitive receptors along the RoW of indicative feeder roads (Cont'd)

NO	ROAD NAME	Length (km)	Sensitive receptors			
			Households likely to be affected	Houses likely to be affected	Total land to be acquired for 10.5m RoW (Ha)	Total land to be acquired for 6.0m paved road
1	NDAGO-CYAHINDA-NYAGISOZI-NGOMA	20.10	228	14	8.84	0.00
2	KIBEHO-MATA-RURAMBA	17.80	168	17	7.12	0.00
3	MUNINI-KAMANA-GISWI-GATUNDA-REMERA	17.82	158	16	7.84	0.00
4	GISWI-RUGWOGWE-KABERE-NSHILI TEA FACTORY-KABERE (RUHERU)	21.30	126	21	10.22	0.64
5	MUGANZA-BURUHUKIRO-RUBUMBURI- RUGERERO-RDB (NYUNGWE)	29.13	111	15	16.31	3.20
6	MUNINI-MUGANZA-RUKORE-BIGUGU-NYABIMATA	13.50	121	9	7.56	1.48
7	RYABIDANDI-VIRO-AKANYARU-GISWI	10.49	169	7	4.83	0.10
8	SHEKE- AKANYARU-CYAHINDA	8.56	69	5	3.94	0.09
9	RUSENGE-CYAHINDA	13.60	124	13	6.53	0.41
10	HUYE-RUSENGE-NGERA-NYAGISOZI	11.30	116	11	5.20	0.11
11	RUYENZI-UWIMBOGO-REMERA	14.96	149	7	10.62	3.89
13	NDAGO-AKAVUGUTO-RUSENGE	5.21	77	7	2.50	0.16
14	RUNYOMBYI(RYAGWIZA)-NTEKO- KIRARANGOMBE-NKANDA	10.80	370	36	4.10	0.00
Total		**196.56**	**1,980**	**178**	**95.61**	**10.09**

Annex 9: Prioritization matrix for the indicative feeder roads

Priority Indicators - variation range [5,1]								Benefits indicator & ranking		Road Improvement cost per beneficiary (weighted by benefits' indicator) USD/hab.
1	2	3	4	5	6	7	8			
Connectivity	Road condition	Remoteness	Traffic	Access to social & economic services	Agriculture potential	Community Priority	VUP Impact			
Indicator Weight								Indicator [5,1]	Ranking	
0.10	0.09	0.05	0.11	0.20	0.35	0.07	0.03			

The ***connectivity*** is the potential of the FR under evaluation to connect other areas within and outside the district. It allows to assess the contribution of the FR improvement to the transport performance of the district's road network. The ***road condition*** has a significant influence on the transportation costs and thereby onto its use. The bad condition of a FR is a limiting factor to the development of economic and social activities in its direct and wider influence areas.

The ***remoteness*** combines two criteria: (i) level of permanent or periodic inaccessibility of the FR under evaluation and, (ii) the distance from the closest national road (NR). The objective of this indicator is to evaluate the effect of the FR improvement on the all-weather use of the road.

Traffic and ***Access to Social and Economic Services*** are other important indicators. The first indicator refer to the expected traffic after FR improvement. The expected traffic takes into consideration the generation effect linked to the road improvement and the economic potential of served areas. The objective of this indicator is to assess the contribution of the road improvement to the development of the served area. The objective of the access to social and economic services is to assess the impact of the FR improvement on the living condition of the served area population. The greater is the number of services benefitting from the FR improvement, the higher will be the priority of planned improvement.

