

REPUBLIC OF RWANDA



MINISTRY OF INFRASTRUCTURE

ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF)

FOR THE

**SUSTAINABLE WATER AND SANITATION PROGRAM IN RWANDA
(ADDITIONAL FINANCING)**

Prepared by

Théogène HABAKUBAHO

ESIA Lead Consultant

Email: htheogene@yahoo.fr

Phone: +250788643982

October 2018

ACRONYMS/ABBREVIATIONS

AfDB	: African Development Bank
AIDS	: Acquired Immune Deficiency Syndrome
ARAP	: Abbreviated Resettlement Action Plan
CBOs	: Community Based Organizations
CITES	: Convention of International Trade of Endangered Species
CBD	: Convention of Biological Diversity
EDPRS	: Economic Development and Poverty Reduction strategy
ESIA	: Environmental and Social Impact Assessment
ESIA	: Environmental and Social Impact Assessment
ESMP	: Environmental and Social Management Plan
GIS	: Geographic Information System
GoR	: Government
GPS	: Global Positioning System
IUCN	: International Union for the Conservation of Nature
IWRMP	: Integrated Water Resources Master Plan
IWRMP	: Integrated Water Resources Master Plan
KCC	: Kigali City Council
Ltd	: Limited
MININFRA	: Ministry of Infrastructure
MoE	: Ministry of Environment
NGO	: Non-Government Organization
NISR	: National Institute of Statistics of Rwanda
OHS	: Occupational, Health and Safety
RDB	: Rwanda Development Board
REMA	: Rwanda Environment Management Authority
RLMUA	: Rwanda Land management and Use Authority
RURA	: Rwanda Utilities Regulatory Agency
RWAF	: Rwanda Water and Forestry Authority
ToRs	: Terms of Reference
WASAC	: Water and Sanitation Corporation
WHO	: World Health Organization

TABLE OF CONTENTS

LIST OF ANNEXES	v
LIST OF TABLES	v
LIST OF FIGURES	v
EXECUTIVE SUMMARY	1
 1. INTRODUCTION	 5
1.1. Background	5
1.2. Program objectives and Components	6
1.2.1. Water supply infrastructure and services improvement	6
1.2.2. Sanitation Infrastructure and Services Improvement	9
1.2.3. Institutional support and program management component	9
 2. INSTITUTIONAL, LEGAL AND REGULATORY FRAMEWORK	 17
2.1. National legal and regulatory framework	17
2.1.1. Relevant policies for the proposed program	17
2.1.2. Relevant Laws	21
2.1.3. Institutional arrangement for the environmental management in Rwanda	25
2.2. International Guidelines and Procedures	32
2.2.1. AfDB Integrated Safeguards System	32
 3. BIO-PHYSICAL ENVIRONMENT AND SOCIO-ECONOMIC BASELINE	 37
3.1. Geography	37
3.2. Physical Environment	37
3.2.1. Climate and rainfall	37
3.2.2. Topography	38
3.3. Hydrology and water resources	39
3.3.1. Surface water	39
3.3.2. Groundwater	40
3.3.3. Wetlands	40
3.4. Soils and Geology	42
3.4.1. Highland soils	43
3.4.2. Soils of the central plateau	43
3.4.3. Soils of the lowlands	43
3.4.4. Soils of valleys	43
3.4.5. Land use	Erreur ! Signet non défini.
3.5. Biological Environment-Ecosystems	44
3.5.1. Forests	44
3.5.2. Protected areas	45
3.5.3. Biodiversity of wetlands	48
3.5.4. Biodiversity in agricultural systems	49
3.5.5. Pastoral zones	50
3.5.6. Woodlands	50
3.6. Socio-Economic Background	50
3.6.1. Population and Demographic Characteristics	50
3.6.2. Economic Development Evolution	53
3.6.3. Industry and Mining	53
3.6.4. Human settlements	54
3.6.5. Physical Cultural Resources	54
3.6.6. Agriculture	55
3.6.7. Animal husbandry	55
3.6.8. Water and sanitation situation in Rwanda	56

3.6.9.	Electricity Coverage and Renewable Energy.....	57
3.7.	Gender analysis.....	58
3.7.1.	Overview.....	58
3.7.2.	Country gender profile.....	59
3.7.3.	Gender situation in water and sanitation sector in Rwanda.....	62
3.7.4.	Gender issues associated with the proposed program.....	63
4.	DETERMINATION OF POTENTIAL ENVIRONMENT AND SOCIAL IMPACTS	66
4.1.	Positive environmental and social impacts	66
4.2.	Potential Adverse Impacts	67
4.2.1.	Adverse Impacts biological environment.....	67
4.2.2.	Adverse Impacts Physical environment.....	67
o	Wastewater and Sludge Treatment and Discharge.....	70
4.2.3.	Adverse Social Impacts.....	71
4.3.	Environmental and Social Management Process	73
4.3.1.	Mitigation considerations and options	73
4.3.2.	Recommended mitigation measures.....	73
4.4.	Monitoring Plans and Indicators	77
4.4.1.	Monitoring of Environmental and Social Indicators	77
4.5.	Monitoring Roles and Responsibilities	84
4.5.1.	Water and Sanitation Corporation (WASAC)	84
4.5.2.	Rwanda Environment Management Authority (REMA).....	84
4.5.3.	Rwanda Development Board(RDB)	84
4.5.4.	WASAC -Social and Environmental Specialist	84
5.	SUB-PROJECT REVIEW, COORDINATION & IMPLEMENTATION ARRANGEMENTS	85
5.1.	Sub Project Safeguards instrument review and approval	85
5.2.	Screening and subproject preparation	86
5.3.	Who prepares a screening checklist?.....	86
5.4.	Process for screening, preparing and approving RAPS/ARAPS.....	86
5.4.1.	Screening Mechanism for Resettlement Action Plans.....	87
5.4.2.	Scope of Resettlement Action Plans (RAPs).....	87
5.4.3.	Preliminary Assessments	87
5.4.4.	Preliminary information on the subproject design and screening checklist	88
5.4.5.	Baseline and socio-economic data	88
5.4.6.	Preparation of a sub-project RAP and approval process	89
6.	CAPACITY BUILDING, TRAINING AND BUDGET	93
6.1.	Institutional Capacity for ESMF Implementation.....	93
6.2.	ESMF Implementation Budget	93
7.	PUBLIC CONSULTATION AND DISCLOSURE	94
7.1.	ESMF Disclosure.....	94
7.2.	Public Consultation	94
7.2.1.	Overview.....	94
7.2.2.	Purpose.....	94
7.3.	Public consultations and participation.....	94
7.4.	Stakeholders.....	95
7.5.	Public participation – methods and process	95
8.	CONCLUSION AND RECOMMENDATIONS	96
	REFERENCES.....	97
	ANNEXES.....	98

LIST OF ANNEXES

Annex 1: Screening checklist	98
Annex 2: Content of an Abbreviated Resettlement Plan	104
Annex 3: Resettlement screening form	105
Annex 4: General environmental management conditions for construction contracts	105
Annex 5: Key information to be included in the subproject brief	110
Annex 6: Sample ToRs for ESIA/ESMP study for subprojects	112
Annex 7: List of institutions/people consulted /to be consulted	116

LIST OF TABLES

Table 1: Population in the program areas	51
Table 2: DHS Indicators from 1992 to 2017 (see Rwanda statistical yearbook, 2017)	52
Table 3: Distribution (%) of Households by Main Source of Water	62
Table 4: Access to Improved Sanitation Facilities	63
Table 5: Distribution (%) of Households by Main Mode of Sewage Disposal	63
Table 6: Indicative ESMF Budget for the ESMF implementation	93
Table 7: Possible Outcomes of RDB Review of Project Reports	101
Table 8: Screening Responsibilities.	104

LIST OF FIGURES

Figure 1: Water Resources in Rwanda	40
Figure 2: Wetlands in Rwanda	42

EXECUTIVE SUMMARY

This report is an Environmental and Social Management Framework (ESMF) for the additional Financing to Rwanda Sustainable Water and Sanitation Program. The ESMF will be used to screen and assess the environmental and social impacts of the planned and future water and sanitation subprojects under sustainable water and sanitation program. The planned activities include Water Treatment Plants, Water Reservoirs and Water Intakes forwarding infrastructure. The ESMF is complies with the AfDB's Integrated Safeguards System (ISS) approved in 2013 especially Operational safeguard 1: Environmental and Social assessment and Operational safeguards 2: Involuntary resettlement land acquisition, population displacement and compensation involuntary resettlement and Rwanda's national legislation. The ISS requires that all Bank- financed operations are screened for potential adverse environmental and social impacts to enable development of Environmental and Social Management Plans (ESMP) to manage the residual impacts which can neither be avoided nor designed out in a sustainable manner.

Objectives of the ESMF

The objective of this ESMF, is to guide Water and Sanitation Corporation (WASAC), the Implementing Agencies (IA) in screening, assessing and development of site specific environmental and social management plans during the implementation of the proposed subprojects activities under the Program. It defines the environmental and social concepts, methodologies, screening and assessment tools, and procedures that should be followed throughout the "project development cycle" to comply with AfDB's ISS and the National legislative and permitting requirements.

Program components

The program objective will be achieved through three components activities: 1) Water Supply Infrastructure and Services Improvement; 2) Sanitation Infrastructure and Services Improvement; and 3) Institutional Support. The initial program is financed by an AfDB loan of USD 121.137 million, and Africa Growing Together Fund (AGTF) loan of USD 50.000 million, and loans from the European Investment Bank (EIB) and the OPEC Fund for International Development (OFID) to the tune of EUR 45.000 million and USD 20.000 million respectively. The Additional financing from the AfDB is expected to be approximately USD 135 million.

Justification of the ESMF

The ESMF was selected as the most applicable safeguard instrument based on the fact that some of the listed sub-projects are at prefeasibility/feasibility stages, as such their exact location and technical designs are yet to be firmed up. WASAC has therefore, developed this ESMF to guide the Program implementation in compliance with the ISS. The use of the ESMF will also enable incorporation of future additional scope into the program if considered justifiable under the financing arrangements.

Policy, Legal and Institutional Considerations

Both International and National regulations were reviewed to identify all the applicable consolidated legal and regulatory policies, standards and framework which the program component activities need to comply with in regards to respect to environmental and social assessment and management.

The Constitution of the Republic of Rwanda, adopted in June 2003 and revised in 2015, ensures the protection and sustainable management of the environment and encourages rational use of natural resources. In consideration of the Constitution as amended to date, article 49 states that every citizen is entitled to a healthy and satisfying environment. Every person has the duty to protect, safeguard and promote the environment. The State shall protect the environment. The Organic Law determines the modalities for protecting, safeguarding and promoting the environment. To comply with this constitutional statement and to ensure that the country development is done in sustainable manner, the government has adopted different sectoral policies, laws and set up different institutions. These institutions are responsible for the implementation of the different environmental and social policies and their enforcement.

The AfDB ISS approved in 2013, provides the requirements to promote the sustainability of project outcomes by protecting the environment and people from the potentially adverse impacts from project component activities. The safeguards aim to:

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

Potential Environmental and Social Impacts

The proposed program is expected to have both positive and negative environment and social impacts.

Positive environmental and social impacts include: increased accessibility to potable water, improved sanitation, temporary and permanent employment creation from construction works, transfer of skills from construction activity, and indirect benefits like affordability of medical insurance and education from income received from jobs.

Anticipated adverse environmental impacts include loss of vegetation, degradation to local Air Quality, Water pollution and water Quality Degradation, Soil pollution, disturbance of water table, Sedimentation, Noise and Vibration Impacts, Road Safety, Traffic Management and Access, Construction Solid and Effluent Waste, Visual Intrusion,

Downstream Impacts, impacts related to Borrow Pits and Quarry Sites etc. Anticipated social Impacts may include, minimal economic and/or physical displacement resulting from project related land acquisition, Public Health and safety impacts, Loss of Land and properties, Labor Influx Impacts, HIV/AIDS and sexual transmission diseases, escalation, community conflicts due to the presence of workers , Gender based violence and sexual exploitation.

Safeguard Screening Procedures

The program has been rated Category 2 in lien with the AfDB Environmental and Social Procedures (ESAP). The ESMF has been designed to include tools that will be used to screen each proposed subproject investment activities prior to implementation and contains recommendation on the mitigation measures that need to be adhered to in order to reduce their adverse impacts.

Through the screening process a determination on the safeguards policies triggered by a particular proposed investment will be made and the mitigation measures to put in place outlined. If identified as a requirement of the sub project through the screening process, a Resettlement Action Plan (RAP), is prepared alongside or as an integrated part of the ESMP or ESIA.

Institutional Implementation Arrangements and Reporting Requirements

WASAC has established the Single Project Implementation Unit (SPIU) to effectively implement the Program component activities including the safeguard instruments. The SPIU will be responsible for the preparation, implementation and monitoring of safeguards tools throughout the program development phases. To do so, the SPIU will have personnel with experience in environmental and social impact assessment and management. WASAC will screen, assess impacts and prepare project specific ESIA's and ARAPs for each identified investment where needed during the feasibility study phase of the program. All prepared safeguard instruments will be submitted to AfDB and RDB for review and approval prior to commencement of site construction works. Quarterly monitoring report will be shared with AfDB and Rwanda Environmental management Authority (REMA) to assess effectiveness and compliance of the ESMPs and ARAPs.

Capacity Building and Training

WASAC is well equipped with environmental and social professionals who are conversant with the requirements of the ISS and have received training over the years on environmental and social risk management. Provision for additional staff (one dedicated sociologist) and training have been included within the ESMP to further enhance capacity especially during program implementation. The training will target SPIU staff, contractors and local authorities to enable them to implement and monitor safeguards instruments during program implementation.

Public Consultations

This ESMF was prepared in consultation with key project stakeholders including project Implementation unit, Environmental regulatory bodies and local authorities. Additional consultation meeting will be conducted in particular with project affected communities during the preparation of ESMPs and ARAPs.

Disclosure of ESMF/ESMPs

Public disclosure of the ESMPs/ESIAs will be made to Project Affected Persons (PAPs) and other interested stakeholders for review and comments on identified impacts, mitigation and monitoring measures and other issues in the implementation of the ESMF. The purpose of the disclosure will be to receive comments and suggestions from PAPs and other stakeholders to allow for their consideration within the subproject designs to avoid, minimize their impacts. The ESMPs will be disclosed in a form, manner and language comprehensible to the PAPs and in places accessible to the affected communities and other stakeholders for review and comments on the impacts and mitigation measures. WASAC shall disclose and post any ESMPs on its website, places where PAPs can easily access the documents within the project implementation areas, local newspapers with wide circulation and receive comments. AFDB will also disclose summary of this ESMF report on its website prior to its Board presentation.

Monitoring and Evaluation Framework

The arrangements for monitoring the ESMF and site specific ESMPs/ARAPS will fit into the overall existing monitoring arrangements of the ongoing parent Program, which will fall under the overall responsibility of the SPIU. Quarterly monitoring and annual evaluations will be conducted to determine whether the monitoring and mitigation measures proposed in the ESMPs for the subproject components are being implemented effectively by the project implementing agencies.

ESMF Implementation Budget

The estimated cost for the implementation of this ESMF is USD 695,000. This budget covers costs related to stakeholder trainings and consultation forums on ESMF; preparation, implementation monitoring and evaluation of individual instruments (EA/ESMPs/RAPs) and payment of Compensation fees. The budget for the implementation of specific mitigation measures will be included in specific ESMPs and RAPs.

1. INTRODUCTION

1.1. Background

The Government of Rwanda (GoR) is seeking Additional Financing from the AfDB to expand the geographical scope of the ongoing Sustainable Water and Sanitation Program financed by the AfDB. The core objective of the additional water supply projects to the Rwanda Sustainable Water Supply and Sanitation Program is to ensure full access to clean water and sanitation services in targeted urban and peri-urban areas. In urban areas, the program will contribute to development of those cities by triggering growth of these areas and enhancing linkages to other towns and rural areas in line with the National Strategy for Transformation 1 (NST1). In rural areas, the program will contribute to equitable provision of adequate, reliable and sustainable water services as per goal 6 of Sustainable Development Goals (SDGs).

The program is consistent with Rwanda's Vision 2020 and the National Strategy for Transformation (NST1) which envision scaling up investments in reliable, affordable and environmentally sustainable infrastructure such as water and sanitation services as key drivers and enablers of economic transformation and rural development. It also fits with the Bank's Country Strategy Paper (CSP) 2017–2021 for Rwanda with regards to investing in energy and water infrastructure to foster inclusive and green growth. By providing sustainable and affordable water and sanitation services, the program will help accelerate development and improve the quality of life of the people as espoused by the Bank's High 5 priorities under the Ten Year Strategy, 2013-2022.

The initial/parent program is financed by an ADB loan of USD 121.137 million, and Africa Growing Together Fund (AGTF) loan of USD 50.000 million, and loans from the European Investment Bank (EIB) and the OPEC Fund for International Development (OFID) to the tune of EUR 45.000 million and USD 20.000 million respectively. The initial program seeks to improve water supply and sanitation services in the City of Kigali and within the six satellite cities of Musanze, Rubavu, Muhanga, Nyagatare, Huye, Rusizi and in Karongi Town.

The proposed additional financing from the AfDB is expected to be approximately USD 135 million. The additional subprojects will be implemented in Nyanza, Ruhango, Muhanga, Kamonyi, Musanze, Nyabihu, Rubavu, Nyagatare, Gatsibo, Ngoma and Ngororero Districts. Upon completion of the construction works, 1,590,468 people will benefit from improved water and sanitation supply services from the program. In Muhanga, Kamonyi and Nyagatare Districts, the proposed Water Treatment Plants and associated forwarding infrastructures have been

prioritized to allow effective operation of network developed in context of rehabilitation, upgrading and extension of water networks in Muhanga and Nyagatare towns as parts of initial phase of the Rwanda Sustainable Water Supply and Sanitation Program. In Ngoma, Ruhango, Gatsibo and Gicumbi Districts, the subprojects have been prioritized to contribute to the development of emerging cities after six satellites cities. And in Nyanza, Ngororero, Musanze, Nyabihu and Rubavu Districts, the subprojects have been prioritized to increase access to clean water to ensure equitable provision of adequate, reliable and sustainable water and sanitation services in areas with lower access to clean water compared to remaining parts of the country.

1.2. Program objectives and Components

The development objective of the program is to improve the quality of life and socio-economic development of the people and country by ensuring equitable provision of adequate, reliable and sustainable water and sanitation services for targeted areas with a view to promote economic growth and transformation. The additional financing, is structured under three Components namely: (i) Water Supply Infrastructure and Services Improvement component, (ii) sanitation infrastructure and services improvement and (iii) Institutional Support.