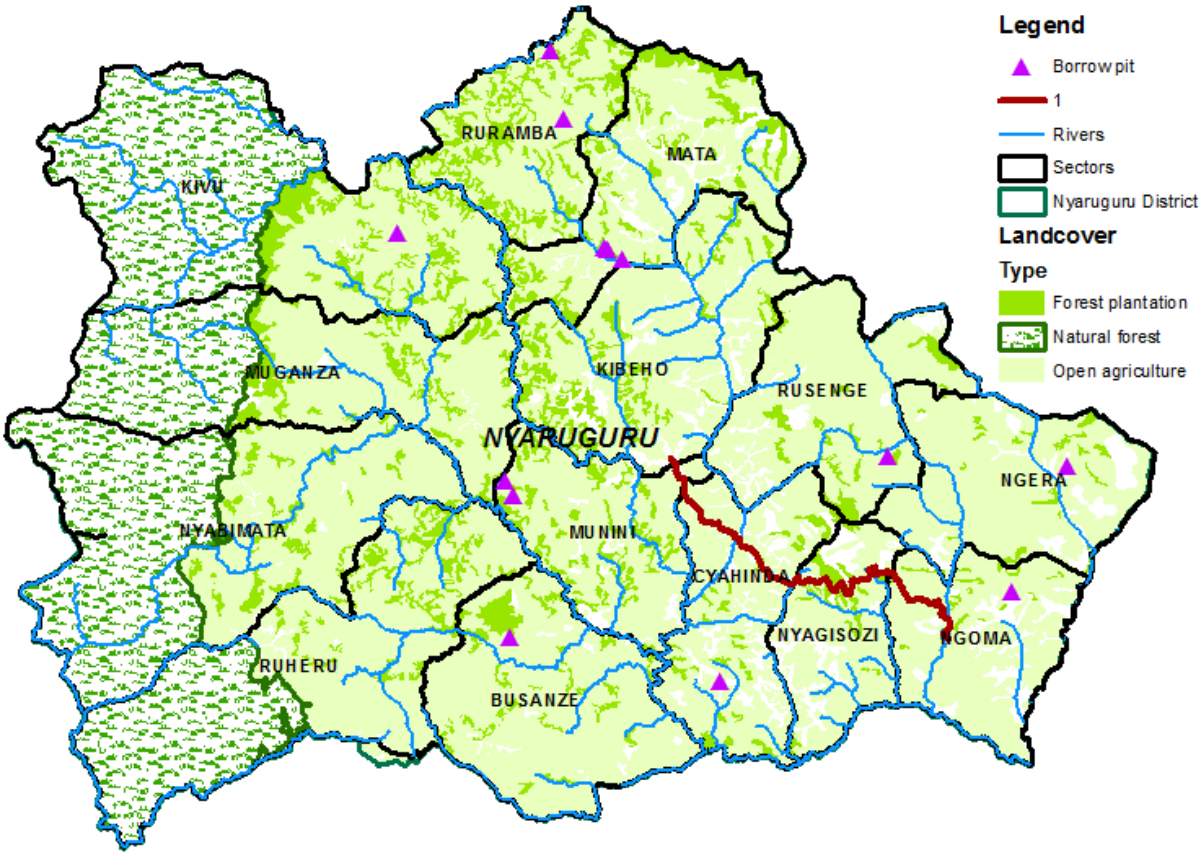
Agriculture potential is the main driver of the transport demand in rural areas. The assessment of its potential can substantiate the socioeconomic justification for roads' improvement. In this regards, agriculture development and support projects can play an important role in stimulating the transportation demand, hence the need of improved roads.

Community priority: The objective of this indicator is to asses to what extent the road improvement is felt as factor of living condition amelioration. The last indicator is the ***Impact on Vulnerable Sectors***. Sectors beneficiary of Vision 2020 Umurenge Program

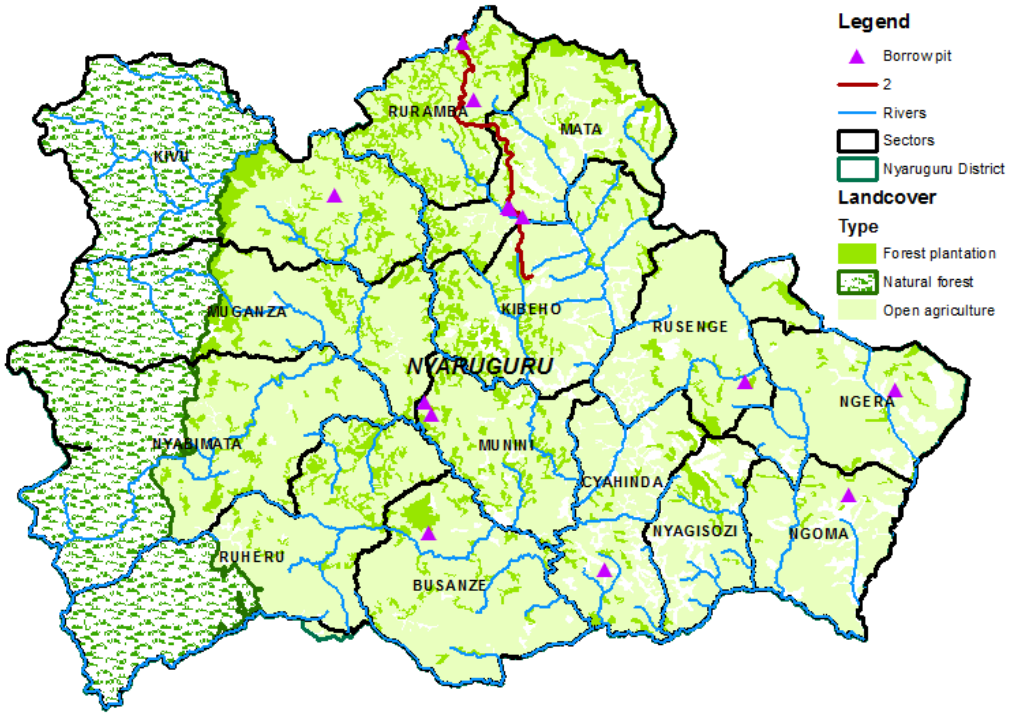
(VUP) are particularly vulnerable and if the FR proposed for improvement passes through a vulnerable Sector as decided by VUP, the FR improvement would produce an enhanced social impact.