1.2.1. Water supply infrastructure and services improvement

Water Supply infrastructure and service improvement is the major program component. The component will consist at providing water supply infrastructure including water treatment Plant (WTP), Water reservoirs, water intake and water pipelines. The additional financing will cover 8 subprojects activities including: (i)Construction of Ngoma River Water Supply System, (ii)Construction of Muhazi WTP and Distribution Networks,(iii)construction of Sake Water Supply System (Phase I),(iv)Construction of Busogwe Water Supply System, (v) Construction of Ngororero Water Supply System, (vi) Construction of Kagaga WTP and Distribution Systems, (vii) Construction of Volcano Belt Water Supply System, and (viii) Construction of Kivu Belt Water Supply System (Phase I).

- **Construction of Ngoma River Water Supply System**

Ngoma River is located in Nyagatare District in Kiyombe sector near the existing WASAC site. Raw water will be abstracted from the proposed intake location through a conventional water treatment Plant and pumped from the WTP to the distribution reservoir located at the nearest and highest point overlooking the areas to be served.

From the header reservoir water will be transported by gravity for distribution. The proposed WTP will have the capacity to treat water at 12000m³/day to meet the demand of water supply, industries, livestock and coffee washing stations. The system will also have a pumping station

which will be designed to operate at the duty flow of 13,800 m³/day and a duty head of more than 312.0 m. Other structures included in the system include treated water reservoirs with a total of 4,800m³, five distribution reservoirs, main water pipeline (55km) and distribution pipelines (163km). It is expected that once completed the system will have 120 double public stand taps, and 9 water kiosks and 1400 connections. 412,310 beneficiaries are expected to be served with the system following completion.

- **Construction of Muhazi WTP and Distribution Networks**

The proposed Muhazi WTP and distribution network shall be located on northern part of Lake Muhazi in Nyagasambu Village, Nyabisindu Cell of Kiramuruzi Sector in Gatsibo District. It is proposed to construct a conventional water treatment plant at the proposed site which will treat water and supply it to the customers within Kayonza and Gatsibo Districts. The raw water will be treated by the constructed water intake and the WTP. The planned capacity of 23148 m³/day shall be increased to 10000m³/day under additional financing. The system will also include main transmission pipeline of 16.6km, secondary distribution pipes of 393km, storage reservoirs of 11,979 m³ total capacity and pump stations. 317,071 people are expected to benefit from this water supply system following completion.

- **Construction of Sake Water Supply System (Phase I),**

The selected intake site shall be located in Kumurenge Village in Gafunzo Cell of Sake Sector in Ngoma District. This subproject is proposed to construct a WTP and the water will be treated and pumped at Nyagasenyi Village, with existing storage reservoirs of WASAC before supply to customers of Ngoma and Bugesera Districts. The proposed WTP will have a capacity of 6,000m³ and 123,524 beneficiaries are expected to be connected following completion. Other structures expected to be constructed include water intake, pumping station, water reservoirs and water pipelines.

- **Construction of Busogwe Water Supply System**

The Busogwe water supply system is planned to meet the drinking water needs of the rural areas of the Districts of Nyanza and Ruhango. It is designed to essentially treat raw water from intake to be constructed on the Busogwe River. The proposed WTP will have a maximum capacity of 12,000m³/day. Other project components include construction of raw water transmission pipelines, construction of clean water main transportation pipelines of 65 km, construction of clean water distribution pipelines of 153 km, water pumping station, construction of clean water storage reservoir of 2500m³ and four distribution reservoirs. It is expected that 125,000 people will benefit from this system following completion.

- **Construction of Ngororero Water Supply System**

This water supply subproject is planned to cover administrative sectors of Kabaya, Kageyo, Ngororero, Muhororo, Sovu, Bwira, Gatumba, Hindiro, Kavumu, Matyazo, Muhanda, Ndaro and Nyange. The project will mainly consist of rehabilitation of exiting water supply systems which are not no longer operating and need to be rehabilitated. New sources will be identified, captured and conveyed in order to complement the old ones.

The Feasibility study identified eighty five (85) water Systems with estimated length of 840.7 km including: (i) twenty six (26) gravitational water Systems which might require total rehabilitation with estimated length of 185.1km. (ii) Twenty two (22) gravitational water system which might require partial rehabilitation with estimated length of 82.1km. (iii) sixteen (16) existing gravitational water Systems which are in good operational condition with estimated length of 115.5 km and (iv) Twenty one (21) new water Systems in the entire District have been proposed to serve clustered rural settlements which are not supplied by existing water Systems with estimated length of 444km including one (1) pumping System with 26.8km long and twenty (20) gravitational water Systems with 417km of length. It is estimated that the proposed project will allow WASAC to serve 84,880 households following completion.

- **Construction of Kagaga WTP and Distribution Systems,**

This proposed WTP and distribution system is designed to supply water to the population of Muhanga and once completed, it is anticipated that 141,719 households will benefit from the system. It is proposed to construct a water treatment plant with a capacity of 9000 m³/day. The raw water to be treated will come from two different sources of water intake on the Makurungwe River and the Kagaga River.

- **Construction of Motobo West crest water Supply System,**

This proposed Volcano belt water supply project include the part of Musanze District (Sectors of Busogo, Cyuve, Gacaca, Gataraga, Kimonyi, Kinigi, Muhoza, Musanze, Nyange and Shingiro), part of Burera District (Sectors of Cyanika, Gahunga, Kagogo, Kinoni and Rugarama), part of Nyabihu District (Bigogwe, Jenda, Kabatwa, Kintobo and Mukamira Sectors) part of the Rubavu District (Bugeshi, Busasamana, Cyanzarwe, Kanzenze, Mudende, Nyakiliba, Nyundo, Rubavu and Rugerero Sectors. Under the additional financing only the rehabilitation of the Mutobo West Crest system is considered. The system will include the construction of clean water pipeline of 120km, 3 pumping stations (Muhingo-Gahira; Muhingo-Susa and Gahira-Gasizi), 2 reservoirs (300m³ cum at Kinigi and 700m³ at Susa) and 20 public stand taps.

- **Construction of Kivu Belt Water Supply System (Phase I)**

The proposed Kivu belt water supply project aims at providing water to the emerging towns and

urban centers including Karongi, Mubuga center, Mugonero Center, Karengera center, Kibogora, Matyazo and Nyamasheke center where there is current shortage of water supply services. The project will be constructed in phases and the additional financing will be used to implement phase I that will supply water in the Karongi Town where the feasibility study has been completed.

The system will include the Construction of raw water retention intake, raw water transmission pipelines (13,6km), two water treatment plants (one with 7000m³/day and another one of 1500 m³/day.) treated water pipeline of 66.64 km raw water and clean water pump stations, distribution pipeline of 158km, storage clean water reservoir of 1500m³ and 1000m³ and distribution reservoir including three reservoir of 500 m³, two of 200m³ and three of 5mm³. The subproject will also have 350 public taps and 1400 Pro-poor connections following completion.

1.2.2. Sanitation Infrastructure and Services Improvement

This component will mainly focus on Provision of Model Latrines for Schools in various Districts.

1.2.3. Institutional support and program management component

The Institutional support program will mainly consist of efficiency improvement Support for Rural Piped Schemes while the program management component will consist of daily program management of the program including support services.

2. INSTITUTIONAL, LEGISLATIVE AND REGULATORY FRAMEWORK

2.1. National legislative and regulatory framework

The Constitution of the Republic of Rwanda, adopted in June 2003 and revised in 2015, ensures the protection and sustainable management of environment and encourages rational use of natural resources. In consideration of the Constitution as amended to date, article 49 states that every citizen is entitled to a healthy and satisfying environment. Every person has the duty to protect, safeguard and promote the environment. The state shall protect the environment. The Organic Law determines the modalities for protecting, safeguarding and promoting the environment. To comply with this constitutional statement and to ensure that the country development is done in sustainable manner, the government has adopted different sectoral policies, laws and institutional set ups for their monitoring and enforcement.

2.1.1. Relevant policies for the proposed program.

➤ The National Policy on Environment

Adopted by the cabinet in November 2003, the Environment Policy has an overall objective of improving the human well-being, the judicious utilization of natural resources and the protection and rational management of ecosystems for sustainable development. The recommendation of the policy on population and land-use management is to balance the national policy in terms of population, land-use management and environment, while the recommendation on Land is to ensure that land, which is the major resource of the country, is not degraded and used in an unplanned manner. The policy operates within and towards the global concept of sustainable development. It is intended to achieve benchmarks and embrace commitment to international environmental conventions agreed upon in Ramsar (1971), Vienna (1985), Montreal (1990), Rio (1992), Kyoto (1998), and Stockholm (2001) to all of which, Rwanda is a party. The policy has resulted in the national Organic Law on environment protection and conservation and different guidelines and laws related to Environmental Impact Assessment. The Policy seeks to achieve this through the following objectives.

- to improve the health and the quality of life for every citizen and promote sustainable socio-economic development through a rational management and utilization of resources and environment;
- To integrate environmental aspects into all the development policies, planning and in all activities carried out at the national, provincial and local level, with the full participation of the population;
- To conserve, preserve and restore ecosystems and maintain their functioning, which support life, particularly the conservation of national biological diversity;

- To ensure optimum utilization of resources and attain a sustainable level of consumption of resources;
- To create awareness among the public to understand and appreciate the relationship between environment and development;
- To ensure the participation of individuals and the community in the activities for the improvement of environment with special attention to women and the youth;
- To ensure the meeting of the basic needs of today's population and those of future generations.

➤ **National Biodiversity Strategy (NBS)**

The revised and updated Rwanda National Biodiversity Strategy (NBS) of 2015 has a long-term vision which is in line with the Convention on Biological Diversity (CBD) strategic plan to 2020 and states that: "by 2040, national biodiversity be restored and conserved, contributing to economic prosperity and human well-being through delivering benefits essential for Rwandan society in general." NBS as a 'living document', responsive, flexible and practical, including biodiversity conservation in economic decisions and turn it into a driver for national development. Relevant economic development sectors such as agriculture and animal resources, fisheries, forestry, mining and infrastructures will incorporate biodiversity conservation activities into their planning systems as well as in the annual budgets of upcoming years.

➤ **Integrated Water Resources Management Policy(IWRMP)**

The IWRMP is the latest development in Government's consistent and continuous efforts to strengthen the water resources management sub-sector. It replaces the 2004 policy and has been necessitated by the ill-alignment between the 2004 policy and water law No. 62/2008, which embraced many modern and cutting-edge principles of sustainable water resources. Additionally, the government has been introducing reforms in the water sector that have significantly changed the context for water resources management and rendered the 2004 policy out of date. With the promulgation of a law establishing the Rwanda Water and Forestry Authority (RWFA) with the mandate to lead the management of water resources across sectors, there is potential to achieve a coordinated approach to water resources management, in line with the integrated water resources management concept. In other to address the capacity limitations being faced by the sector, it will require concerted efforts in resource mobilisation, human resource development and institutional capacity building.

➤ **Land Policy in Rwanda, 2004**

The National Land Policy of Rwanda approved in 2004, seeks to establish a land tenure system that guarantees tenure security for all Rwandans and give guidance to the necessary land

reforms with a view to good management and rational use of national land resources. The policy seeks to ensure this through the following objectives.

- To put in place mechanisms which guarantee land tenure security to land users for the promotion of investments in land;
- To promote good allocation of land in order to enhance rational use of land resources according to their capacity;
- To avoid the splitting up of plots and promote their consolidation in order to bring about economically viable production;
- To establish mechanisms which facilitate giving land its productive value in order to promote the country's socio-economic development;
- To focus land management towards more viable and sustainable production by choosing reliable and time-tested methods of land development;
- To develop actions that protects land resources from the various effects of land degradation;
- To establish institutional land administration arrangements that enable land to have value in the market economy.
- To promote the involvement and sensitization of the public at all levels in order to infuse land use practices that are favorable to environmental protection and good land management. To promote conservation and sustainable use of wetlands As such, this policy bears the responsibility of allocating and planning land use activities in Rwanda including housing activities. The policy dictates that:

The policy was the basis for the Land Law approved in 2005 and revised in 2013 and the Expropriation Law enacted in 2007 and revised in 2015. Both laws are applicable to the proposed program component activities and their implementation shall require compliance with both.

➤ **Urbanization Policy,2015**

Approved in 2015, the National Urbanization Policy addresses all aspects of cross-sectoral action in urban development and governance. Rwanda guides urbanization in a way to efficiently use and manage its natural resources while promoting sustainable development, reinforce its system of urban areas and human settlements for local economic development based on local potentialities and inter-linkages, promote densification for cost effective public investment and infrastructure service delivery, and to reserve for agricultural production, open space and conservation of the environment, and plan for the needs of transportation, housing, culture, recreation, utilities, waste management, information and telecommunication, commercial and industrial development in response to macro-economic strategies and citizens views.

The overall intent of the policy is to create the conditions for well-managed growth generating vibrant urban environments and sustainable economic development. Rwanda's urban agenda encourages multi-institutional cooperation, for the development of safe public space, quality education, medical and transport facilities, and a friendly city ambiance offering public services and infrastructure. As part of this vision, the government seeks to prevent unplanned growth in support of the urban development system and an increasing quality of life.

➤ **Sanitation Policy, 2016**

National Sanitation policy approved in 2016 outlines initiatives to overcome challenges and exploit existing opportunities in an integrated manner, and will effectively contribute towards achieving the goals of the National Development Agenda. The policy aims at ensuring expanded access to safe and sustainable sanitation services through a number of means including: establishing District sanitation centres providing a wide range of sanitation technologies; improving operation and maintenance of sanitation facilities; and assisting Districts and the City of Kigali to plan and design projects to mitigate urban storm water issues. Specific objectives of the sanitation policy are:

- Raise and sustain household sanitation coverage to 100% by 2020;
- Implement improved sanitation for schools, health facilities and other public institutions and locations;
- Develop safe, well-regulated and affordable off-site sanitation services for densely populated areas;
- Enhance storm water management in urban areas to mitigate impacts on properties, infrastructure, human health and the environment;
- Implement integrated solid waste management;
- Ensure safe management of e-waste, industrial waste, nuclear/radioactive waste and health-care waste;
- Develop the sanitation sub-sector's institutional and capacity-building framework.

➤ **National Water Supply Policy, 2016**

National Water supply policy approved in 2016 outlines initiatives to overcome challenges and exploit existing opportunities in an integrated manner, and will effectively contribute towards achieving the goals of the National Development Agenda. The policy will ensure increased sustainability and access to safe and clean water through improving operations and maintenance of existing water supply infrastructure and providing new water facilities.

The policy has the following specific objectives:

- Raise rural water supply access to 100% by fast-tracking implementation of a strategic investment programme;
- Ensure sustainable functionality of rural water supply infrastructure by strengthening operation and maintenance management arrangements;
- Ensure safe, reliable and affordable urban water supply services for all while striving for financial sustainability;
- Ensure safe and reliable water supply services for schools, health facilities and other public places;
- Strengthen and consolidate the sector's institutional, legal and capacity building framework and;
- Provide Policy directions on cross-cutting issues.

2.1.2. Relevant Laws and guidelines

➤ Constitution of the Republic of Rwanda

In consideration of the Constitution of the Republic of Rwanda of June 4, 2003 and revised in 2015, article 49 states that every citizen is entitled to a healthy and satisfying environment. Every person has the duty to protect, safeguard and promote the environment. The state shall protect the environment. The law determines the modalities for protecting, safeguarding and promoting the environment.

• Law n°48/2018 of 13/08/2018 on environment

The new environmental law approved No 48/2018 of 13/08/2018 determines modalities of protection, conservation and promotion of environment in Rwanda and regulates the Environmental impact Assessment. Article 33 on Consideration and approval of environmental studies, states that the environmental impact assessment, environmental audit and strategic environmental assessment must be approved by the Authority or another State organ authorized in writing to do so by the Authority. If the approval is made by an authorized organ, such an organ does so on behalf of the Authority which is also responsible for its audit.

Currently the ESIA approval process is done on line via RDB one stop centre and is done as follows:

- Project proponent /developer request ESIA terms of reference by submission of project brief;
- RDB review the project brief and conduct field visit before issuance of terms of reference;
- Once terms of reference are approved and sent to the project developer, this one is allowed to hire one of the certified expert based on the list approved by Ministry of Natural Resources;
- The hired consultant conduct the ESIA study and submit the ESIA report to the developer and this one send the report to RDB if is satisfied with the report,

- RDB review the report and issues the ESIA clearance letter with approval condition if is satisfied with the report. Once the conditions of approval are signed by the developer, then RDB issue the original certificate and the developer is allowed to start the project.
- If RDB is not satisfied with the report, the report is reject and the developer together with the consultant addresses comments issues by RDB,
- If the developer is not satisfied with RDB decision he/she can appeal to the Minister of natural resources having environment in his attribution.

Article 30 states projects that must undergo an environmental impact assessment and its procedure. The list of projects that must undergo an environmental impact assessment before they obtain authorization for their implementation is established by an Order of the Minister. An Order of the Minister also issues instructions and procedures for conducting environmental impact assessment.

Article 32 on Environmental Audit requires every project that may have significant impact on the environment to undergo an environmental audit during and after its implementation. The list of projects that must undergo environmental audit is established by an Order of the Minister. An Order of the Minister also issues instructions and procedures for conducting environmental impact assessment.

Furthermore article 46 on implementing a project without environmental impact assessment clearance states that any person who does not carry out environmental impact assessment before launching any project that may have harmful effects on the environment while it is required, is punished by suspension of his/her activities or closure of his/her association and ordered to rehabilitate the damage to environment, persons and property. He/she also pays an administrative fine of two percent (2%) of the total cost of the project.

➤ **Law N° 37 /2008 of 11/08/2008 on mining and quarry exploitation**

The construction of Principal pipeline requires some material including stones and sand. Therefore, the mining and quarry exploitation laws provide the process of acquiring quarries for mining activities, the licensing process and the environmental consideration in exploiting a quarry. Nevertheless the quarry component will be conducted by a contractor who will be required to fully respect strictly the permitting process. An ESIA Certificate is required for each quarry to be exploited. Thus, the contractor will be requested to acquire material from certified mines and quarries and in respect to environmental requirement.

➤ **Ministerial Order N°007/2008 of 15/08/2008 establishing the list of protected animal and plant species**

Chapter II Article 2 of this order classifies protected animals in three categories as Mammals, birds, and reptiles. The list is published in Appendix 1 of this Order as follows:

Animals: Gorilla, Chimpanzee, Black rhinoceros, Elephant, Roan antelope, Sitatunga, Lions, Leopard, Klipspringer, Buffalo, Cheetah, Zool mongoose, Cephalophus, Zool serval, Wild dog, Bushbuck, Hippopotamus, Burchell's zebra Birds: Black-headed Heron, Cattle Egret, Grauer's Swamp Warbler, Owls, All Lemnoids, Grey Crowned-Crane, wallow, Arrow-marked Babbler, Cape Robin-Chat, All pangolins, Vulture, Bee eater, Scimitar bills, Hamerkop, Sunbirds.

Reptile: Tortoises (all species), Python, Crocodile, Viper.

Plants: Ficus thonningii, Prunus Africana, Pentadesmone indensis, Myrianthus holstii, Thonningia sanguinea, Hypoestemon trifolius, Aloe sp., Syzygium guineense, Erythrina abyssinica, Fagarachalybea, Kigelia africana, Orchidaceae, Eulophia streptopetala, Eulophia horsfallii, Diaphanandra bilosa, Disa emili, Disperiskilimanjarica, Euggelinaligulifolia, Polystachya hastata, Tridactyleanthomania, Entandophragmas, Podocarpus sambarensis, Albizzia sasa, Piptadenia africana, Podocarpus milinjanus, grandiflora, Strombosia, Scheffleri. The Order specifies that the listed animals and plant species shall not be destroyed without permission of the competent authorities. Although none of these species were observed in the project area, this project will endeavour to respect and protect these organisms, their habitats and the regulation enforcing the measures of their protection where they are present.

➤ **Environmental Impact Assessment general guidelines, 2007**

REMA has now developed the ESIA regulations which provide a guide and requirements for ESIA in Rwanda. According to these new regulations, Article 1 makes it mandatory for all the projects listed under schedule I to be subjected to a full scale ESIA. The Article further states that no environmental authorization shall be granted by the Authority for any project in Schedule I to these Regulations if no Environmental Impact Assessment has been submitted to the Authority in accordance with the provisions of these Regulations.

The Article states that any project listed under Impact Level III of Schedule I to these Regulations shall require a full environmental impact assessment by preparation of an environmental impact report, unless the Authority refuses permission. The construction and rehabilitation of mass graves of victims of 1994 Genocide, falls in this category II and thus must be subjected to full scale ESIA.

Public Hearing Process: Article 47: The Authority shall on receipt of the developer's environmental impact report, arrange for a public hearing to take place within twenty (20) working days from the first day of public notification, at which relevant Lead Agencies, local

governments, civil societies and concerned members of the public may comment on the environmental impact report and express views on impacts of the proposed development. The Authority shall cover all costs incidental to the public hearing. Article 48: All projects classified under Impact Level III shall be subjected to a public hearing prior to the decision-making process.

➤ **Ministerial order N° 003/2008 of 15/08/2008 relating to the requirements and procedure for Environmental Impact Assessment**

Article 1 stipulates that Environmental Impact study is a systematic way of identifying environmental, social and economic impacts of a project before a decision of its acceptance is made. In article 3, the developer submits an official application which includes a project brief of the proposed project to the authority. Article 4 specifies that within thirty (30) calendar days after receipt of the project brief and after its analysis, the Authority shall submit the Terms of reference to the developer for the Environmental impact study.

In Article 7, upon completion of the environmental impact study, the developer shall deposit with the Authority five (5) hard copies and a soft copy of the report.

➤ **Organic law N° 43/2013 of 16/06/2013 governing land in Rwanda**

The land law was initially adopted in 2005 and then revised in 2013 and was gazetted in the official gazette no special of 16/06/2013. It determines the use and management of land in Rwanda: This is the law that determines the use and management of land in Rwanda. It also institutes the principles that are to be respected on land legal rights accepted on any land in the country as well as all other appendages whether natural or artificial.

According to the Law, land in Rwanda is categorized into two: individual land and public land. The latter is subdivided into two categories: the state land in public domain and the state land in private domain. State land in public domain includes national land reserves for environment conservation; land over which administration building are erected, state roads, land containing lakes, rivers, stream and springs. State land in private domain include swamps that may be productive in terms of agriculture, vacant land with no owner, land purchased by the State, donation, land acquired through expropriation and land occupied by state owned forests.

The Organic Land Law also provides two types of formal land tenure: full ownership/ freehold and long term leasehold. So far, all land in the country has been registered and land titles issued to citizens. According to article 10 of new land law of June 2013, private individual land shall comprise land acquired through custom or written law. That land has been granted definitely by competent authorities or acquired by purchase, donation, inheritance, succession, ascending

sharing, and exchange or through sharing. This law offers equal protection to rights over land resulting from all channels stipulated in the preceding paragraph. All types of land tenure must be in compliance with the designated land use and environmental protection measures as outlined in the Land Use Master Plan.

- **Organic law n° 32/2015 of 11/06/2015 law relating to expropriation in the public interest**

This Law determines the procedures relating to expropriation of land in the interest of the public. The law stipulates that the government has the authority to carry out expropriation. However the project, at any level, which intends to carry out acts of expropriation in public interest, shall provide funds for inventory of assets of the person to be expropriated. According to the organic law, no person shall hinder the implementation of the program of expropriation on pretext of self-centered justifications and no land owner shall oppose any underground or surface activity carried out on his or her land with an aim of public interest. In case it causes any loss to him or her, he or she shall receive just compensation for it.

Eligibility for compensation is enshrined under the Rwandan constitution (article 29) and the expropriation law. The two laws regulate and give entitlement to those affected, whether or not they have written customary or formal tenure rights. The person to be expropriated is defined under article 27 of the expropriation law to mean any person or legal entity who is to have his or her private property transferred due to public interest, in which case they shall be legally entitled to payment of compensation.

2.1.3. Institutional arrangement for the environmental management in Rwanda

The institutional framework for environmental management is currently enshrined in the Organic Law determining the modalities of protection, conservation and promotion of the environment in Rwanda, published in the Official Gazette RWA N° 9 of the 1st May 2005, particularly in its chapter III relating to the establishment of the institutions.

- **Ministry of Infrastructure (MININFRA)**

The mission of Ministry of Infrastructure includes:

- to initiate programs, to develop, rehabilitate and maintain an efficient and integrated national transport infrastructure network, including roads, bridges, airports, railways, and water supply which will contribute towards economic development and regional integration.
- To initiate programs aimed at increasing access to affordable energy, water and sanitation, and transport infrastructure and related services for the population;

- To supervise the implementation of quality standards and norms, cost effectiveness, response to environmental sustainability, safety and cross-cutting issues in infrastructure development;
- To work towards implementation of programs to enhance human resource capacities under the transport, energy, habitat & urbanism, water and sanitation, and meteorology sub-Sectors respectively;
- To supervise activities meant to elaborate, monitor and assess the implementation of national policies and programs on matters relating to habitat and urbanism, transport, energy, water and sanitation.

- **Water and Sanitation Corporation Limited(WASAC Ltd)**

WASAC Ltd is the entity setup to manage the water and sanitation services in Rwanda and was created by the law N° 87/03 of 16/08/2014. The company was created in the on-going government reform intended to deliver water and sanitation utility sufficiently focused to deliver new infrastructure; efficient and effective service delivery; build a strong people capability; and meet key national milestones. It is expected to reverse the status quo that includes inadequate planning and investments; inefficient and wasteful operations; inadequate institutional management focus; improve viability and autonomy; and establish a sustainable and customer-centric utility to deliver an important mandate that touches people of all walks of life. The mission of the company is providing quality, reliable and affordable water and sewerage services through continuous innovations and detailed care to customers' needs.

As implementing agency, WASAC Ltd will play a critical role in project implementation but also in the implementation of ESMPs and ARAPs as well as conditions of approval to be issued by Rwanda Development Board. WASAC Ltd is also responsible for monitoring of the implementation of mitigation measures and report back to Rwanda Environment management Authority and AfDB.

- **Ministry of Environment (MoE)**

The Ministry of Environment is responsible for the development of environmental policies and procedures (including impact assessments), protection of natural resources (water, land, flora, and fauna), environmental legislation, biodiversity, and other environmental aspects. The Chapter IV of the organic law on environmental protection, conservation and management, Article 65, clearly calls for the need to subject projects to mandatory ESIA. The Article 65 further specifies that every project shall be subjected to environmental assessment prior to its commencement. It shall be the same for programs, plans and policies likely to affect the environment. Specific details of projects referred to in this Article shall be spelt out by the order of the Minister in charge of environment. MoE is one of the lead Agencies / Line Ministry as

provided by the General Guidelines and Procedure for ESIA.

MoE is expected to perform the following functions in the ESIA process:

- Participate in screening at the request of Rwanda environment Management Authority (REMA);
- Publish the list of ESIA practitioners;
- At the request of REMA, review Project Briefs so as to advise on Terms of Reference;
- Ensure that their own projects adhere to ESIA requirements;
- Ensure that private-sector projects in fields over which they have jurisdiction comply with ESIA requirements;
- At the request of REMA, review ESIA report;
- Serve on REMA's Technical Committee;
- Serve on REMA's Executive Committee;
- Provide information or advice to developers and ESIA Experts during ESIA process;
- Participate as panelist at public hearings held during the conduct of ESIA;
- Advise developers on the requirement for ESIA (where relevant) before licensing their projects;
- Assist in inspecting and monitoring environmental compliance by ensuring that licensing terms and conditions are met, including those specified by REMA.

- **Rwanda Environment Management Authority (REMA)**

REMA was established in 2004 to act as the implementation agency of environment related policies and laws in Rwanda. Under supervision of the Ministry of Natural Resources, from the Law n°63/2013 of 27/08/2013 determining the mission, organization and functioning of REMA, it has the legal mandate for national environmental protection, conservation, promotion and overall management, including advisory to the government on all matters pertinent to the environment and climate change. Key responsibilities of REMA are as follows:

- Advise the Government on policies, strategies and legislation related to the management of the environment as well as the implementation of environment related international conventions, whenever deemed necessary;
- Conduct thorough inspection of environmental management in order to prepare a report on the status of environment in Rwanda that shall be published every two (2) years;
- Put in place measures designed to prevent climate change and cope with its impacts;
- Conduct studies, research, investigations and other relevant activities in the field of environment and publish the findings;
- Closely monitor and assess development programs to ensure compliance with the laws on environment during their preparation and implementation;

- Participate in the preparation of activities strategies designed to prevent risks and other phenomena which may cause environmental degradation and propose remedial measures;
- Provide, where it is necessary, advice and technical support to individuals or entities engaged in natural resources management and environmental conservation;
- Prepare, publish and disseminate education materials relating to guidelines and laws relating to environmental management and protection and reduce environmental degradation risks;
- Monitor and supervise impact assessment, environmental audit, strategic environmental assessment and any other environmental study. REMA may authorize in writing, any other person to analyze and approve these studies. The ESIA review has been delegated to Rwanda Development Board.

- **Rwanda Water and Forestry Authority (RWFA)**

The Rwanda Water and Forestry Authority was established under the Law N°06/2017 of 03/02/2017 establishing the Rwanda Water and Forest Authority and determining its mission, organization and functioning. The Authority has the following main mission:

- To implement policies, laws, strategies and Government decisions related to the management of forests and natural water resources;
- To advise Government, monitor and coordinate the implementation of strategies related to the management of forests and natural water resources;
- To assist public and private institutions in charge of management of forests and natural water resources in a bid to fight erosion;
- To establish programmes and strategies for production of tree seeds;
- To prepare programmes of reforestation, forest promotion and appropriate management and support districts in the management of forests and natural water resources;
- To undertake research, studies and other relevant activities with regard to the importance of forests in the national economy and to the exploitation of trees and wood-based products and disseminate the findings;
- To assist in the establishment of standards and regulations relating to the management of forests and natural water resources.

- **Rwanda Land Management and Use Authority (RLMUA)**

RLMUA is responsible for putting in place and operationalizing an efficient system of land administration, use and management that secures land ownership, promotes investment in land for socio-economic development and poverty reduction. Responsibilities of RLMUA are

- Put in place mechanisms which procure security of land tenure for the promotion of investments in land.
- Promote proper allocation of land, and proper use of land resources, according to their potential.
- Avoid the splitting up of plots, and to promote their regrouping in order to bring about optimum production.
- Establish of mechanisms which facilitate an optimum exploitation of land, targeting the social-economic development of the country.
- Orient land management towards a more profitable and sustainable production, by making good choices among methods of land development.
- Develop methods that protects land resources from various types of land degradation.
- Establish institutional frameworks which enable land to become more valuable in the economy or at the market.
- Promote research as well as the education of the public on all aspects concerning land tenure, management, and transactions.
- Establish order and discipline in the allocation of land, as well as in land transactions in order to control the pressure on land, inappropriate development, speculation and trafficking of land.
- Involve and sensitize the public at all levels in order to ensure protection of the environment and good management of the land.
- Ensure the sustainable use of wetlands.

- **Rwanda Development Board (RDB)**

RDB was created by Organic Law N° 53/2008 of 02/09/2008. It has a mission of improving the well-being of all Rwandans by fast-tracking development, catalyzing sustainable economic growth, and creating prosperity for all. This a one stop institution bringing together several government bodies in Rwanda focused at promoting investment in Rwanda. Initially the responsibility for reviewing and approving ESIA reports was entrusted to REMA, this duty has now been transferred to the newly created Rwanda Development Board (RDB) where a department of ESIA has been created and tasked with review and approvals of all ESIA reports for proposed projects and programmes before they are approved for implementation. The Key responsibility of ESIA department under One Stop centre in RDB is to:

- Receive and register ESIA Applications (Project Briefs) submitted by developers;
- Identify relevant Lead Agencies to review Project Briefs and provide necessary input during screening,
- Review Project Briefs and determine project classification at screening stage,

- Transmit Project Briefs to relevant Lead Agencies and concerned Local Governments to provide input on Terms Of Reference (ToR),
- Publicize Project Briefs and collect public comments during development of ToR,
- Receive ESIA documents submitted by a developer and verify that they are complete,
- Transmit copy of ESIA Reports to relevant Lead Agencies, Local Governments and Communities to review and make comments,
- Review ESIA reports and make decision on approval, organize and conduct public hearings, appoint an officer from Authority to chair public hearings, receive public comments and compile public hearing reports,
- Appoint the Technical Committee and its representative to the Technical Committee,
- Forward ESIA Documents (ESIA Report, Environment Monitoring Plan and Public Hearing Report) to the Technical Committee,
- Chair the Executive Committee which makes final decision on approval of a project,
- Communicate decision on whether or not a proposed project is approved,
- Issue to developers ESIA Certificate of Authorization if their projects are approved.

- **Rwanda Standards Board (RSB)**

- RSB was established by the law N°50/2013 of 28/06/2013. Chapter II of that law gives the main mission of RSB which is very relevant to this project:
- to establish and publish national standard;
- to disseminate information on standards, technical regulations relating to standards and conformity assessment;
- to raise awareness and promote the importance of standards and quality service as tools to improve market access, technology transfer and sustainable development;
- to participate in monitoring standardization at national, regional and international level;
- to provide products and quality service certifications and monitor conformity for issued certifications;
- to provide legal, scientific and industrial metrology services;
- to represent the country at the regional and international standardization organizations ;
- to establish laboratories capable of conducting tests and offering testing services;
- to act as reference laboratory in the quality domain;
- to carry out measurement and comparison of proficiency with same level regional and international institutions;

- to organize training programs in the area of standardization, metrology and conformity assessment. Requirements for potable water are presented in standards RS 435:2009.

- **Rwanda Utility Regulatory Authority (RURA)**

Rwanda Utilities Regulatory Authority (RURA) was initially created by the Law n° 39/2001 of 13 September 2001 with the mission to regulate certain public Utilities, namely: telecommunications network and/or Telecommunications services, electricity, water, removal of waste products from residential or business premises, extraction and distribution of gas and transport of goods and persons. This Law was further reviewed and replaced by Law N° 09/2013 of 01/03/2013 establishing Rwanda Utilities Regulatory Authority (RURA) and determining its mission, powers, organization and functioning. This Law gives to RURA the mandate to regulate:

- Telecommunications, information technology, broadcasting and converging electronic technologies including the internet and any other audiovisual information and communication technology;
- Postal services;
- Renewable and non-renewable energy, industrial gases, pipelines and storage facilities;
- Water supply including tariffs;
- Sanitation;
- Transport of persons and goods; and
- Other public utilities, if deemed necessary.

- **Local Governments**

Generally, decentralized entities are responsible for the implementation of laws, policies, strategies, objectives and programmes relating to protection, conservation and promotion of the environment in Rwanda. Article 61 of environmental law state that in the framework of conservation and protection of the environment, decentralized entities are particularly responsible for:

- ensuring activities related to better management of land, especially controlling soil erosion and tap rain water;
- Afforestation, protection and proper management of forests;
- efficient management of rivers, lakes, sources of water and underground water;
- efficient management and effective use of swamps;
- Protection and proper management of reserved areas, historical sites, endangered animal and plant species.

Under the General Guidelines and Procedure for ESIA Local Governments including Kigali City, Nyarugenge and Gasabo Districts and its respective sectors are tasked to perform the following

functions:

- At the request of RDB, review Project Briefs so as to advise on Terms of Reference,
- Provide information or advice to developers and ESIA Experts when consulted during ESIA process,
- At the request of RDB, review ESIA reports and provide comments to RDB,
- Assist RDB in organizing public hearings,
- Host public hearings,
- Host individual consultations,
- Gather written comments from public and transmit them to RDB.
- Facilitate the land acquisition process through land bureau office;
- Plan and complaints resolutions.

2.2. International Guidelines and Procedures

This Environmental and Social Management Framework Social Impact Assessment has been updated in compliance with National Regulations as well as international policies especially the AfDB ISS.

2.2.1. AfDB Integrated Safeguards System.

Approved in 2013, the AfDB's ISS is designed to promote the sustainability of project outcomes by protecting the environment and people from the potentially adverse impacts of projects. The safeguards aim to:

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

The 'Environmental and Social Safeguard Policies' of the African Development Bank (AfDB) consist of Environment Policy, Operations Manual and Guidelines; Policy on Involuntary Resettlement. The preparation of the environmental and social impact assessment for the proposed project has also followed the AfDB Environmental and Social Assessment Procedure (ESAP).

The ESAP gives the steps to be undertaken when undertaking an ESIA including the generic terms of reference of an ESIA; typical contents of an ESIA and the minimum contents of an Environmental and Social Management Plan (ESMP). It defines ESIA as an Instrument whose purpose is to identify and assess the potential environmental and social impacts of a proposed project, evaluate alternatives, and design appropriate mitigation/enhancement, monitoring,

consultative and institutional strengthening measures. The ESAP divides projects into four categories:-

- **Category 1:** projects are those that are likely to have significant and irreversible environmental and social impacts, widespread in extent and require a full ESIA.
- **Category 2:** projects are likely to have detrimental and site-specific environmental and social impacts that can be minimized by the application of mitigation measures included in an ESMP.
- **Category 3:** shall not induce any adverse environmental and social impacts and do not need further action.
- **Category 4:** projects involve investment of Bank's funds through Financial Intermediaries (FIs) in subprojects that may result in adverse environmental or social impacts. Specific requirements for this type of project include an assessment of FI capacities to handle environmental and social considerations.

The proposed project falls under a category 2 within the AfDB's ISS because the potential environmental and social impacts are not significant, localized in nature and can be managed via a robust ESMP. Beyond this ESMF, site specific ESMPs shall be developed to avoid, minimize and/or compensate for any residual impacts associated with each subproject component activities.

Consequently Operational Safeguards OS 1 on Environmental Assessment have been triggered because the component activities could generate localized environmental and social impacts to identified receptors within its area of influence which requires assessment. Operational Safeguard OS2 has also been triggered because the component activities such as the WTP, forwarding infrastructure such as pipelines and Storage tanks could cause minimal economic displacement. Site specific ARAP shall be developed to manage these impacts. OS 5 on Labor, Working Conditions, Occupational Health and Safety is applicable since the construction will involve a significant number of construction workers.