Annex 10: Maps of the indicative feeder roads in Nyaruguru District

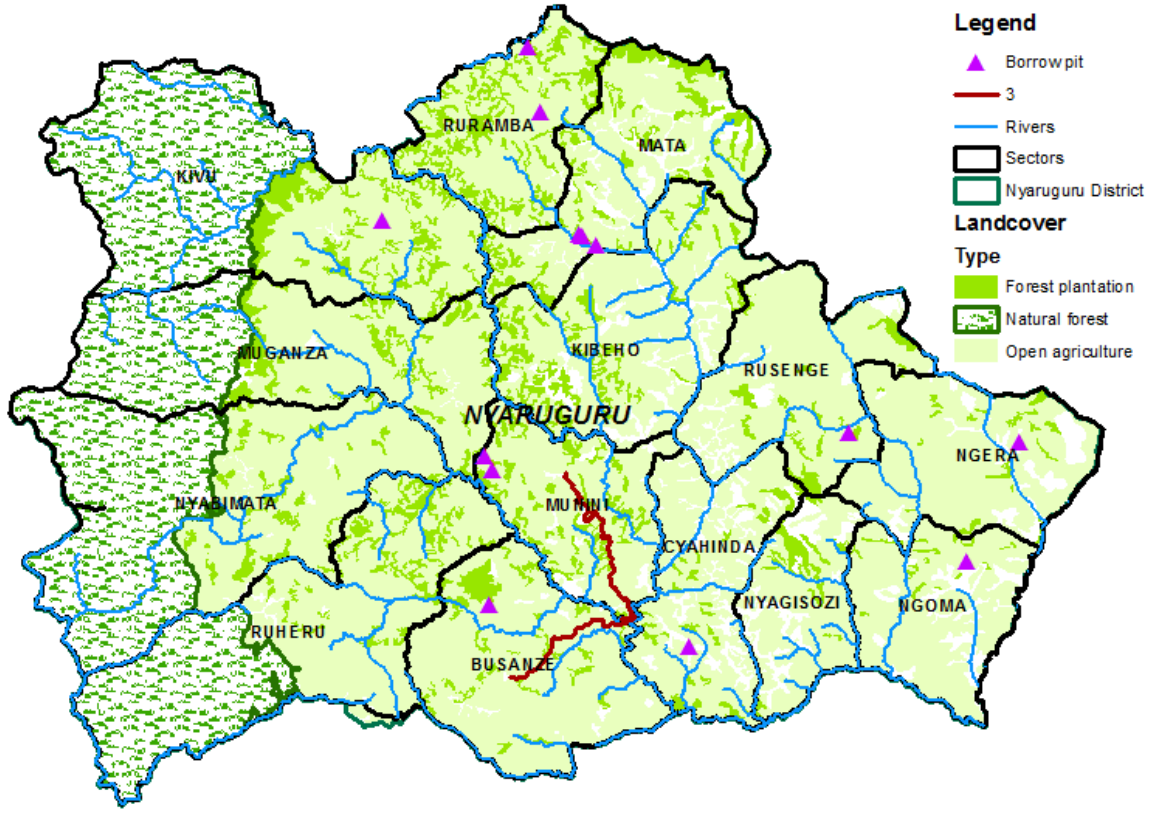
Annex 10.1. Location of Ndago- Cyahinda- Nyagisozi- Ngoma (FR1) in Nyaruguru District



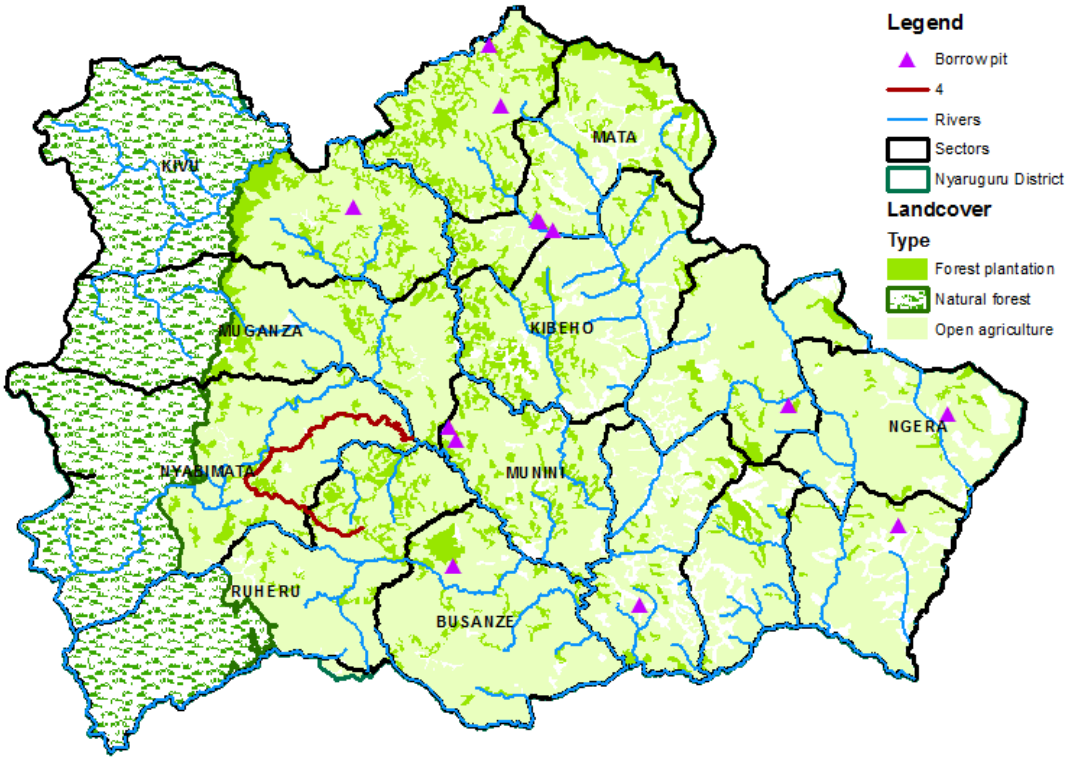
Annex 10.2. Location of Kibeho- Mata- Ruramba (FR2) in Nyaruguru District



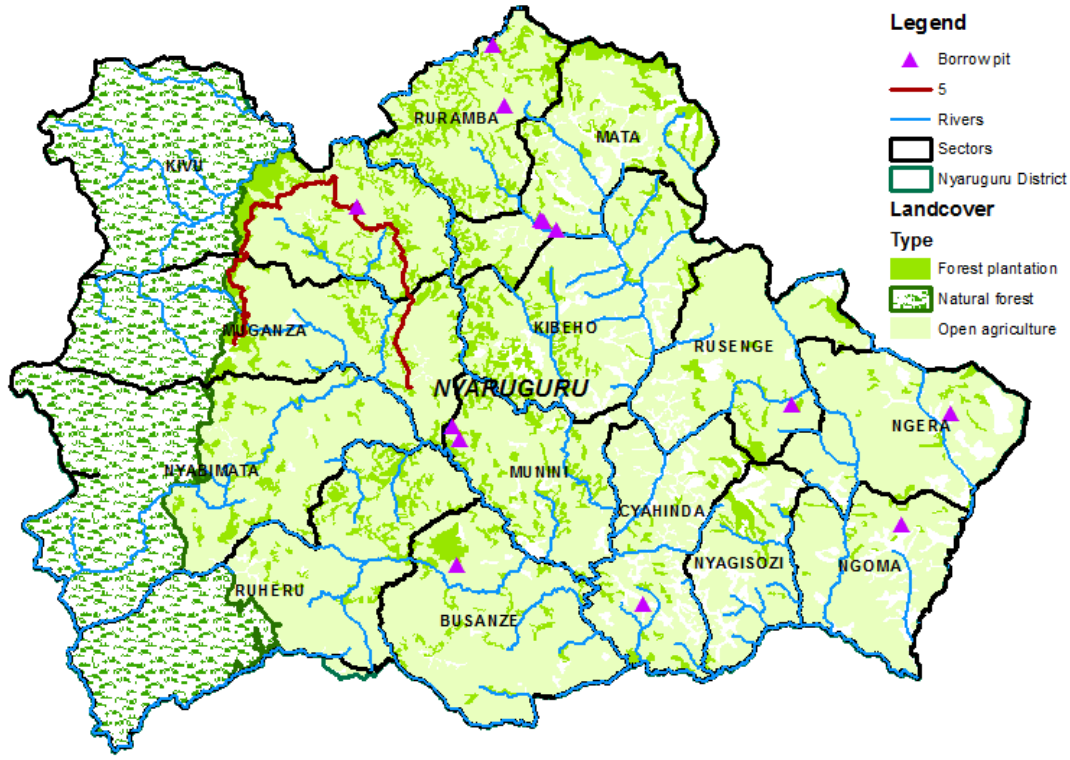
Annex 10.3. Location of Munini- Kanama- Gatunda- Remera (FR3) in Nyaruguru District