- **Operational Safeguard 1: Environmental and Social Assessment**

This overarching safeguard governs the process of determining a project's environmental and social category and the resulting environmental and social assessment requirements: the scope of application; categorization; use of the appropriate Environmental and Social Assessment ESA (SESA, ESIA, ESMF, ESMP); climate change vulnerability assessment; public consultation; community impacts; appraisal and treatment of vulnerable groups; and grievance procedures. It updates and consolidates the policy commitments set out in the Bank's policy on the environment. At project level, clients are responsible for conducting the ESA and for developing, as an integral part of project documentation, an appropriate plan for managing possible impacts. The Bank's environmental and social staff in operations, support the due diligence process and ensure

that borrowers and clients are fully aware of Bank policies and procedures, while the Bank's Compliance and Safeguards function ensures that deliverables and the compliance process are properly conducted to ensure good quality.

To the extent possible, the assessment complies with the relevant legislation and standards applicable in the local jurisdiction, bearing in mind the equivalence of standards with those of the Bank, and it takes into consideration national- or regional- level programming documents (i.e., CSP or RISP) that are under implementation or in preparation.

- **Operation Safeguard 2: Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation**

This safeguard consolidates the policy commitments and requirements set out in the Bank's policy on involuntary resettlement, and it incorporates refinements designed to improve the operational effectiveness of those requirements. In particular, it embraces comprehensive and forward-looking notions of livelihood and assets, accounting for their social, cultural, and economic dimensions. It also adopts a definition of community and common property that emphasizes the need to maintain social cohesion, community structures, and the social interlinkage that common property provides. The specific objectives of this OS is to avoid involuntary resettlement where feasible, or minimize resettlement impacts where involuntary resettlement is deemed unavoidable after all alternative project designs have been explored;

The safeguard retains the requirement to provide compensation at full replacement cost; reiterates the importance of a resettlement that improves standards of living, income- earning capacity, and overall means of livelihood; and emphasizes the need to ensure that social considerations, such as gender, age, and stakes in the project outcome, do not disenfranchise particular project-affected people.

The affected populations are offered a range of different compensation package, resettlement assistance, and livelihood improvement options, as well as options for administering these measures at different levels (e.g., family, household and individual), and the affected persons themselves are given the opportunity to express their preferences. This option-based resettlement planning is part of a development approach that aims to ensure that the affected populations are able to reconstruct their production foundations and become self-sustaining producers and wage earners.

Particular attention is given to ensuring that the interests of both women and men and of the elderly and the handicapped are taken into account when formulating and implementing compensation packages, resettlement assistance measures and livelihood improvement measures. As a concrete step to implementing this requirement, households headed by women especially widows are provided productive land to improve their income and livelihood sustenance capacity in rural areas where livelihoods are generally agriculture-based. In general, compensation arrangements, resettlement assistance and livelihood improvement measures, such as skills training, are made equally available to all social groups and adapted to their

specific needs, even when land is owned.

- **Operational Safeguard 5: Labor Conditions, Health and Safety**

This safeguard establishes the Bank's requirements for its borrowers or clients concerning workers' conditions, rights and protection from abuse or exploitation. It covers working conditions, workers' organizations, occupational health and safety, and avoidance of child or forced labor.

Other AfDB policies relevant to the projects include:

- **Gender policy**

The Gender Policy aims to promote gender equity and gender mainstreaming in all AfDB operations. It requires the AfDB to apply gender analysis to all its activities.

- **Gender Strategy, 2014-2018**

The goal of this strategy is twofold; first, it seeks to strengthen gender mainstreaming in all Bank national and regional operations and strategies. The Bank aspires to be a more caring and more gender-sensitive institution, which also values its female and male staff, protects against discrimination and all forms of harassment and violence, and ensures a safe and secure working environment. Preferential to attract the best professionals.

- **Policy on Poverty Reduction (February 2004)**

This policy reaffirms the AfDB's commitment to the overarching goal of poverty reduction through measures to promote national ownership, participation and the obligation of results in its actions to improve living conditions poor people in Africa.

- **Policy on Dissemination and Access to Information (May 2013)**

This policy aims to i) maximize the dissemination of information held by the Bank Group and limit the list of exceptions; ii) facilitate access to information on AfDB operations and its sharing with a broad spectrum of stakeholders; (iii) promote good governance, transparency and accountability; (iv) improve the effectiveness of implementation and better coordinate information dissemination processes; (v) raise awareness of the Bank Group's mission, strategies and overall activities; vi) support the consultative process; and (vii) strengthen harmonization with other development finance institutions in the field of information dissemination. The objectives of this policy are also to encourage States to communicate information to the public, in particular to groups directly affected by operations in the Member States; increase public awareness of Bank Group operations, activities, policies, programs, procedures and operations, facilitate the participation of local populations affected by Bank Group-financed projects,

including non-Bank organizations; eligible governments ("NGOs") recognized by the Bank Group and other relevant community organizations.

3. BIO-PHYSICAL ENVIRONMENT AND SOCIO-ECONOMIC BASELINE

3.1. Geography

Rwanda is located in central Africa, immediately south of the equator between latitude 1°4' and 2°51'S and longitude 28°63' and 30°54' E. It has a surface area of 26,338 square kilometers and is bordered by Uganda to the north, Tanzania to the east, the Democratic Republic of the Congo to the west, and Burundi to the south.

Landlocked, Rwanda lies 1,200 kilometers from the Indian Ocean and 2,000 kilometers from the Atlantic Ocean. Rwanda forms part of the highlands of eastern and central Africa, with mountainous relief and an average elevation of 1,700 meters. However, there are three distinct geographical regions; Western and north-central Rwanda is made up of the mountains and foothills of the Congo-Nile Divide, the Virunga volcano range, and the northern highlands. This region is characterized by rugged mountains intercut by steep valleys, with elevations generally exceeding 2,000 meters. The divide itself rises to 3,000 meters at its highest point but is dwarfed by the volcano range, where the highest peak, Mount Karisimbi, reaches 4,507 meters.

The Congo-Nile Divide slopes westward to Lake Kivu, which lies 1,460 meters above sea level in the Rift Valley trough. In Rwanda's central region, mountainous terrain gives way to the rolling hills that give the country its nickname, "Land of a Thousand Hills." Here the average elevation varies between 1,500 and 2,000 meters. The area is also referred to as the central plateau (Randall Baker, 1970). Further east lies a vast region known as the "eastern plateaus," where the hills level gradually into flat lowlands interspersed with a few hills and lake-filled valleys. The elevation of this region generally is below 1,500 meters.

3.2. Physical Environment

3.2.1. *Climate and rainfall*

Because of its elevation, Rwanda enjoys a temperate, sub-equatorial climate with average yearly temperatures around 18.5°C. The average annual rainfall is 1,250 millimeters, occurring over two rainy seasons of differing lengths that alternate with one long and one short dry season. The climate varies somewhat from region to region, depending on the altitude. The volcano range and northern highlands are generally cooler and wetter, with an average temperature of 16°C and an average rainfall above 1,300 millimeters per year. The maximum rainfall is 1,600 millimeters above the divide and the volcanic range. The hilly central region receives an average of 1,000 to 1,300 millimeters of rain per year, while rainfall on the eastern plateau, where the climate is relatively warmer and drier, generally falls below 1,000 millimeters and can be as low as 800 millimeters. Although Rwanda enjoys more or less constant temperatures, the climate is known to vary from year to year, with extreme variations in rainfall sometimes resulting in

flooding or, more often, drought. These extremes have a profound impact on agricultural production.

In the high regions of the Congo-Nile ridge, average temperatures ranges between 15 and 17°C and the rainfall is abundant. The volcanic region has much lower temperatures that can go below 0°C in some places. In areas with intermediary altitude, average temperatures vary between 19 and 21°C and the average rainfall is around 1000mm/year. Rainfall is less irregular, and sometimes causes periods of drought. In the lowlands (East and Southeast), temperatures are higher and the extreme can go beyond 30°C in February and July-August. The absolute temperature of 32.8°C was recorded in the Southeast by Karama-Plateau station on the 4th of September 1980.

The quantity of total annual rainfall varies between 800mm in the North-East of Rwanda (Eastern Umutara) and 1600 mm in the natural forest of Nyungwe and in the high lands of the North-West (Kinigi). The decrease in rainfall is observed in the region of Bugesera (900 mm) and in the Western part of Rubavu district (1200 mm). The increase of rainfall is observed in some regions like Kibungo (Gahororo, 1200 mm); in the South-West (Mibirizi, 1450 mm) and in the natural forest of Gishwati (1350 mm).

The region that is characterized by the highest rainfalls (over the average isohyets of 1200 mm) is located in the western half of the country, from Byumba to Kibeho and from Kinigi to Mibirizi including the region bordering Lake Kivu.

3.2.2. Topography

Rwanda is often referred to as the country of a “thousand hills” (mille collines), because of its numerous highly dissected hills, often with flat peaks and convex slopes mainly in Northern and Western part, separated by relatively narrow valleys, with the lowest altitude of around 900 m at Bugarama and the highest altitude at Mount Karisimbi 4,519 m. The average altitude is 1,250 m above sea level. Rwanda can be divided into six topographical regions which are:

- From North-West to South -West are the narrow Congo Nile Ridge, which slopes sharply to Lake Kivu
- The Volcanic Virunga Mountains, whose highest peak, Mount Karisimbi, towers over the high North-Western lava plains.
- The steep North-South rise of the Congo – Nile Basins divide, whose width averages 25km.
- The ridge of the Congo – Nile Basins divide, with an average elevation of 2750 m above sea level.
- The Central Plateau East of the mountains, which are covered by rolling hills.

- The savannas and swamps of the Eastern and South Eastern border areas which cover one tenth of the nation's land area and include the Akagera National Park.
- Most of Rwanda is at least 900m above sea level; the central plains have an average elevation of 1932m, while South-Eastern Rwanda has a desert like terrain.

3.3. Hydrology and water resources

Rwanda has a relatively large volumes of water: rivers, lakes and marshes and occupy a surface area of 211000 ha or about 8% of the national territory (lakes: 128000 ha, rivers: 7260 ha and marshes: 77000 ha).

3.3.1. Surface water

Rwanda has a dense hydrographical network of $\pm 2 \text{ km/km}^2$ (length of the superficial flow network by km^2 of surface). The country is divided into two hydrographical basins with a separating line called Congo-Nile Ridge, moving from the North to the South and \pm perpendicular to the volcanic chain, making natural obstacles exchange between the catchments basins of the Northern Kivu and the Southwest of Uganda and those of Rwanda.

In the West of that line there is the Congolese basin (33% of the surface of the national territory) that drains 10% of water resources of the country. It comprises rivers Sebeya, Koko, Rusizi, Rubyiyo, as affluent of Lake Kivu (around 1000 Km^2 on the Rwandan side, 490 m of maximum depth), Ruhwa and many other small rivers (around 127 rivers).

In the East of the Congo Nile Ridge there is the Nile basin which covers 67% of the National territory and drains 90% of Rwandan waters by two main rivers namely Nyabarongo and Akagera. The latter is the main affluent of Lake Victoria with an average outflow of 256 m^3/s at Rusumo station and thus considered as the source of the Nile.

Rwanda has some 28 lakes of significant size. Six among the largest are entirely within the national territory: Ruhondo, Muhazi, Mugesera, Ihema, Rwanyakizinga and Burera. Three others, Rweru, Cyohoha and Kivu, are shared with neighboring countries. The largest and most spectacular is Lake Kivu, so large as to seem almost like a sea to the landlocked inhabitants. Lake Kivu lies at 1,460m above sea level and is 90 km long (north-south) and 49 km wide (east west). From an average depth of 240 m, it plunges to a maximum depth of 490 m.

Lake Kivu has a rough, jagged coast and contains numerous islands, including Nkombo and Iwawa. Lake Kivu lies on the border with Congo in Western Rwanda at the foot of the Virunga Volcanoes. Kivu's shores are densely populated and the principal town on the Rwandan side is Rubavu. Although it is supplied with fish, the lake is poor in fauna but rich in volcanic substance.

Great volumes of dissolved methane gases (~60 km³ STP) that may be developed as energy sources exist in its deep waters. Lake Kivu drains to the south into Lake Tanganyika by the swiftly descending Ruzizi River.

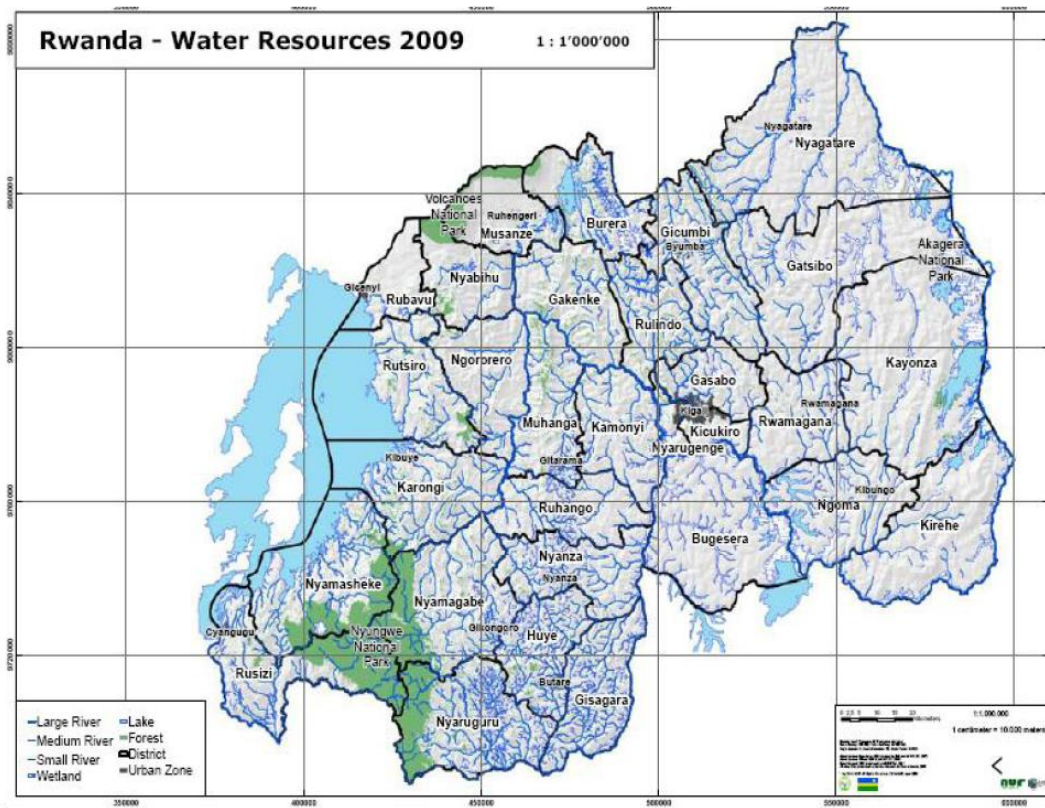


Figure 1: Water Resources in Rwanda

In Rwanda the quality of water is generally good with a pH ranging between 6 and 7.5. Surface water often carries sediments and in mining and volcanic regions, the water can contain arsenic, lead, mercury, fluoride, iodide and other toxic metalloids and heavy metals. The physio-chemical pollution of water is not frequent due to the small level of industrialization and use of agricultural chemical inputs. The microbiological pollution is often observed and it comes from various domestic wastes and debris carried by rain water towards the natural environment. The pollution of water courses and lakes by the water hyacinth and other harmful aquatic plants is a phenomenon that is very recent and alarming in Rwanda.

3.3.2. Groundwater

The outflow of the ground renewable water resource is estimated at 66 m³/s. Out of this, the 22,000 known sources contribute an output of 9 m³/s. In general, little information is available on ground water resources.

3.3.3. Wetlands

Wetlands cover a total area of 164,000 ha or about 6% of the territory. The wetlands include a variety of ecosystems, ranging from large, permanently flooded swampy peat-lands to smaller,

seasonally flooded wetlands with a more mineral soil. The main swamps are Akanyaru (30,000 Ha) on the border with Burundi, Mugesera Rugwero in the southeast, Kagera swamps along the Tanzania border in the east, Nyabarongo (10,000 ha) and the Rugezi wetlands (5,000 ha) in the north.

Currently, an estimated 94,000 ha have been brought under agriculture, the large majority of this being spontaneous agriculture with maize, sweet potatoes and beans. In addition, the wetlands are used for a variety of traditional activities including the collection of leaves to make handicrafts, extensive grazing and making of bricks. Wetlands also provide a spawning habitat for fish, and are of great significance for biodiversity conservation. The wetlands are composed of marshes, lakes, rivers and brooks representing around 14.9% of the national territory of which 6.3% consist of marshes and 8.6% of lakes, water courses and pools of permanent or seasonal fresh water.

In the highlands of the North-West, there are: lakes Burera and Ruhondo as well as the marshes of Rugezi. In the Central and the East of the country, wide marshes are those of Nyabarongo, Akanyaru and Akagera rivers. Many cuvette lakes connect with rivers and most of them are located in the Akagera National Park. From the Southeast to the North-West, there are lakes like Cyohoha in the South, Mugesera, Rweru, Sake, Cyambwe, Ihema, Milindi, Rwanyakizinga, Kivumba, etc.

Given the importance that the Government of Rwanda attaches to wetlands, in 2003 Rwanda ratified the Ramsar Convention or convention on wetlands and has already registered on the Ramsar list the site of Rugezi and identified other potential sites that will be registered in the future, like the complex of Mugesera-Rweru, Kamiranzovu marshes and the wet zones of the Akagera National Park. In addition, an action plan for the implementation of the Ramsar Convention was developed in June 2004. The wetlands ensure several functions and provide numerous services to people. For instance, they ensure control of floods and the recharge of underground waters. They play the role of alleviating the erosive force of water and thus facilitate the deposit of sediments in suspension that could block water courses downstream.