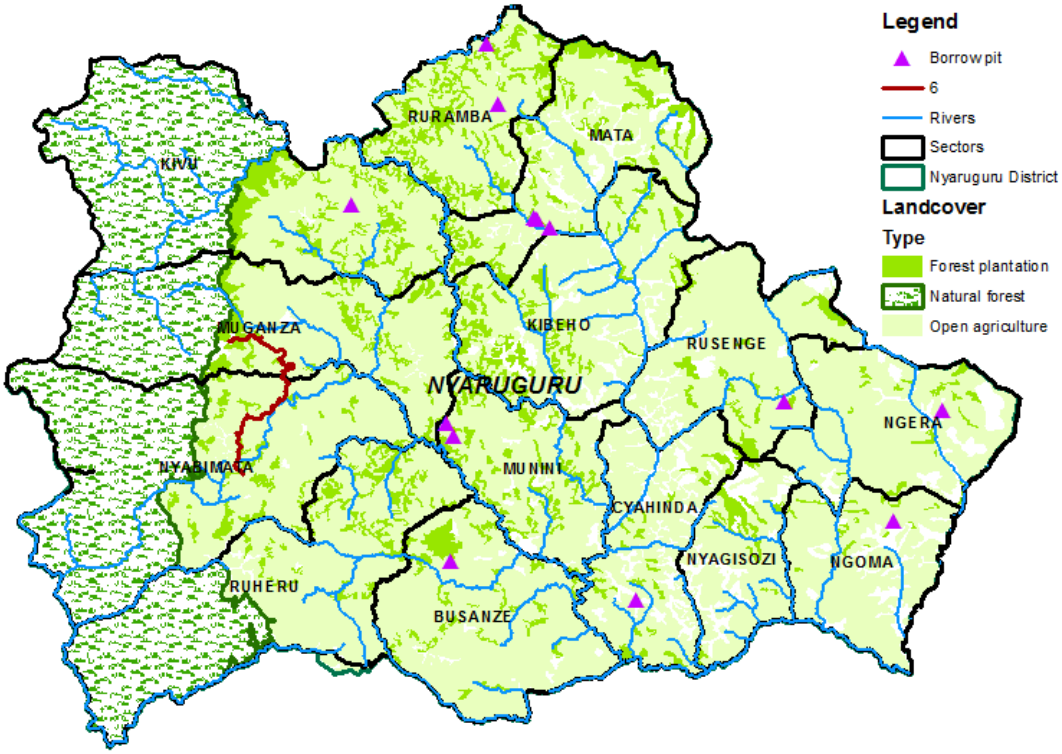
Annex 10.4. Location of Giswi- Rugogwe- Kabere- Nshili Tea Factory- Kabere (Ruheru) (FR4) in Nyaruguru District



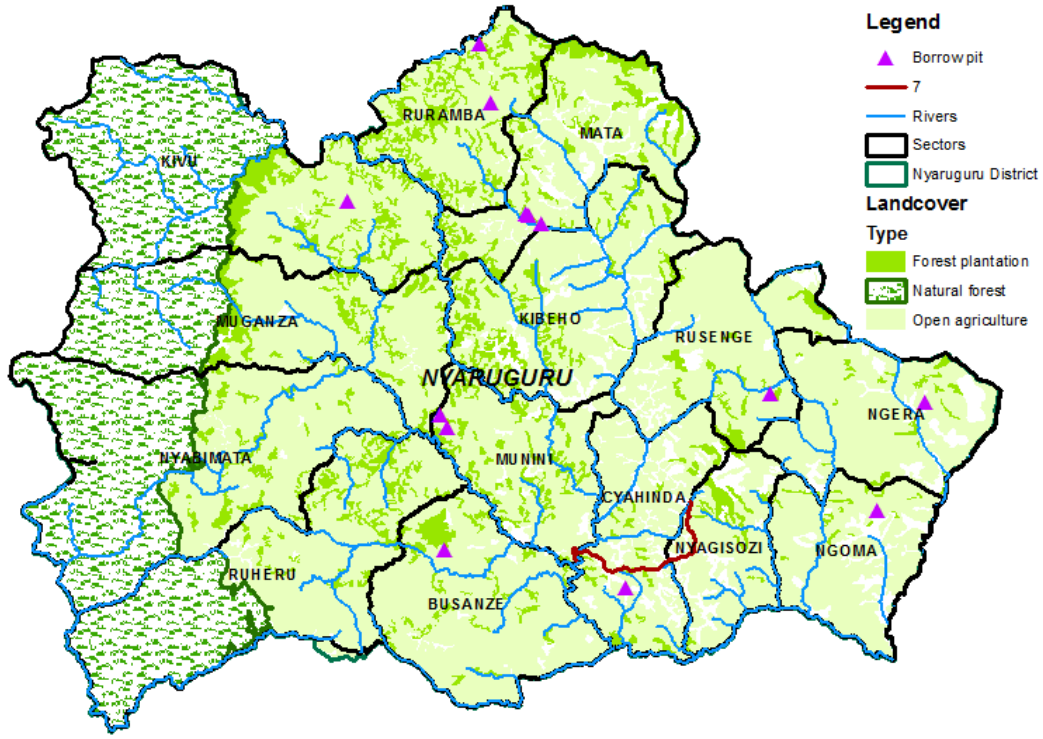
Annex 10.5. Location of Muganza- Buruhukiro- Rubumburi- Rugerero- RDB Nyungwe (FR5) in Nyaruguru District



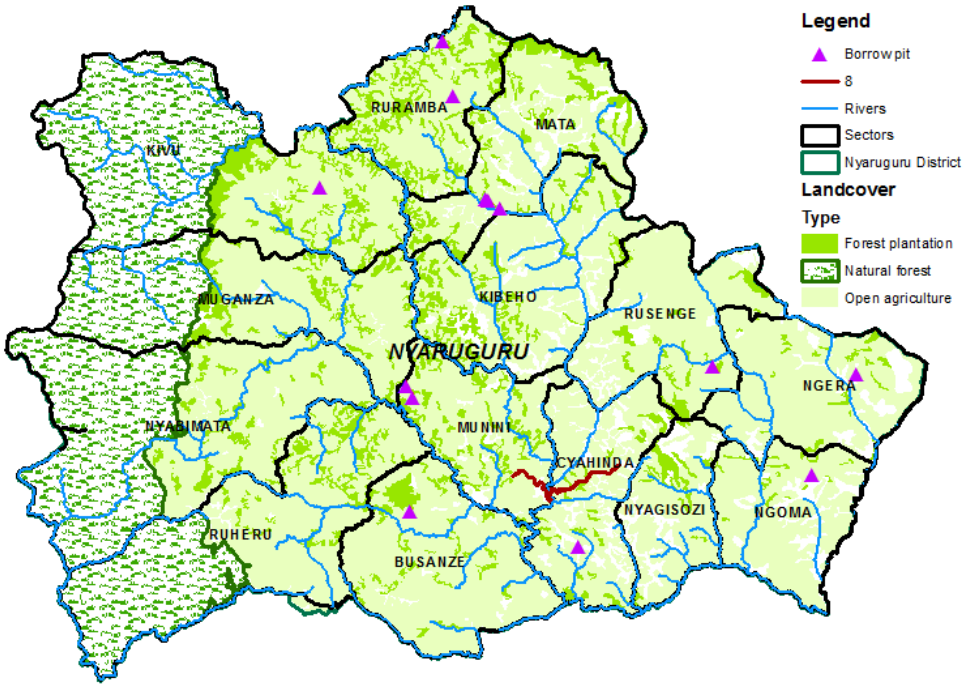
Annex 10.6. Location of Rukore- Bigugu- Nyabimata (FR6) in Nyaruguru District



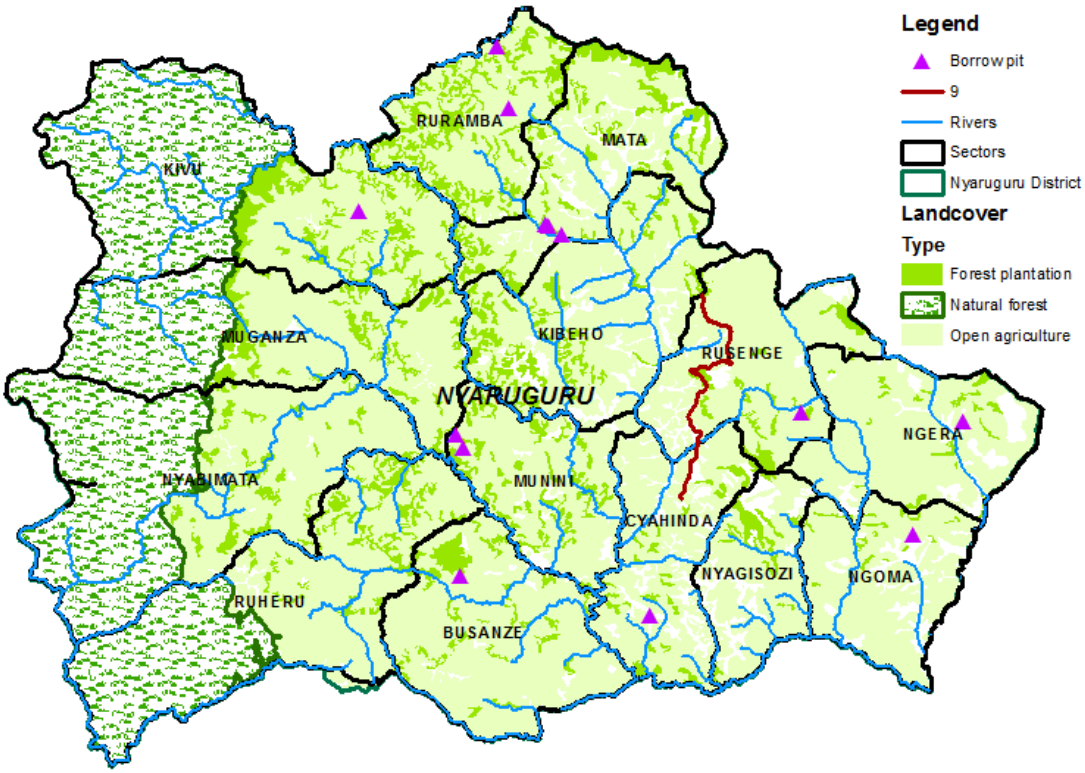
Annex 10.7. Location of Ryabidandi- Viro- Akanyaru- Giswi (FR7) in Nyaruguru District