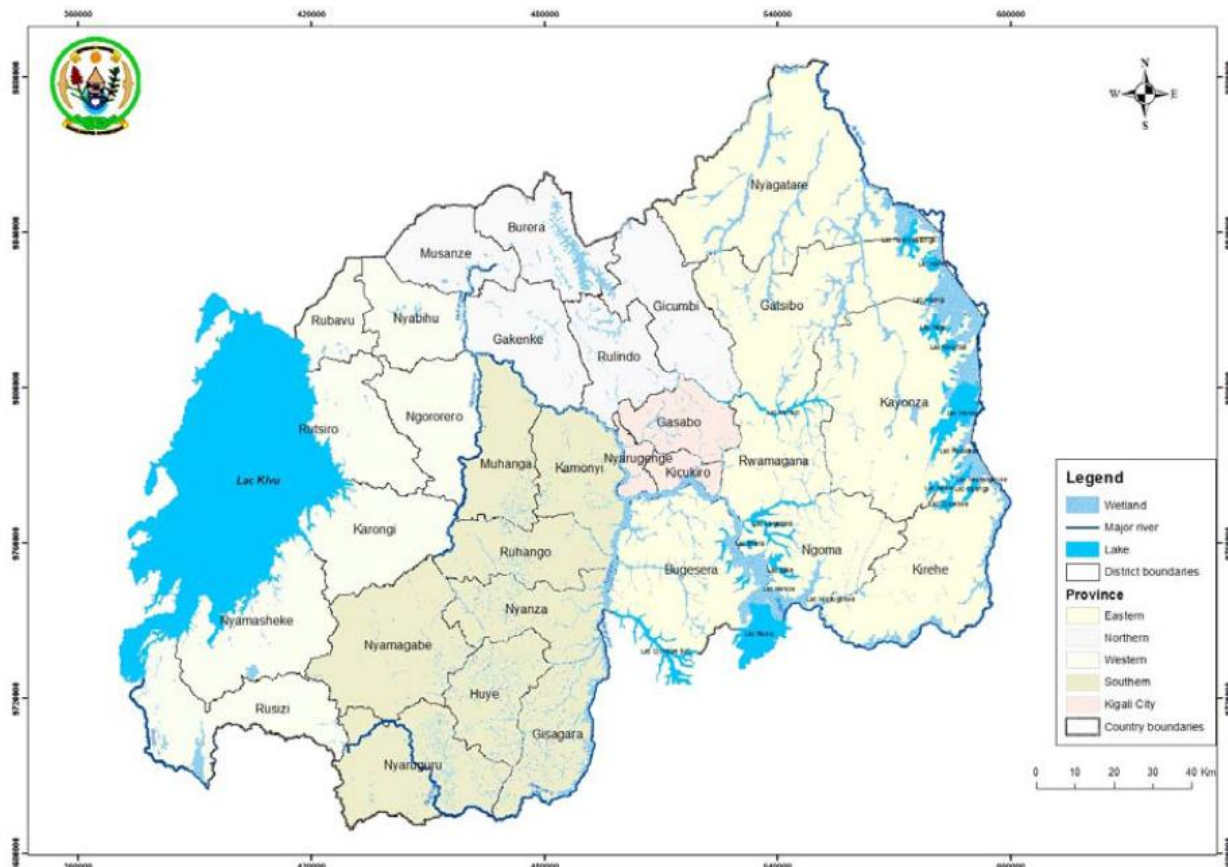


Figure 2: Wetlands in Rwanda

3.4. Soils and Geology

According to the Geological Map of Rwanda, the regional geology consists of pelitic rocks and QuartzPhyllites (Cyurugeyu Superformation), Granites to Granite-Gneisses, Quarzites and Mica-Schists, Amphibolites and Mylonites (Huye Complex) as well as Quartz-Phyllites and Meta-Volcanics (Nyungwe Formation). The greater part of the geological structure is occupied by such lithological varieties of Rocks. Rwanda shows well developed drainage pattern that belongs to dendritic and trellis types. Metamorphic rocks form the major part of the rock mass and some magmatic rocks are also present. Major rock types observed in the area are granitic gneiss, quartzite, schists and amphibolites.

The dominant soils are the result of alteration of the granite and the gneiss. Disruption of drainage due to tectonic movements of the Pleistocene caused the formation of alluvial valleys. They consist of alluvium and colluvium in the basin as result of the erosion. They have generally colluvial and alluvial in the valleys around the rivers. The soils of the top of the mountains are products of granite and gneiss and have resisted erosion.

Soils derived from schistose, sandstone and quartzite formations found in the Congo-Nile Ridge and Soils derived from old volcanic materials found in the plateau of the south west of the country.

3.4.1. Highland soils

The highland soils are particularly prone to erosion and landslides especially regions of the Congo-Nile ridge, valleys and lowlands (peat lands) as well as highland meadows. Soils of foothills of the Congo-Nile Ridge and of other transition regions between the central plateau and highlands are fertile but, due to deforestation and inappropriate agricultural practices, they are vulnerable to erosion.

3.4.2. Soils of the central plateau

The central plateau covers the regions of South and South-East. The soil types are hill Ferro soils and valley histosols. The slopes of hills are exposed to erosion notably in the case of clay-sandy or gravelly soils.

3.4.3. Soils of the lowlands

They cover the Eastern and South-eastern regions and are Ferro soils with savannah vegetation. Similar to the region of Bugesera, the river-lake complex along Nyabarongo and Akanyaru rivers underwent serious leaching. In addition, the geological structure of soils in those regions allows rain waters to infiltrate deeply into soils, and that can partly explain the lack of runoff waters and shallow brooks.

3.4.4. Soils of valleys

These are soils of histosol and peat soil types that constitute potential agricultural and energy wealth (case of intermountain basins of Kamiranzovu and Rugezi). In the wide water surfaces of eastern regions like Umutara and Bugesera, as well as the Rusizi region (Bugarama), the valleys are of vertisol and alluvial types are fertile. The slope slight as they may be, are threatened by erosion due to the weak permeability of soils.

The exploitation of peat for fuel production purposes would require a preliminary development plan for swampy areas. In fact, any extraction of peat is associated with drainage and exudation, two factors likely to impact negatively on the crucial role of wet ecosystems and swamps in regulating the hydrology. Moreover, the exploitation of mines and quarries spoils the landscape and more often constitutes a source of soil erosion, water pollution and pose a danger to human health. A good number of queries are not rehabilitated and always left open.

3.4.5. Land use

The exploitation of land employs around 70% of the active population. Land resources are thus limited and coveted resulting in overexploitation and inappropriate use of lands with disastrous consequences on land resources and on environment in general.

In mountainous area, steep slope lands are deforested and used for staple crops under high rainfall precipitation, with often accelerated land degradation through water erosion, poorer soil fertility, increased floods and landslides, and overall, food insecurity and poverty. Appropriate land uses combined with soil and water conservation measures then become a must; in some sites, active erosion mainly caused landslide hazards which increase sediments in rivers. Other than that, erosion has also formed gully bodies through the slopes of mountainous area.

Land use activities including infrastructure development may increase the potential of occurrence of landslides and erosion in various ways, which include destabilization of rock masses by cuts in slopes, improper stockpiling of materials, destruction of vegetative cover during site clearing and uncontrolled surface run-off during storms may increase the erosion rate. River banks are composed of alluvial and pluvial loose-fragmental soils. Thus, the activities may increase erosion and landslides rates at various points along the banks of rivers and in some lateral ravines.

Intensive cultivation occurs along the steep slopes predominant in the area without proper soil conservation techniques hence accelerating soil erosion. However, it is worth mentioning that terracing as a measure for soil erosion control is practiced in some parts of the project area.

Extensive deforestation to meet energy demands has further reduced the soils 'ability to withstand the scouring effects of rain in the upland watersheds has had serious downstream implications. When viewed against that background, therefore, it is easy to appreciate that the project would have negligible incremental impact on the rates and overall patterns of erosion. Nevertheless, erosion is of relevance to slope stability, which is in turn relevant to the design of the project and the conduct of operations such as excavation and borrowing. The specific measures will be taken to address these considerations.

3.5. Biological Environment-Ecosystems

Rwanda is covered with diverse ecosystems that include mountains, forests, and gallery forests, savannahs, wet and aquatic zones, wood and agro ecosystems. All these ecosystems have rich flora and fauna.

3.5.1. Forests

Rwanda's remaining natural forests, the Nyungwe Forest, the Gishwati Forest and the Mukara Forest, are highland forests around the volcanoes, have a high degree of biological diversity and rare animal species, such as mountain gorillas, Ruwenzori colobus monkeys and golden chimpanzees.

It is estimated that there are 2150 plant species to be found in Rwanda, with around 700 species of these acknowledged to have medicinal value. Towards the east of the country lies the Akagera National Park, the Mutara game reserve forests galleries and wooded savannahs. Population pressures have already drastically reduced the land area of the natural forests of Rwanda from about 30% to presently fewer than 10% in less than a century. The deforestation of Rwanda's remaining forests is also the result of high fuel wood consumption. Heavily populated and cultivated areas adjacent to the natural forest, as well as the recent wars, have resulted in massive deforestation and loss of genetic diversity within Rwanda's natural forest.

Clearance for farming and pasture land has also contributed to the reduction in forest cover, as well as harvesting for fuel wood and timber for housing and small scale mining. Production of export crops is also a factor in forest destruction: half the forests around the volcanoes in the North were cleared for pyrethrum plantations in the 1960's, and areas around the Nyungwe were cleared for tea plantations.

Preliminary estimates indicate that the protected areas and forest reserves were seriously damaged as a result of recent wars. From an estimated pre-1994 total surface area of 417,000 ha, it is thought that they have been reduced to approximately 226,000 ha. Specifically, the Akagera National Park was reduced to less than one-third of its original size when the Umutara prefecture was created in 1996 for the resettlement of returning refugees. The Gishwati Forest has all but disappeared (from a pre-war estimate of 37,000 ha, only about 2,000 ha now remain).

3.5.2. Protected areas

The fauna and the flora can be better preserved and protected thanks to the establishment of a system made of protected areas like national parks and forest reserves to which the best management is applied. However, through time and due to human activities, these conservation areas have been reduced considerably. These areas are exclusively reserved for the protection of flora and fauna, eco-tourism, biodiversity conservation, and for geological formations of scientific and aesthetic value. The geographical distribution of those parks on the national territory is a guarantee of the conservation of biological diversity representative of the fauna and flora of the country.

- **Volcanoes National Park**

Spanning on a 160 Km² area in the Northern part of Rwanda, Volcanoes national park is the oldest national park in Africa, created in 1925. It was initially a small area around Karisimbi, Mikenno and Visoke volcanoes which was gazetted to protect the Mountain gorillas which were facing the threat of extinction as a result of poaching. In 1929, the park was extended into Rwanda and the then Belgian Congo and was named Albert national park managed and run by

the Belgian Colonial Authorities. During early 1960s, the park was divided as Rwanda and Congo gained their independence and by the end of that decade, the park was almost half of its original size (340 Km² to 160 Km²).

Volcanoes National Park is home to Mountain Gorilla (*Gorilla beringei beringei*); golden monkeys (*Cercopithecus mitis kandti*), Spotted Hyena (*Crocuta crocuta*), buffaloes (*Synceruscaffer*), elephants, black-fronted duiker (*Cephalophus niger*), and bushbuck (*Tragelaphusscriptus*). The park also harbors 178 bird species including at least 29 endemics to Rwenzori mountains and the Virungas. The VNP also host 245 species of plants of which 17 are Predominant, including 13 orchids internationally protected, 115 species of mammals, 27 species of reptiles and amphibians and 33 species of arthropods. Some of these species are endemic while others are internationally protected.

- **Nyungwe National Park**

Located in the South West corner of Rwanda, Nyungwe National Park is an untouched natural rainforest that is filled with exciting biodiversity. Nyungwe National Park was established in 2004 and covers an area of approximately 1000 km² of rainforest, bamboo, grassland, swamps, and bogs. The nearest town is Rusizi, 54 km to the west. Mount Bigugu is located within the park borders. Nyungwe is surely one of the world's most beautiful and pristine mountain rainforests. It's believed to be one of Africa's oldest forests, staying green even through the Ice Age, which explains its diversity. The Nyungwe forest has a wide diversity of animal species, making it a priority for conservation in Africa. The forest is situated in a region in which several large-scale biogeographical zones meet and the variety of terrestrial biomes provides a great span of microhabitats for many different species of plants and animals.

The park contains 13 different primate species (25% of Africa's total) with habituated chimpanzees and 12 other primates species (including a 400-strong troop of habituated Ruwenzori Black and White Colobus), 85 mammal species, 275 species of birds of which 26 are endemic in the Albertin Rift and 3 are on the red list of the IUCN (*Bradypterus graueri*, *Cryptospiza shelleyi* and *Apdis argentea*), 32 amphibian and 38 reptile species and 1068 plant species of which 140 species of orchids, 260 species of ligneous and herbaceous plants, 24 species of trees. Many of these animals are restricted-range species that are only found in the Albertine Rift montane forests ecoregion in Africa. In fact, the number of endemic species found here is greater than in any other forest in the Albertine Rift Mountains that has been surveyed. The forest, which reaches its maximum altitude of 3000 metres above sea level, is of particular interest for the presence of colonies of chimpanzees (Pantroglodytes-Blumenbach, 1775) and Angola colobus (Colobus angolensis - Sclater 1860).

- **Akagera National Park**

The savannah in the North Eastern Rwanda is used as the Akagera National Park; it covers 900km² situated between 1300-1825 m of altitude. This park was created in 1934 to protect animals in three ecoregions: savannah, mountain and swamp. Conserving biodiversity in this ecosystem has been challenging due to increasing pressures, potential loss of habitat and species or lack of up-to date data, etc.

This park has a set of compounds that define its high importance, the Akagera major components are: Forest fringed lakes, papyrus swamps, savannah plains and rolling highlands. Akagera has exceptional levels of biodiversity, partly due to its position at the confluence of different vegetation zones. The extensive systems of freshwater lakes and associated papyrus swamps form the largest protected wetland in central Africa. Its biodiversity has a double origin; both native and introduced species make the Akagera fauna and flora diversity.

The wildlife in the Akagera National Park comprises 90 species of mammals of which 47 species of big mammals, 530 bird species, 35 fish species, 9 species of amphibians and 23 species of reptiles. Four animal species are protected by the CITES (Convention on International Trade of Endangered Species) namely *Loxodonta Africana*, *Sincerus caffer*, *Panthera leo* and *Tragelaphus oryx*. The flora of the Akagera National Park is diverse and 6 species of orchids are recorded. The ANP is dominated by the grass savannah and different species of acacia trees; the most found in the forest savannah.

Introduced 'Masai' giraffe, black rhino, elephant, buffalo, zebra and duikers are major herbivorous of the Akagera National Park. Whereas for the large predators only leopard (*Panthera pardus*) and hyaena (*Crocuta crocuta*) can still be found in the park. Although lion once occurred throughout Akagera, the population has been wiped out mostly through poisonings by cattle herders seeking to protect their livestock. A reduction in the prey-base due to heavy poaching would also have contributed to their demise. Smaller predators are still well represented with healthy populations of several mongoose species, *viverrid species*, serval (*Leptailurus serval*) and side-striped jackal (*Canis adustus*). Gishwati-Mukura National Park

Presently, Gishwati-Mukura forest reserve is known for a wide range of fauna, including four species of primates: the eastern chimpanzee, the golden monkey, the blue monkey, and the l'hoest's monkey (also known as mountain monkey); more than a dozen species of East African chimpanzees; mammals such as red river hog, the black-fronted duiker, the southern tree hyrax, among others. Conservationists have also reported seeing the black and white colobus, another

species of primates. The forest reserve also boasts about 60 species of trees, including indigenous hardwoods and bamboo. Gishwati and Mukura natural forests were originally earmarked as forest conservation zones in 1933.

According to the draft law of October 15, 2014, the Gishwati-Mukura National Park will cover a total surface area of 3,427.46 hectares with Gishwati forest (1,439.72 hectares) and Mukura forest (1,987.74 hectares). The government has also dedicated an area covering 992.48 hectares to a subsequent buffer zone to deter human encroachment. Over the past decades, the Gishwati-Mukura area was nearly depleted largely due to resettlement, livestock farming and smallholder farms in the aftermath of the 1994 Genocide against the Tutsi.

- **Relic forests and gallery forests**

The Gishwati forest that covered 21.000 ha before 1981, consisted of only 600 ha in 2002. The natural forest of Mukura that stretches on 3.000 ha in 1960 covered only 800 ha in 2002. Regarding tree species and altitude, it is similar to that of Gishwati (2000~3000 m). Relict forests and savannahs in the East are located around the Akagera Park and have a variety of endemic and rare species whose majority is used in traditional medicine. Gallery forests accommodate an important biodiversity with endemic and rare species. That is for instance the case of the *Blighia unijugata*, *Grewia forbesi*, *Rhus vulgaris*, *Pterygota mildbraedii* and *Ficus sp.*

In general, for a period of about 40 years, the surface area of the natural forests of Rwanda underwent a decrease of about 65% between 1960 and 2002. The search for arable lands, extensive farming, illegal felling of forests for firewood, production of wood for charcoal and poles for building in urban areas, as well as a land mismanagement have drastically contributed to the reduction of the surface area of forests.

3.5.3. Biodiversity of wetlands

The ecosystems of the Rwandan wetlands inhabit a rich biological diversity in terms of vegetation and animal species (more than 104 plant species have been identified), except for Lake Kivu, Bulera and Ruhondo that have some limnologic problems.

The Lake Kivu contains a very poor aquatic flora and the density of the phytoplankton is relatively low due to the lack of mixture of layers with a biozone limited at 60 m to 70 m (the nutrients are found at the bottom of the lake). The ichthyologic fauna is also poor with 31 fish species due the volcanic origin of the lake.

Most lakes of the Akagera National Park are very rich in biodiversity with phytoplankton, fish species and ornithological fauna. The flora is dominated by the *Cyperus*, *Phragmites*, *Phinix*, etc.

The Water Hyacinth (*Eichornia crassipes*) is present and has started spreading covering more important surfaces of the lakes, thus posing a threat to their biological diversity. Some lakes like Cyambwe, Rwampanga and Rweru are particularly rich in hippopotamuses and crocodiles. One can also find many other lakes such as Nasho, lakes of Gisaka and Bugesera that contains phytoplankton that is very rich in biodiversity and flora that is mainly dominated by papyrus with *Cyperus papyrus* mixed with *Miscandium violaceum* and *Nymphaea nouchallii*. All these lakes are associated with gallery forests onshore or on small islands.

Concerning the Northern lakes (Bulera and Ruhondo), the aquatic flora and fauna are poor due to the physico-chemical situation unfavourable to their development and the isolation of the two lakes. The concentration of the plankton is less important in Lake Bulera than in Ruhondo. They have 48 species grouped in 4 families (*chlorophyceous*, *Cyanophyceous*, *pyrophytes* and *bacillariophyceous*). Lake Muhazi is land locked, isolated, and its ichthyologic fauna is very limited. One can find three endemic species and other nine introduced from outside. The lake is very rich in phytoplankton.

The macroflora of the marshes is mostly composed of wide spaces of papyrus with some zones of *Miscanthidium*. The low layer is covered with *Cyclosorus stratus*. The fauna of big rivers and associated marshes comprises ungulates, carnivores, primates, rodents, lagomorphous, insectivorous and birds.

3.5.4. Biodiversity in agricultural systems

Demographic pressure and intensive agricultural practices in combination with diversified agro-pastoral practices; deforestation, bush fires and urbanization have disrupted the ecosystem functions. These changes caused secondary formation consisting essentially of graminaceous plants, numerous seasonal or perennial species alternating with crops.

Agricultural arable land presently covers around 52% of the total surface area of the country and is permanently cultivated (RNRA 2012). The time between two growing seasons is the only period of respite. These areas have various crops that play an essential role in the national economy. These crops are usually grouped in two categories: subsistence and cash crops.