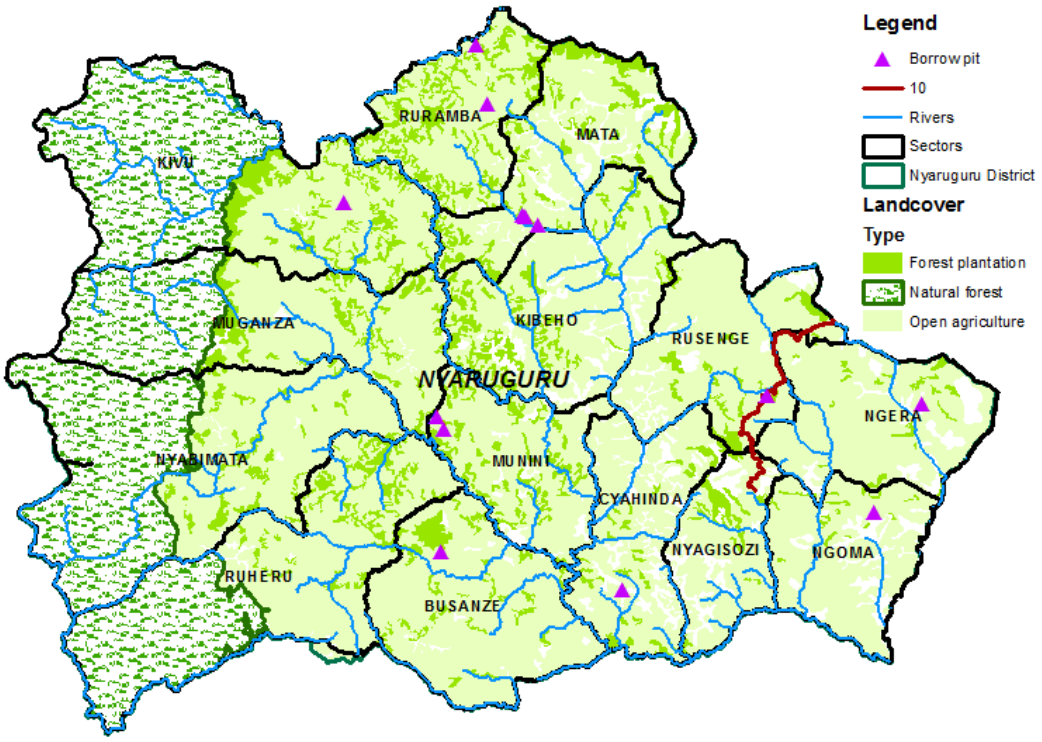
Annex 10.8. Location of Sheke- Akanyaru- Cyahinda (FR8) in Nyaruguru District



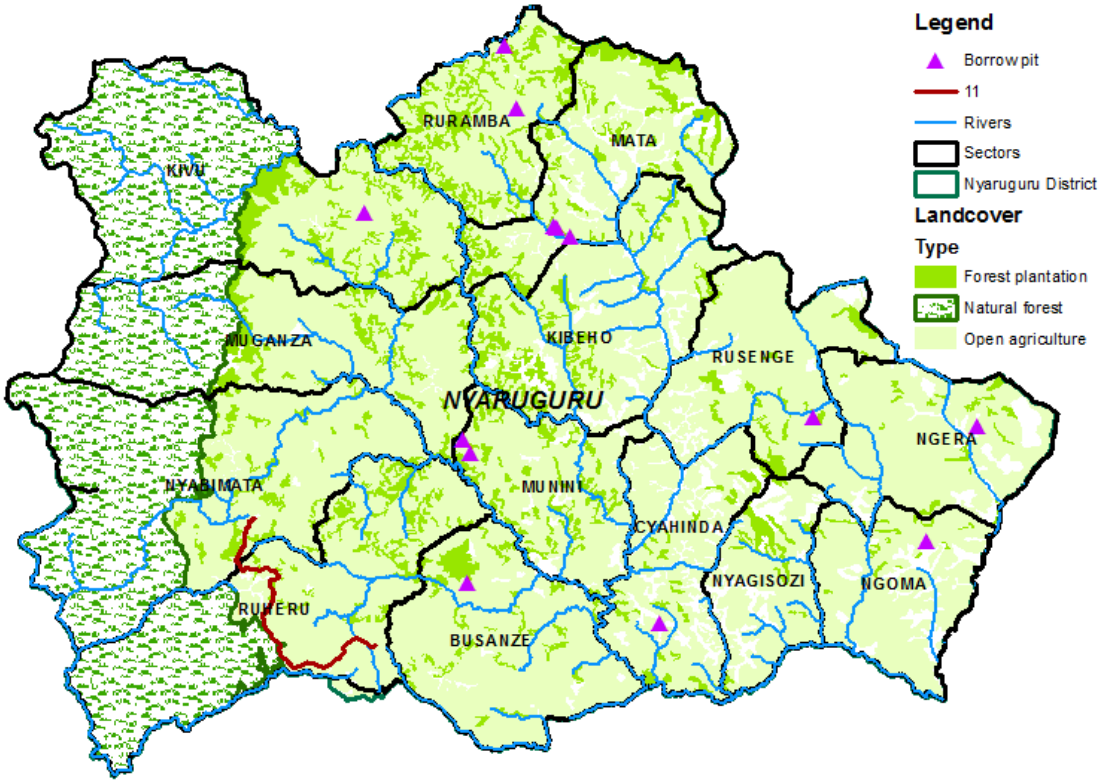
Annex 10.9. Location of Cyahinda- Rusenge (FR9) in Nyaruguru District