Some of the food crops include; sorghum, beans (*Phaseolus vulgaris*), eleusine (*Eleusine corocana*), Colocases (*Colocasia antignorum*), maize (*Zea mays*), rice (*Oryza sativa*), wheat (*Triticum sp*), barley (*Hordeum vulgare*), peas (*Pisumsativum*), soya bean (*Soja hispada*), peanut (*Arachis hypogea*), sweet potato (*Ipomea durcis*), potato, cassava (*manihot esculanta*) and banana (*Musa*). The importance of each crop varies according to regions.

Some crops, like bananas, potatoes, different varieties of wheat, sorghums and beans are subject to high commercial trade. Potatoes, beans, cassava and bananas are present everywhere for the daily diet of the people. The cash crops are very few. They are limited to coffee, tea and pyrethrum.

3.5.5. Pastoral zones

In Rwanda, the essential part of animal husbandry is limited to the family and a small number of animals per household. As agriculture occupies the biggest portion of land, the cows graze in paddock, some parts of marginal lands and limited pasturelands mainly Gishwati national reserve and Umutara. This obliges farmers to adopt the semi-permanent farming and grow fodder crops such as *Tripsacum laxum*, *Setaria spp*, *Desmodium spp*, *Pennisetum purpureum*, *Mucuna pruriensis*, *Cajanus cajan*, *Calliandra calothyrsis*, *Leucaena diverifolia*, *Sesbania sesban*, etc.

These areas are prone to bush fires, trampling and sometimes overgrazing. The latter is the main cause of reduction of the biological diversity as it exterminates the most precious species along with pyrophyle species with small bromatologic value such as *Eragrostis spp*, *Sporobolus spp* and *Digitaria spp*.

3.5.6. Woodlands

Tree planting in Rwanda was limited to some plants around households such as *Ficus thoningii*, *Euphorbia tirucalli*, *Erythrina abyssinica*, *Vernonia amygdalena*, *Dracaena afromontana*, etc., but the cultivation of woody perennials for timber, energy generation or other services was not part of the customs. That resulted in a massive exploitation that quickly proved its limits.

The first forest plantations were created in 1920 and 1948 and only consisted of *Eucalyptus*. Later on, other species were introduced. These were namely *Pinus spp*, *Callistris spp*, *Grevillea robusta*, *Cedrella spp*, *Cupressus*. The Arboretum of Ruhunde (RAB Station) has 206 species among which 146 feuillus, 56 resinous and a species of bamboo. Those species proved to be dangerous for the biological patrimony because they used to drain and acidify places that are already acid, what caused the reduction or even the extermination of the undergrowth. Thus planting those species would lead to erosion. The covered surface area was estimated at 256,300 hectares in 1998. Despite efforts of diversifying tree species, we estimate that 99% of trees consisted of *Eucalyptus spp*.

3.6. Socio-Economic Background

3.6.1. Population and Demographic Characteristics

Rwanda is classified among the densely populated countries of the world. The Fourth Rwanda Population and Housing Census of 2012 places Rwanda's population at 10,515,973 residents, of

which 52% are women and 48% men. The population density in 2012 was 415 inhabitants per square kilometer. Compared to neighbouring countries, Burundi (333), Uganda (173) or Kenya (73), Rwanda is the highest densely populated country in the region. Now the total population is estimated at 12million(statistical yearbook 2017)

In general, urban districts have the highest population densities, particularly the districts of Nyarugenge with 2,124 inhabitants/ km², Kicukiro with 1,911 inhabitants/km², Gasabo with 1,234 inhabitants/km² and Rubavu with 1,039 inhabitants/km².

Low densities are recorded in rural districts; those with the lowest density are Bugesera (280 inhabitants/km²), Gatsibo (274 inhabitants/km²), Nyagatare (242 inhabitants/km²) and Kayonza (178 inhabitants/ km²).

The population of Rwanda is still largely rural, with 83% living in rural areas. The majority of the population of Rwanda lives in private households with an average size of 4.3 persons. Households are a bit smaller in urban areas with 4.0 persons. The Rwandan population is young, with one in two persons being under 19 years old. People aged 65 and above account for only 3% of the resident population. This has consequences in that the demographic dependency ratio, measuring the number of potential dependent persons per 100 persons of productive age, is 93 at national level (NISR, 2012). The Table below indicates the population in the Project areas.

Table 1: Population in the program areas

Provinces and Districts	Sex			Population share (% of the total population)	Population density (Inhabitants per Square km)
	Both sexes	Male	Female		
RWANDA	10,515,973	5,064,868	5,451,105	100	415
<i>Kigali City</i>	<i>1,132,686</i>	<i>586,123</i>	<i>546,563</i>	<i>10.8</i>	<i>1,552</i>
Nyarugenge	284,561	148,132	136,429	2.7	2,124
Gasabo	529,561	274,546	255,015	5	1,234
Kicukiro	318,564	163,445	155,119	3	1,911
<i>South</i>	<i>2,589,975</i>	<i>1,233,754</i>	<i>1,356,221</i>	<i>24.6</i>	<i>434</i>
Nyanza	323,719	157,650	166,069	3.1	482
Gisagara	322,506	150,455	172,051	3.1	475
Nyaruguru	294,334	139,279	155,055	2.8	291
Huye	328,398	158,104	170,294	3.1	565
Nyamagabe	341,491	161,219	180,272	3.2	313
Ruhango	319,885	152,075	167,810	3	510
Muhanga	319,141	152,783	166,358	3	493
Kamonyi	340,501	162,189	178,312	3.2	519
<i>West</i>	<i>2,471,239</i>	<i>1,168,445</i>	<i>1,302,794</i>	<i>23.5</i>	<i>420</i>
Karongi	331,808	156,073	175,735	3.2	334
Rutsiro	324,654	154,044	170,610	3.1	281

Provinces and	Sex			Population	Population
Rubavu	403,662	194,989	208,673	3.8	1,039
Nyabihu	294,740	137,799	156,941	2.8	555
Ngororero	333,713	154,591	179,122	3.2	491
Rusizi	400,858	192,528	208,330	3.8	418
Nyamasheke	381,804	178,421	203,383	3.6	325
North	1,726,370	818,456	907,914	16.4	527
Rulindo	287,681	135,625	152,056	2.7	507
Gakenke	338,234	159,366	178,868	3.2	480
Musanze	368,267	174,399	193,868	3.5	694
Burera	336,582	160,395	176,187	3.2	522
Gicumbi	395,606	188,671	206,935	3.8	477
East	2,595,703	1,258,090	1,337,613	24.7	274
Rwamagana	313,461	153,607	159,854	3	460
Nyagatare	465,855	228,325	237,530	4.4	242
Gatsibo	433,020	207,669	225,351	4.1	274
Kayanza	344,157	166,720	177,437	3.3	178
Kirehe	340,368	163,790	176,578	3.2	287
Ngoma	336,928	161,769	175,159	3.2	388
Bugesera	361,914	176,210	185,704	3.4	280

Source: NISR, 2012

The social indicators related to health have improved with life expectancy of 64.4 years in 2012 compared to 2002 (Rwanda statistical yearbook, 2014), and infant mortality of 107 per 1000 live births compared to 27 in 2000.

The HIV/AIDS prevalence rate has declined from 13.7% in 2000 to 3% in 2012. Malaria has also considerably declined due to effective preventive measures including distribution of mosquito nets to the population at a rate of 80.60% in 2015 compared to 18.20% in 2006 (see Rwanda statistical yearbook 2017). As illustrated in the tables below so many other indicators show that health and socio-demographic conditions have generally improved in the recent years. The table below gives details about health and demographic incidence of malaria and HIV.

Table 2: DHS Indicators from 1992 to 2017 (see Rwanda statistical yearbook, 2017)

Indicators	1992 DHS-I	2000 DHS-II	2010/11 DHS-IV	2014-2015 DHS-VII
Fertility				
Total fertility rate	6.20	5.80	4.60	4.20
Median at first birth			22.40	-
Teenage fertility	13.00	4.00	45.10	730
Family Planning				
The use of modern contraceptive methods among the currently married women	13.00	4.00	45.10	47.50
Unmet need for family planning		17.00	18.00	18.90
Child Health				

Indicators	1992 DHS-1	2000 DHS-II	2010/11 DHS-IV	2014-2015 DHS-VII
Vaccination	86.00	76.00	90.10	92.60
Infant mortality rate(per 1000 live births)	85.00	107.00	27.00	32.00
Child mortality rate	151.00	196.00	76.00	50.00
Underweight	29.00	24.00	11.00	9.00
Maternal Health				
Maternal mortality rate (per 100,000)		1071.00	476.00	210
Assistance during delivery	25.00	26.00	69.00	91.00
Adolescent birth rate (% total live birth)			4.10	-
Antenatal care coverage (at least one visit)		92.50	98.00	99.00
Antenatal care coverage (at four visits)		10.40	35.40	43.9
Malaria				
Prevalence rate in children			1.40	
Prevalence rate in women			0.70	
Ownership of mosquito nets			82.70	80.6
HIV prevalence rate		13.70	3.00	3.00

Source: Rwanda Statistical Yearbook, 2017

3.6.2. Economic Development Evolution

Despite the efforts in declining the on-farm activities by increasing off-farm income generating activities, the Gross Domestic Product of Rwanda is still dominated by the agricultural sector (RoR_MINECOFIN, 2012). The lowest Gross Domestic Product (GDP) per capita is estimated at 644 USD approximately equivalent to 463,700 FRW (see Rwanda Statistical Yearbook, 2014). The real growth of the GDP has increased from 6, 5% in 2006 to 8.2% in 2012 due to substantial improvement of varied socioeconomic activities. For instance, during the EDPRS 1, services sector grew at an average rate of 10 % per year, and the industrial sector grew at an average of 9.8% per year and contributed 20% of total growth, while the agriculture sector contributed 32.7% of GDP and 28% of total growth with an average of 5.4% (Ibid.). In the effort to reduce poverty and food insecurity countrywide, the government of Rwanda supported agriculture sector by using fertilizers and improved seeds, particularly maize, voluble beans, soya beans, wheat, rice, etc. For instance, from 2006 to 2011, use of fertilizers tripled in tonnage terms, and the share of marketed agricultural output increased from 21.5% to 26.9%. At the same time, the number of off-farm jobs increased by 50- 60% (see RoR_MINECOFIN, 2012; see also Rwanda Statistical Yearbook, 2017).

3.6.3. Industry and Mining

The industrial sector of Rwanda is modest and recent: 78% of industrial companies were created between 1964 and 1987. In 2013, the contribution of the industry sector to the GDP was of 15% of which the major part was from the agro industry and the rest from small and medium size of companies which produce consumption goods in replacement of importation by using simple technologies. The mining has contributed only 2% of the GDP in 2013, (Statistic Yearbook, 2014).

One of the major problems is related to the location of industrial units as some of them are installed near residence houses, others in valleys (wetlands). These installations are sometimes

sources of pollution because of their wastes, liquid (waste waters) or gaseous (dust, smoke, smell), and noise.

The mining policy covers not only mineral extraction, processing and export, but also quarrying, production of construction materials and extraction and processing of semi-precious stones. The mining sub-sector has registered some key achievements. It is one of the major sources of income to the country with revenue from minerals exportation. However, the exploitation of mines and quarries is often a source of water pollution due to contamination linked with the absence of wastewater purification, modern practices of exploitation and soil erosion.

3.6.4. Human settlements

The Rwandan settlement pattern has been scattered since time immemorial. It has for long been characterized by the traditional use of land associated with the ancestral lifestyle but which does not correspond any more to the present environmental and economic constraints. It is in that perspective that the present policy of the Government of Rwanda regarding settlement consists of encouraging a clustered habitat commonly known as *Imidugudu*.

In most urban areas, Rwanda has not yet developed city master plans. There are only plans of different towns of which some have expired and need updating. Urban centers developed spontaneously without taking environmental aspects into consideration. Sanitary facilities are insufficient and sometimes inadequate in city centers. In suburban zones known as spontaneous quarters, solid wastes are piled in disorder, drinking water is rare, and rain water draining gutters are insufficient. Thus, diseases are frequent in those areas, the degradation of environment is more pronounced and living conditions are poor.

3.6.5. Physical Cultural Resources

Rwanda's physical cultural resource, seen from a general perspective, is rich and diversified. But it has, for long, been regarded as being a sector of minor importance, and, because of such consideration, failed to play its basic role of developing the nation.

However, there is no doubt physical cultural resource is one of the main pillars for sustainable development. Rwanda's physical cultural heritage is rich and diversified; it contains:

- Sacred hills, forests and trees with legendary history;
- Traditional huts and royal palace;
- Churches and other colonial buildings;
- Caves and rocks with bas-reliefs marking the legendary or historical events that have occurred on the site;
- Thermal springs and wells used for ritual purposes;
- Genocide memorial sites;
- Designated burial sites which are located in different sectors

Protection and preservation of national cultural heritage consolidate national unity, social cohesion, cultural freedom and recognition of community identity. Therefore, Government of Rwanda and its partners have the obligation to preserve and perpetuate this physical cultural

heritage for present and future generations because, on the one hand, it brings in a lot of money as do agriculture, industry, gold or oil and, on the other, it maintains harmony and social balance between peoples. This implies, the project will undertake the Chance Finds Procedures in addressing possible encounters of any archaeological resources during project implementation.

3.6.6. Agriculture

The agriculture production system is based on small family exploitations whose production is consumed by the owners at more than 80%. The systems of crops are complex, based on the diversification of productions and the association of crops. Seven main crops, namely banana, bean, sweet potato, cassava, sorghum and potatoes, of which the first five are present in 90 % of production units and constitute the common basis for all the regions of Rwanda.

Great investments in modern agriculture and research-based agriculture using fertilizers and improved seeds on consolidated lands, pumping irrigation on hillsides, etc., have allowed great productions of maize, soya beans, voluble beans, wheat, irish potatoes and rice. This achievement results in MINAGRI's decision of putting in place specialized agencies for policy implementation and research such as RAB, NAEB etc.

The recent survey has proved that the agriculture is the most important sector of the Rwandan economy and contributes considerably to poverty reduction. For instance, from 2011 to 2013 the total production of vegetables increased by 9% and their exports while fruits production increased by 18%. Their exports counted an increase from 15.4 ('000 Tons) in 2012 which generated 5,013,260 USD to 31.9 ('000 Tons) which generated 9,494,442 USD (see Rwanda Statistical Yearbook, 2017).

However, the extensive agriculture practiced by the majority of Rwandan population contributes to the degradation of environment. Moreover, the agricultural intensification at the level of projects was often realized without taking into account environmental drawbacks accrued from inputs like (mineral fertilizers, pesticides, herbicides and used techniques).

3.6.7. Animal husbandry

The pastures consisted mainly of family fallows and marginal lands considered as inappropriate to agriculture such as the undergrowth. The limited subsisting pastoral areas were badly used because farmers did not master the management of pastures. That was showed by the overgrazing and overexploitation caused by trampling, degradation and disappearance of vegetation cover. The MINAGRI policy of keeping cattle in shed known as "zero grazing" program has significantly limited environmental degradation and crops damage, which was also a source conflicts between neighbors.

Moreover, the demographic pressure has progressively led to the semi intensification or intensification of fodder resources used to feed animals. Hence, animal husbandry, essentially made of cattle, was progressively transformed. This resulted in considerable increase of milk production from 257,450 in 2008 to 628,266 tons in 2013 and beef meat production increased from 24,889 to 29,807 tons in 2017 (see Rwanda Statistical Yearbook, 2017). Animal husbandry has also contributed to poverty reduction through RABA-MINAGRI program called “One Cow per Every Poor household in Rwanda”. This program has decreased the number of malnourished children countrywide and has considerably contributed to poor household food security.

3.6.8. Water and sanitation situation in Rwanda

The water, sanitation and hygiene sector in Rwanda is guided by the National Water Supply and Sanitation Policies and Strategies which were approved by the Cabinet in December 2016. The policies and strategies aim at achieving universal access to basic water and sanitation services by 2020. Rwanda has met MDG targets for water and sanitation with coverage of improved water supply and sanitation estimated at 85% and 83%, respectively, in 2014. The more ambitious WASH targets and standards under the SDGs, however, significantly raise the bar for what is required. Rwanda will aim to achieve 100% access to basic water supply and sanitation and 100% access to safely managed water and sanitation services by the years 2020 and 2030, respectively. The main challenge is funding gaps for increasing access to WASH services, particularly in scattered settlements in difficult, hilly terrain.

According to the most recent EICV4, the proportion of the population/ households accessing improved source of water is 84.8% with a gap of almost 15%. Due to increase pace of urbanization in Kigali and secondary cities, WASAC, the Utility responsible to supply and distribute potable water, is faced with old water distribution networks, the major cause of water shortage. The functionality of rural water supply systems is not optimal due to old extension network which results in the breakdown of systems.

In regards to Sanitation sub-sector, Households using improved sanitation facilities in rural areas stand at 81%, urban 94% making an average of 83% country wide. The Water and Sanitation sector in Rwanda is being guided by the Vision 2050 which is about ensuring high standards of living for all Rwandans; improve quality of life, modern infrastructure, transformation for prosperity. In order for this to happen, adequate investment in water and sanitation infrastructure, providing sanitation facilities and promoting hygiene at every level is a prerequisite.

The water and sanitation strategic plan is expected to be implemented for another period of seven years from 2018-2024 in line with achieving broad water supply and sanitation targets of at least basic water supply services for 100% of people by fast-tracking implementation of strategic investment program as well as achieving at least basic sanitation coverage for 100% of households.

In 2014, the demand for water was estimated at 110,000 cubic meters per day while the available production was 65,000 cubic meters a day in Kigali. The deficit was accentuated during the dry season because the water flow from water sources that supply Kigali became very low and the population didn't have any alternative water source to use for their daily needs. In order to solve the challenge, WASAC and the ministry of infrastructure negotiated a full turnkey project, dubbed Nzove II Water Treatment Plant with Culligan International to increase water production in the city of Kigali. The Nzove II plant was completed in March, 2018, in a record 11 months and now supplies Kigali city an additional 25,000 cubic meters of water per day, making the total production 90,000 cubic meters per day.

In Rural areas, the population is served by more than 1,000 piped water systems and approximately 20,000 improved point water sources (protected springs or boreholes and wells equipped with hand pumps), according to the National Inventory of Water and the most efficiently governed country in sanitation infrastructure. Of these, 27 systems have a length of more than 40 kilometres.

3.6.9. Electricity Coverage and Renewable Energy

Rwanda's energy consumption is dominated by biomass that accounts for about 85% of primary energy use while petroleum accounts for 11% and electricity for the remaining 4%. Despite its low share in the present energy mix, the electricity sector is considered as a critical factor in enabling socio-economic development, and as the main vehicle for energy diversification. At the same time, it is noted that Rwanda has by far one of the lowest per-capita electricity consumptions in the world; Rwanda consumes about 42 kWh/year/capita compared with 478 kWh in sub-Saharan Africa and 1,200 kWh for developing countries as a whole. Although Rwanda's densely distributed population should facilitate network expansion and access to electricity, presently only 16% of Rwanda's households (350,000 customers) are connected to the grid.

With such a low level of electricity consumption, there is a sizeable need for additional electricity services. Projections of electricity demand are therefore reflective of government targets rather than behavioral factors that normally affect power demand. Based on the targets set by the

EDPRS and the Vision 2020, peak demand was expected to grow from 51 MW in 2008 to 204 MW in 2015 and 328 MW in 2020. Extrapolation of the envisaged trend would result in a peak load of 500 MW by 2025. These figures were the basis of the extensive analysis that was carried out while preparing the Electricity Master Plan in 2009-2010. However, the new cabinet that was formed in October 2010 decided to accelerate the expansion of electricity services. A new target was set to reach an access ratio of 50% by 2017 (as compared with an access ratio of 28% set by Vision 2020). Extension of the envisaged trends would imply that electricity access would reach 94% by 2025 (as compared with the 40% goal set by Vision 2020). Accordingly, the number of household connections to the grid is expected to increase from about 350,000 in 2012 to 1,200,000 in 2017 and 2,400,000 in 2025. This target was further pushed up in February 2012 with a government desire to reach 70% access by 2017.

The new target would also include electricity supply by 2017 to 100% of schools, 100% of health facilities and 100% of public sector offices either through connection to the grid or through reliable off-grid systems. With these targets, the peak demand and electricity consumption are forecast to grow at about 12.0% and 11.6% p.a. respectively from 2010 to 2020.

Projection of electricity demand depends very much on the assumptions about the progress toward the target for increasing household access as well as growth in industrial and commercial uses of electricity. The Electricity Master Plan (2011) provides the basis of demand projections under a scenario that electricity access may reach 35% by 2017.

The residential and non-residential demands are also disaggregated while electricity use by the industrial sector is considered to grow at about 25% p.a. The resultant demand for 2017 is then estimated at about 250 MW. The seven-year electricity development program uses a more aggressive growth rate for the overall electricity consumption (based on a 2017 access target of 50%) to arrive at an estimated peak demand of 350 MW for 2017. The most recent decision by the government to achieve 70% access by 2017 would imply total peak demand of up to 410 MW by 2017.

3.7. Gender analysis

3.7.1. Overview

Incorporating gender and other social issues in projects has been shown to improve program and project performance and facilitate achievement of the goal of poverty reduction. Successful strategies for designing and implementing policies, programs, and projects in the water and sanitation sector now rely on demand-driven, participatory approaches rather than supply-driven, blueprint approaches.

In this perspective the African development Bank has developed a Gender Policy that aims to promote gender equity and gender mainstreaming in all AfDB operations. It requires the AfDB to apply gender analysis to all its activities. The bank has also prepared gender strategy (2014-2018) and the goal of this strategy is twofold. First, it seeks to strengthen gender mainstreaming in all Bank national and regional operations and strategies. The Bank aims to be a more caring and more gender-sensitive institution, which also values its female and male staff, protects against discrimination and all forms of harassment and violence, and ensures a safe and secure working environment preferential to attract the best professionals.

Furthermore, the Rwanda National Water Supply Policy approved in 2016 commits that the sector activities will be designed and implemented in consideration of equal participation and representation of men and women. Therefore, this section analysis the gender implication of the additional financing to the Rwanda sustainable water supply and sanitation program.

3.7.2. Country gender profile

- **Socio-cultural context**

For long time, Rwandan society has been characterized by a patriarchal social structure that underlies the unequal social power relations between men and women, boys and girls. This has translated into men's dominance and women's subordination. Gender inequalities is not seen as unjust, but as respected social normality. During the colonial era, men's supremacy over women was reinforced. For example, the abrupt shift from a subsistence economy to monetary economy based on paid employment and a formal education system, weakened women's position relative to that of men. In particular, it weakened their bargaining position on matters concerning their access to and control over resources and the degree of their level of participation in the development process. However, historically there are many cases to show that although women largely played a dominant role in the Rwandan society, some positive tendencies existed within the Rwandan culture, which reinforced women's social role and ensured their autonomy. For example, women played a pivotal role in the management of household resources and participated in decision-making at different levels.

- **Socio-economic context**

Poverty is identified as one of the biggest issues faced by women and men in Rwanda. The 1994 war and genocide worsened an already precarious situation with women being the majority among the mostly affected. Women require economic freedom, obtained notably by promoting their rights in management and access to resources, employment, adequate working conditions and economic capacity building. Women's participation in economic activities has been measured, at national level, at 56.4% while men's participation is 43.6%. Out of the 56.4% of the economically active women, 55.8% had an occupation and 87.6% of them were involved in agricultural activities. In terms of employment gender inequalities are illustrated as follows: in rural area 66.3% of women are employed while men are 49.7%. In urban areas women employed represent 53.5% while men are 60.9%.

It is worth mentioning that majority of women employed are under the category of supporting staff while a significant number of men occupy the key positions. Only 18% of well structured companies are run by women. A large number of them are in the informal sector, generally comprising small businesses. Concerning access to employment, the majority of women are employed as unskilled laborers, traders or craftsmen. The analysis of the type of employment shows that women compose the majority of the labor force in agriculture and animal husbandry (86% as compared to 61.5% for men) and that in towns, they are numerous in the unskilled occupations. It is estimated that up to 15.2% of women are paid either as temporary or permanent employees in rural areas, the majority of which are house helpers. In towns this figure is estimated to be 33.5%.

As regards income, only 14.8% of women earn cash incomes, 15.7% are either paid in cash or in kind, 12.4% are paid in kind only, and 57% earn no income at all (EDSR, 2005). Within the private sector, no single woman exercises an activity of a large scale industrial type, according to the study by the Association on Women Entrepreneurs in Rwanda (AFER) in 2003. These statistics highlight women's marginalized position and their economic dependence on men, which is one of the main causes of sexual and gender based violence. Compounding this, poverty affects men and women differently, mainly due to existing inequalities in terms of development opportunities, as well as in the management and control over economic resources. This is fundamentally due to their respective roles and responsibilities that have been socially constructed.

- **Socio-political context**

Government's recognition of women as key players in the nation building process, commitment to gender equality at the highest level of leadership and women's resiliency in hardship and willingness to step up to the challenges were the key elements that played a role in making women equal participants. These developments led to policy and legal reforms in areas critical to advancing women's economic status and well-being. These include: (i) the Law on Matrimonial Regimes, Donations, Succession and Liberalities (1999) that stipulates gender equality in property ownership in marriages and inheritance; (ii) the Constitution (2003) that includes provisions for equal rights between men and women; (iii) the Gender Policy (2004); (iv) the Organic Land Law (2005) which ensures equality to land ownership; and (v) and the Law for the Prevention, Protection and Punishment of Gender Based Violence (2008).

- **Gender and Poverty Reduction**

The Government of Rwanda made a strong commitment to integrate gender into policy and strategic planning instruments. In the Vision 2020, the Economic Development and Poverty Reduction Strategy (EDPRS), gender is highlighted as cross cutting issue in all sectors. In addition to that, a Gender Responsive Budgeting Project was initiated by the Ministry of Finance and Economic Planning in Partnership with the Ministry of Gender and Family Promotion to ensure budget allocation to government interventions are gender sensitive.

- **Gender and Access to Education**

Nine year- basic education is under implementation and will facilitate full access to education by both girls and boys. - Girls' education Policy and its strategic plan put in place by the Ministry of Education to ensure access, retention performance of girls and women at all levels. Emphasis is put on girls' education in science and technologies. In this regard, some affirmative actions were put in place including the FAWE Girls' schools, Awards for girls, etc. - In support to science and technologies, the One laptop per child was introduced and is under implementation, and boys and girls are using computer and internet to improve learning and research skills through internet and other program designed in the laptop.

- **Gender and access to Health services**

Presence of Health Advisors all over the Country who mobilize and monitor the implementation of health programs in community; - National Health insurance scheme is put in place for all the population; - The Reproductive Health Policy is developed - Demographic and Health Survey and Gender Profile produced at regular basis;

Gender-Based Violence and sexual exploitation & abuse (SEA)

Gender-based violence (GBV) is a universal reality existing in all societies. Though there are very limited data on GBV, it has not become a big problem in Rwanda. The child labour or abuse situation in the Country is also not alarming.

The Country has achieved impressive results in the fight against GBV, child labour or abuse situation and women and child trafficking. 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 awareness campaigns on GBV, human trafficking and child labour 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.

For eradicating Gender Based Violence (GBV), the following are achievements registered:

- Establishment of One stop centers for GBV survivors care in medical, psychosocial, legal support;
- National strategic plan on UNSC Resolution 1325 has been elaborated; - Promulgation of law preventing and punishing Gender Based Violence;
- Enacting gender sensitive laws and reviewing existing discriminatory laws ;
- Establishment of anti - GBV and child protection committees from the grassroots level to the National level;

- Gender Desk in Rwanda National Police, Rwanda Defense Force and in National Public Prosecution Authority;
- Free hotline in Rwanda National Police, Rwanda Defense Force and in and in National Public Prosecution Authority; and
- A Men's association (RWAMREC) that strives to sensitize the population and eradicate gender based violence specifically violence against women.

- **Decision Making -**

Rwanda is the first country in the world to have a majority of women in Parliament, Chamber of Deputies (61.25%). The Speaker of Parliament is a woman. - 35% of Member of Senate are women, - 38% of Ministers are women, - 40% of Minister of State are women - Within the Judiciary women represent 50%.

3.7.3. Gender situation in water and sanitation sector in Rwanda

Improving access to infrastructure is fundamental for promoting women's economic empowerment. It increases agricultural productivity, a sector in which women contribute more in developing countries, gives free time for productive activities, facilitates employment and provides easy access to markets. However, many infrastructure projects and programmes are gender-blind as they assume that both women and men will automatically benefit from them. Given that the achievement of the Millennium Development Goals (MDGs), especially in Africa, depends on how living conditions of women and girls are improved, there is a pressing need of improving women's lives. Well designed, appropriately located and affordable infrastructure can be a powerful tool in the pursuit of gender equality. In other words, infrastructure projects should be designed to increase economic opportunities for women, provide appropriate services to women, and actively involve and empower women. This section presents the status of key indicators that are used to monitor gender in the water and sanitation program.

- **Access to Safe Water:**

Access to improved water sources by male and female headed households is almost equal with 84.4% and 85.9% respectively. Interestingly, female headed households carry the highest proportion than the national average which is 84.8%.

Table 3: Distribution (%) of Households by Main Source of Water

Main/ Improved source of water	Rwanda Urban Rural					
	Sex of Household Head					
	Female	Male	Female	Male	Female	Male
Internal pipe-born water	0.3	0.5	1.8	2.3	0.1	0.1
Pipe-born water in the com- pound	4.8	7.9	28.3	36.0	1.0	1.6
Public tap out of the compound	26.7	28.0	46.4	43.3	23.5	24.5
Protected spring/ Well	39.9	36.0	13.8	10.2	44.2	41.7

Source: 4th Rwanda Population and Housing Census, 2012.

- **Sanitation**

Though the overall access rate to improved sanitation facilities is relatively high among Rwandan population, the detailed analysis shows that there are still gender inequalities in distribution of improved sanitation among male and female headed households. The proportion of female HH with access to improved sanitation facilities is low compared to that of male HH with 76.6% compared to 85.7% respectively. This may be attributed to unequal income distribution between men and women where women tend to have low income combined with high illiteracy rate

Table 4: Access to Improved Sanitation Facilities

Type of Sanitation Facility	Sex of Household Head	
	Male	Female
Use of improved sanitation	85.7%	76.6%
Flush toilet	1.9%	1.5%
Pit latrine with solid slab	83.8%	75%
Use of improved and not shared with other HH	66.3%	55.3%
Unimproved sanitation	14.3%	14.5%
Pit latrine without slab	12.1%	17.4%
No toilet facilities	2.2%	6%

Source: 4th Rwanda Population and Housing Census, 2012.

Table 5: Distribution (%) of Households by Main Mode of Sewage Disposal

Main mode of sewage disposal	Rwanda Urban Rural					
	Sex of Household Head					
	Female	Male	Female	Male	Female	Male
Sump	12.4	15.2	20.9	22.9	11.0	13.4
In the court- yard	11.6	11.2	9.1	7.9	12.0	11.9
Rivulet/ Trench/ Channels	0.5	0.7	3.2	3.4	0.1	0.1
In the street	0.6	0.6	1.6	1.3	0.4	0.4
Main sewer	5.6	6.0	6.5	6.7	5.5	5.9
Cesspool	6.7	9.7	26.3	32.1	3.4	4.6
Bush	44.7	41.0	25.6	20.2	47.8	45.6
Other	17.4	15.2	6.3	4.8	19.3	17.6
Not stated	0.6	0.5	0.6	0.7	0.6	0.5
Total	100	100	100	100	100	100

Source: 4th Rwanda Population and Housing Census, 2012

3.7.4. Gender issues associated with the proposed program

Gender mainstreaming and addressing gender inequalities are among the priorities of the Rwandan Government and very positive results have been achieved during the last years. In the context of district administrations it is noticeable that women are more present today and also have responsible positions. However, women are still underrepresented within the administration. Exceptions are the Ubudehe committees on village level (at least in the districts

where the approach is prominently developed) where women have a representation of more than 50 %.

In rural areas women and girls are responsible for tasks related to energy supply, which is essentially the collection of fire-wood as well as water fetching. This occupies a significant part of their weekly time schedule. Benefits of electrification could reduce the time spent with this task (though cooking with electricity is not very likely to be an impact of potential rural electrification due to the electricity price). In any case, the availability of electrical light would facilitate learning at evening time for children and increase their education opportunities.

During construction, women are less likely to be employed as workers and porters than men. This will lead to a greater access and control over the financial resources of the household by men. At the same time it increases the work-load of women who have to cope with the usual tasks alone.

During consultation with district administration it was mentioned several times, that projects should equally employ men and women, as the capacity to work hard and carry heavy burdens was not so different between men and women. The rationale given was, that money directly earned by women would profit the family more than money earned directly by men. The money earned by women is also more likely to profit the household, as a greater proportion is usually spent for the family, especially in case of availability of cash.

In some districts compensations are only paid in presence of both male and female heads of the household in order to insure a more equal access and control over the financial resources. In other districts this practice is not common.

Opening of bank accounts on both names and bank transfer of compensation seems to reduce the problem. However, it was said that sometimes women prefer to have their own account, which men cannot access. The issue is complex and differs case by case, however a monitoring of compensation practices and a study of the utilization of the compensation funds could give further hints how to improve gender balancing of existing practices.

A further issue that has been mentioned is related to polygamy, even though this practice is not accepted by the Rwandan law. Conflicts of polygamy and illegitimate children are linked to land titles. These conflicts arise at district land offices during compensation or expropriation. The Rwandan law foresees heritage of land titles only for children, not for second wives, and reportedly men use a situation of polygamy to bring land titles of several wives under their control especially when compensation is paid. This results in an increase of vulnerability of women and children in situations of polygamy.

Another impact of the Project could be the potential harassment of women by workers during construction phase. Appropriate measures and an involvement of a specialized NGO should be taken to mitigate this impact. A related issue is the potential spreading of HIV/AIDS and other

sexually transmitted diseases, for which a health campaign for workers and population in the vicinity is suggested.

Generally the situation of women will not be changed much for the better through the Project, the positive impact being limited for the resident population irrespective of gender. On the other hand it is clear that negative impacts will affect women, especially widowed or single women headed households that are among the most vulnerable sections of Burundian rural society.

In case of issues related to land titles, relocation and compensation payments, women tend to be disadvantaged compared to men, thereby suffering more from the negative impacts of the Project. The situation of women could be improved through gender sensitive livelihood measures, i.e. focusing on water supply, health, legal support, income generation for women, and anti-violence campaigns.

The extent of the Project's impact on gender issues can be assessed to be low if following mitigation measures are implemented:

- Legal support in case of land titles issues, relocation, compensation issues.
- During recruiting of local workforce/ porters etc. a significant proportion of women should be employed.
- Land title conflicts due to polygamy still persist in rural areas and district administrations should be strengthened in their capacities to deal with this issue.
- Cash compensation payments should be made in presence of male and female heads of the household (if applicable).
- Bank accounts for compensation payments should be accessible by both male and female heads of the household (if applicable).

4. DETERMINATION OF POTENTIAL ENVIRONMENT AND SOCIAL IMPACTS

This chapter analyses the potential positive (beneficial) and negative (adverse) environmental and social impacts of the sub project investments envisioned under Additional Financing for Rwanda Sustainable Water and Sanitation Program.

4.1. Positive environmental and social impacts

The Rwanda sustainable water supply and sanitation program is likely to have substantial positive socio-cultural and economic impacts. Obvious positive impacts are the provision of employment, water and sanitation infrastructures that can support the country's objectives in terms of water supply and economic development. The following section highlights the potential social-cultural and economic impacts associated with the proposed Program.

➤ Local employment

The implementation of this program will provide employment opportunities for local population. The use of local laborers and skilled workers will improve the skill resource base in Rwanda through the implementation of training and development programmes. These are both positive outcomes of the project and for the local population. However, there will be an influx of people looking for work in general. If not carefully managed, this strain would be a negative impact.

The use of local contractors will increase the capability of local contractors to carry out their work competently. There will also be an influx of skilled contractors to the project site. This will help to set up economic diversification.

➤ Access to potable water and reliability of water supply system

The proposed program will increase the capacity of water supply country wide and extend the number of people with access to clean water. The improvement and expansion of water supply system will enable greater responsiveness to the demand, increasing also the reliability of the operating system. The reliability of the system will allow adequate planning for water supplies. The expected total beneficiaries is estimated at 1,625,504 persons.

➤ Knowledge transfer

Technical and planning skills will be gained by the Rwandese people that will be employed by the project and this is likely to contribute to the capacity building.

➤ Economic Diversification and Improved local socio-economy

It is expected that all works related to the program will provide a positive increase to the local and national economy in general this will contribute to the socio economic benefits within and around the projects areas. The economic expansion will enable alternative businesses and economic activities to develop. Also, increased earnings by staff will most likely be spent locally

further supporting already established businesses in the area, as well as potential new businesses that may emerge.

➤ **Gender balance enhancement**

It is expected that during the project implementation women will also equally benefit as men in terms of employment benefits. This will contribute to the government vision of fighting against gender inequality and ensuring that women are given equal opportunity in terms of employment. As required labour policy every investor/ developer is required to use at least 30% of women. Furthermore, is the responsibility of a woman to look for water and in water shortage women and girls use most of their time looking for water. Therefore, the program will increase the available water and connect more people and women and girls will concentrate their effort on other income generation activities.

➤ **Healthcare for Employees**

Employees and their immediate families will be provided with basic healthcare. This will benefit the overall health of the local population. HIV/AIDS information will be dispersed to employees to prevent the spread of the disease amongst the project employees and their families.

➤ **Possibility of savings for the employees**

The increase of the project's employee's revenue will lead to the possibility of savings in local banks and micro-finances.

4.2. Potential Adverse Impacts

Although the specific project location and scope of the planned work are yet to be confirmed, it is anticipated that proposed works under the program will have negative impacts on human, physical and biological environment. This section describes potential environmental and social impacts associated with the proposed program.