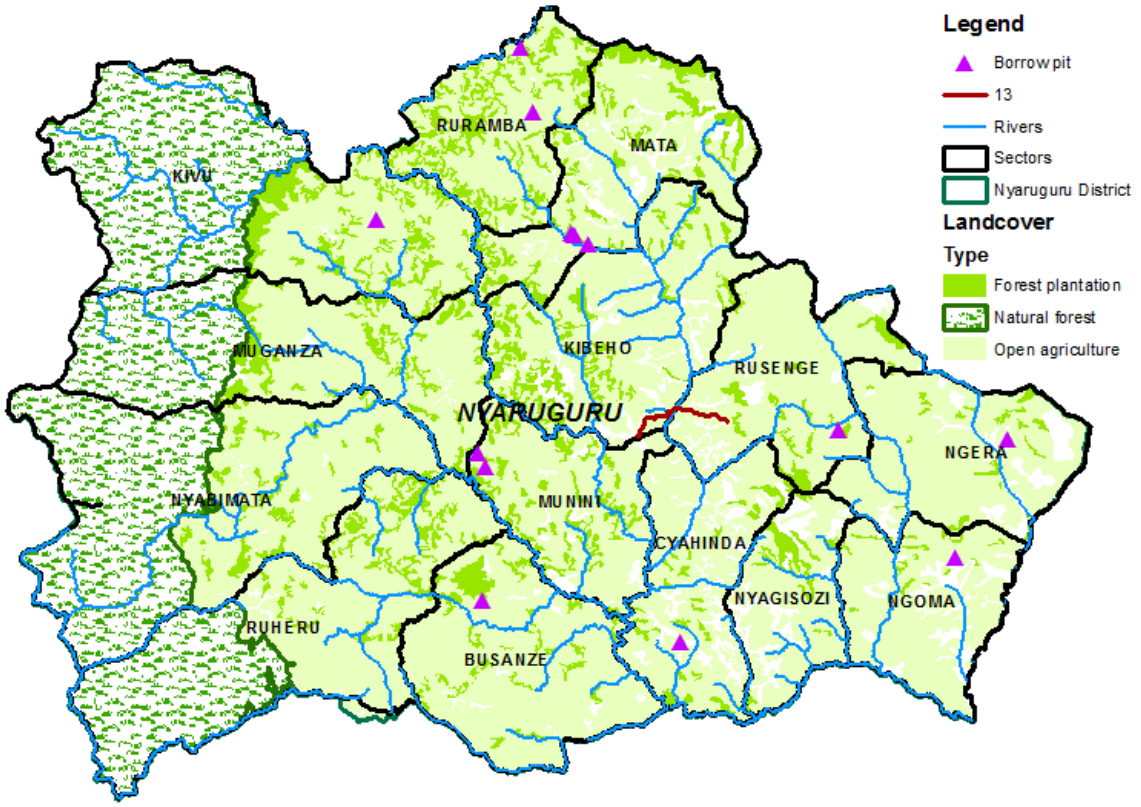
Annex 10.10. Location of Huye- Rusenge- Ngera- Nyagisozi (FR10) in Nyaruguru District



Annex 10.11. Location of Ruyenzi- Uwimbogo- Remera (FR11) in Nyaruguru District



Annex 9.13. Location of Ndago- Akavuguto- Rusenge (FR13) in Nyaruguru District



Annex 10.14. Location of Runyombyi (Ryagwiza)- Nteko- Kirarangombe- Nkanda (FR14) in Nyaruguru District