4.2.1. Adverse Impacts biological environment

- **Loss of vegetation**

There will be vegetation loss (site specific) during the construction phase. The vegetation will be cleared so that the area where the construction work is to take place is clear for the construction work to be performed. The construction works may also involve direct land take of productive pasture land and agricultural lands, bush clearing, removal of top soil, excavation and mass haulage. These activities will expose the land to elements of erosion such as wind and water and thus will trigger the process of land degradation.

4.2.2. Adverse Impacts Physical environment

- **Decreased Air Quality**

Airborne dust will be increased by excavation, vehicle movement hence engine combustion and

materials handling, particularly downwind from the construction sites during the construction phase of the identified investments. Uncovered stock piles and asphalt mixing plant operations are another source of dust. Air pollution will be further caused by emissions from vehicles and construction machinery. There will be decreased air quality due to dust, suspended particles, hydrocarbon vapours, oxides of nitrogen and sulphur (NO_x and SO_x) and Volatile Organic Compounds (VOC) among other emissions.

- **Water Quality Degradation**

The project civil works are likely to alter the water quality in the local water mainly due to site clearing and the disruption of the natural drainage patterns. The construction phase for the WTP, forwarding infrastructure and Storage Tanks may lead to increased water turbidity within the riverine ecosystem and downstream. There will also be potential water contamination from hydrocarbons mainly from the contractor's machineries.

- **Hydrology Impacts**

Construction activities may manifest in impacts to the local hydrology. Construction of the Abstraction point and WTP may interrupt the river system resulting to direct consequence of change in the river flow patterns and sediment transport. Change in the river hydrology may consequently also have an effect on the aquatic habitat such as an impact of fish breeding and migration hence habitat loss.

- **Noise and Vibration Impacts**

Construction activities of the WTP, forwarding infrastructure and Storage Tanks could result in noise impacts so as to impact on general well-being, health and functioning. The construction activities may involve the use of construction equipment (graders, drilling equipment, trucks, tractors and excavators) for among other excavation, asphalt mixing plant operations and vehicular movement that emit noise usually harmful to the environment.

- **Road Safety, Traffic Management and Access**

Traffic congestion from construction phases of the WTP, forwarding infrastructure and Storage Tanks could potentially cause disruption, health and safety impacts, as well as economic impacts. The use of heavy moving construction vehicles and machineries at project sites is generally known to cause traffic reducing movement and flow of vehicles which could lead to road accidents. Public access is likely to be compromised and restricted during construction phase activities.

- **Construction Solid and Effluent Waste**

Solid waste issue is a potential adverse impact that will be as a result of abandonment of

litter/construction materials on site. Solid waste from packaging materials will related to WTP, forwarding infrastructure and Storage Tanks may generate solid wastes that may adversely affect the environment including construction debris among others.

- **Impacts related Water Treatment Plant**

Environmental issues associated with water treatment Plant include:

- **Solid waste**

Solid waste residuals generated by water treatment include process residuals, used filtration membranes, spent media and miscellaneous wastes. Process residuals primarily consist of settled suspended solids from source water and chemicals added in the treatment process, such as lime and coagulants. Pre-sedimentation, coagulation (e.g. with aluminum hydroxide [alum] or ferric hydroxide), lime softening, iron and manganese removal, and slow sand and diatomaceous earth filtration all produce sludge.

Composition of the sludge depends on the treatment process and the characteristics of the source water, and may include arsenic and other metals, radionuclides, lime, polymers and other organic compounds, microorganisms, etc. Damaged or exhausted membranes are typically produced from water treatment systems used for desalination. Spent media may include filter media (including sand, coal, or diatomaceous earth from filtration plants), ion exchange resins, granular activated carbon [GAC], etc.

- **Wastewater**

Wastewater from water treatment projects include filter backwash, reject streams from membrane filtration processes, and brine streams from ion exchange or demineralization processes. These waste streams may contain suspended solids and organics from the raw water, high levels of dissolved solids, high or low pH, heavy metals, etc.

- **Hazardous chemicals**

Water treatment may involve the use of chemicals for coagulation, disinfection and water conditioning. In general, potential impacts and mitigation measures associated with storage and use of hazardous chemicals are similar to those for other industrial projects

- **Air emissions**

Air emissions from water treatment operations may include ozone (in the case of ozone disinfection) and gaseous or volatile chemicals used for disinfection processes (e.g., chlorine and ammonia). Measures related to hazardous chemicals discussed above will mitigate risks of

chlorine and ammonia releases. In addition, specific recommended measures to manage air emissions include installation of an ozone-destroying device at the exhaust of the ozone-reactor (e.g., catalytic oxidation, thermal oxidation).

- **Wastewater and Sludge Treatment and Discharge**

The most significant environmental impacts related to wastewater and sludge treatment, discharge, and use include:

- Liquid effluents
- Solid waste
- Air emissions and odors
- Hazardous chemicals
- Ecological impacts

- **Visual Intrusion**

Unightly earthworks and borrow pits during construction may be a source of visual related impacts especially through scarring of landscapes. Construction activities related to WTP, forwarding infrastructure and Storage Tanks may have visual related impacts.

- **wetlands and ecological Impacts**

Changes to the low flow regime due to river abstraction for the WTP may have significant negative impacts on surrounding wetlands and other end-users. Minimum demands from both existing and potential future users need to be clearly identified and assessed in relation to current and future flows following abstraction. The quality of the flows is also important. A reduction in the natural river flow together with a discharge of lower quality drainage water can have severe negative impacts on downstream users.

Habitats both within and alongside rivers are particularly rich, often supporting a high diversity of species. Large changes to low flows ($\pm 20\%$) will alter micro-habitats of which wetlands are a special case. It is particularly important to identify any endangered species and determine the impact of any changes on their survival. Such species are often endangered because of their restrictive ecological requirements. The ecology of estuaries is sensitive to the salinity of the water which may be determined by the low flows. Saline intrusion into the estuary will also affect drinking water supplies and fish catches. It may also create breeding places for anopheline vectors of malaria that breed in brackish water.

As a result, in the cumulative impact analysis which would be done for each subproject within the same water catchment zones would assess the contributing impact of a given project on overall catchment.

- **Potential impact associated with Water Distribution**

The most fundamental environmental health issues associated with distribution networks is the maintenance of adequate pressure to protect water quality in the system as well as sizing and adequate maintenance to assure reliable delivery of water of suitable quality. The most significant environmental issues associated with operation of water distribution systems include:

- ✓ **Water system leaks and loss of pressure**

Water system leaks can reduce the pressure of the water system compromising its integrity and ability to protect water quality (by allowing contaminated water to leak into the system) and increasing the demands on the source water supply, the quantity of chemicals, and the amount of power used for pumping and treatment. Leaks in the distribution system can result from improper installation or maintenance, inadequate corrosion protection, settlement, stress from traffic and vibrations, frost loads, overloading, and other factors.

- ✓ **Water discharges**

Water lines may be periodically flushed to remove accumulated sediments or other impurities that have accumulated in the pipe. Flushing is performed by isolating sections of the distribution system and opening flushing valves or, more commonly, fire hydrants to cause a large volume of flow to pass through the isolated pipeline and suspend the settled sediment. The major environmental aspect of water pipe flushing is the discharge of flushed water, which may be high in suspended solids, residual chlorine, and other contaminants that can harm surface water bodies.

- **Potential impacts associated with borrow Pits and Quarry Sites**

Borrow pits and quarry are sites where stone, sand, gravel, till, clay, or other granular soils are extracted for construction of the hydro-mini-grids. Environmental impacts of pit and quarry development can include the loss, reduction or disturbance to wildlife and habitat, erosion, dust, soil/groundwater contamination, damage to historic resources, waste disposal, noise, and aesthetics.

4.2.3. Adverse Social Impacts

- **Public Health**

There is a potential risk (albeit minimal) that the construction process for most of the investment projects could increase HIV/AIDS and other STI prevalence in the project areas especially through interactions of the locals with the labour force. Increase in risk of sexually transmitted diseases, such as HIV/AIDS etc. due to influx of migrant workers; solid waste and effluent discharge from construction camps; risk of increase in vectors of *schistosomiasis*, *river blindness*, *Lymphatic filariasis* (*elephantiasis*) and malaria due to stagnant water associated with

construction works/borrow pits etc.

- **Loss of Land**

Construction of water treatment plants, water reservoir and water intake as well as water pipelines identified for the investments. There will be loss of farm land, grazing land, business and structures among others by the local communities owning the land mainly during construction of WTP, Water Reservoirs, Water Intake and water pipelines. The construction activities will involve a relatively low degree of land take bearing in mind that most of the projects are linear in nature thus requiring adequate land and space.

- **Health and Safety of Construction Workers and Community**

Occupation health and safety of the workers during the construction phase is likely to be a concern due to the accidents that normally occur in construction sites that could cause loss of life, limbs among others. Construction activities may also endanger the health and safety of the local community around the construction sites as a result of construction related hazards. The construction of WTP, Water Reservoirs, Water Intake and water pipelines are likely to lead to occupational safety and health impacts.

- **Workers Influx Impacts**

Construction activities may lead to influx of workers but the scale is likely to be low including significance. The influx of workers and followers can lead to adverse social and environmental impacts on local communities, especially if the communities are rural, remote or small. Such adverse impacts may include increased demand and competition for local social and health services, as well as for goods and services, which can lead to price hikes and crowding out of local consumers, increased volume of traffic and higher risk of accidents, increased demands on the ecosystem and natural resources, social conflicts within and between communities, increased risk of spread of communicable diseases, and increased rates of illicit behavior and crime. Such adverse impacts are usually amplified by local-level low capacity to manage and absorb the incoming labor force, and specifically when civil works are carried out in, or near, vulnerable communities and in other high-risk situations.

The increase in the number of people in a specific project area or site especially during construction has the potential to lead to a number of negative socio-economic impacts, including increased insecurity and community conflicts, increased incidences of diseases; increased risk of accidents and occupational hazards; and immigration of construction workers and labour force management challenges.

4.3. Environmental and Social Management Process

This ESMF contains potential mitigation measures and monitoring indicators through which the adverse impacts for specific sub project investments may be managed. However, each sub project will have to prepare an ESMP which should at a very minimum contain among others;-

- Description of the possible adverse effects that the ESMP is intended to address;
- Identification of project design alternatives that would meet similar objectives, and a description of why these projects are not viable, especially if they have a lesser environmental or social impact;
- Description of planned mitigation measures, and how and when they will be implemented
- Program for monitoring the environmental and social impacts of the project, both positive and negative;
- Description of who will be responsible for implementing the ESMP; and
- Cost estimate and source of funds to ensure effective implementation of the ESMP

4.3.1. Mitigation considerations and options

All moderate to major adverse impacts are considered for mitigation. Specific measures have been suggested in this regard where practicable. With regard to negligible and minor impacts where the project activity is not expected to cause any significant impact in such cases, best practice measures and mitigation have also been recommended where appropriate to improve the environmental and social performance of the Project. The mitigation options considered may include project modification, provision of alternatives, project timing, pollution control, compensations and relocation assistance. In cases where the effectiveness of the mitigation is uncertain, monitoring programs are introduced.

4.3.2. Recommended mitigation measures

The mitigation measures or guidelines have been designed in other to avoid, minimize and reduce negative environmental and social impacts at the project level. The mitigation measures are presented in the following Tables in a descriptive format.

Table 6: Proposed mitigation measures

Impacts	Description of mitigation measures
Physical Environment	
Solid and Effluent Waste	<u>Solid nontoxic waste</u> <ul style="list-style-type: none">• Adequate waste receptacles and facilities should be provided at project sites/camp sites• Training and awareness on Safe Waste Disposal in construction camps for all workers• Final disposal should be at dumpsites approved by the REMA
	<u>Waste oil /fuel</u> <ul style="list-style-type: none">• Spent or waste oil from vehicles and equipment should be collected and temporarily stored in drums or containers at site• Waste oil should be disposed of by oil marketing companies or agents approved or recognized and have the capacity to undertake oil disposal• Prepare Waste Disposal Plan for every construction site• Install waste disposal receptacles and signs in strategic places within the construction camps

		<ul style="list-style-type: none"> • Provide training and awareness on need to avoid littering • Ensure the construction camps have toilets and connected to the sewer system
Decreased Quality	Air	<ul style="list-style-type: none"> • Proposed investments should require that construction contractors operate only well maintained engines, vehicles, trucks and equipment. A routine maintenance program for all equipment, vehicles, trucks and power generating engines should be in place. • The project should ensure the use of good quality fuel and lubricants only • If dust generation at the project/construction site becomes a problem, limited wetting of sites and or unloading and reloading points should be done to reduce dust raising • Construction traffic speed control measures should be enforced on unpaved roads (speed limits through communities should be $\leq 50\text{km/hr}$ on unpaved roads and near or at project site should be $\leq 30\text{ km/hr}$). • Engines of vehicles/trucks and earth-moving equipment should be switched off when not in use.
Noise and vibration		<ul style="list-style-type: none"> • Proposed investments should require contractors to use equipment and vehicles that are in good working order, well maintained, and that have some noise suppression equipment (e.g. mufflers, noise baffles) intact and in working order. • This will be achieved by making it a component of contractual agreements with the construction contractors. • Contractors will be required to implement best driving practices when approaching and leaving the site (speed limit of $\leq 30\text{ km/hr}$) to minimize noise generation created through activities such as unnecessary acceleration and breaking squeal. • Engines of vehicles/trucks and earth-moving equipment should be switched off when not in use.
Visual Impacts		<ul style="list-style-type: none"> • Landscaping of facilities after construction and restoration of disturbed areas e.g. borrow pits
Impact on traffic and public safety		<ul style="list-style-type: none"> • Only road worthy vehicles and trucks should be used to avoid frequent breakdowns on the roads • Only experienced drivers should be employed • Contractors must provide training for drivers; Establish speed limits; Enforce safe driving and take disciplinary action against repeat offenders
Water Abstraction		<ul style="list-style-type: none"> • Obtain water abstraction permits from the Water Resources Management Authority
Decreased Quality	Water	<ul style="list-style-type: none"> • No garbage/refuse, oily wastes, fuels/waste oils should be discharged into drains or onto site grounds • Fuel storage tanks/sites should be properly secured to contain any spillage • Maintenance and cleaning of vehicles, trucks and equipment should take place offsite especially where project sites are close to water bodies. • Toilet facilities should be provided for construction workers to avoid indiscriminate defecation in nearby bush or local water bodies
Soil Erosion		<ul style="list-style-type: none"> • Minimize land clearing areas as much as possible to avoid unnecessary exposure of bare ground to the elements of the weather • Re-vegetate cleared areas as early as possible using native plant species • As much as possible, avoid construction work in the rainy season
Impact on fauna and habitat		<ul style="list-style-type: none"> • Avoid unnecessary exposure and access to sensitive habitat areas; • For identified or suspected sensitive habitats (swamps/ wetlands), regular inspection or monitoring should be carried out in the area prior to start and during work; • If sensitive habitats are encountered, Project activities should cease and the Project should consult wildlife agency to determine the appropriate course of action. • If the project site is discovered as a sensitive habitat area, the Project should engage the wildlife agency to develop a suitable plan. • Prohibition on hunting and consumption of bush meat by workforces

	<ul style="list-style-type: none"> Proposed investments should require that contractors implement a hazardous materials management plan that includes specification for proper storage and handling of fuels, oil, wastes, and other potentially hazardous materials as well as a plan for containment and clean-up of accidental spills into the aquatic environment. During pre-installation and installation of project facilities, spotting of sensitive aquatic mammals should form part of the project activities. Should these species be observed in the vicinity of the work area, the project should execute measures to avoid destruction or disturbance. Ensure provision for water flow reserves and appropriate reservoir filling schedules Project staff must report sightings of any injured or dead aquatic life (fishes)/ mammals immediately, regardless of whether the injury or death is caused by a Project activity. The report should include the date and location of the animal/strike, and the species identification or a description of the animal. The report should be made to the wildlife agency in Rwanda. The Project workforce and local communities should be educated to ensure that the importance of environmental protection and nature conservation are effectively communicated and that wider appreciation of environmental issues and construction best practice are fostered.
Downstream Impacts	<ul style="list-style-type: none"> Maintain environmental flow reserves for the river, Do into retain water in reservoir during drought, ensure that water retention in dam is controlled to ensure that adequate reserve is left to flow downstream for users
Quarry Site Impacts	<ul style="list-style-type: none"> Identify borrow and quarry sites away from sensitive environments and develop quarry management and rehabilitation plans
Hydrology Impacts/Changes	<ul style="list-style-type: none"> Maintain environmental flow reserves for the river, Do into retain water in reservoir during drought, ensure that water retention in dam is controlled to ensure that adequate reserve is left to flow downstream for users
Social Environment	
Physical displacement	<ul style="list-style-type: none"> All affected persons to be given relocation assistance (cash or kind) by the Project to enable them move their properties to new locations, i.e. in accordance with the Resettlement Action; Resettlement Plans will be required. If a site is acquired, the State may relocate persons and their families as well as community facilities to be affected. The affected families should not be made to incur any cost during the relocation period. A resettlement plan should be prepared for this area;
Loss of employment and livelihoods	<ul style="list-style-type: none"> Those whose livelihood is affected should be assisted to ensure they will not be worse off as a result of the project. This can include livelihood assistance, provision of new jobs immediately without any loss of income. The social assessments and socio-economic surveys, which will be undertaken for the preparation of individual investments/subprojects as well as the resettlement action plans, should assess these issues and provide measures in accordance with the Resettlement Action Plan. Contractors should use local labor as much as possible and where available. As much as possible, all unskilled labor should be contracted or obtained from the local community.
Loss of land and other assets	<ul style="list-style-type: none"> Due process should be followed to establish the true owner of any land, be it family or communal land. Once established, the project should acquire the site by paying appropriate compensation in accordance with the resettlement action plan.
Loss of structures/properties	<ul style="list-style-type: none"> For a project site to be used, irrespective of the land ownership, appropriate compensation should be paid for any structures/ properties which are permanent structures at the site as well as investment made for any development on the land. - Depreciation should not be factored during valuation of these properties. The compensation process should satisfy the RPF developed for the project.

	<ul style="list-style-type: none"> - Appropriate compensation should be paid for any damaged or destroyed propriety that belongs to affected persons. No depreciation during valuation of these properties.
Impact on access among communities living in the project areas	<ul style="list-style-type: none"> - Measures will be considered in the projects' design to ensure that communities are not divided and if they are as a result of a project appropriate measures are taken to mitigate this impact.
Impacts on recreation and public areas	<ul style="list-style-type: none"> - Appropriate notices and warning signs will be erected around working areas and public areas to warn prospective trespassers of any danger or risk
Impacts on human health/ traffic safety and sanitation	<ul style="list-style-type: none"> - Trucks carrying construction materials such as sand, quarry dust, laterite etc. will have the buckets covered with tarpaulin or appropriate polythene material from or to project site - Only road worthy vehicles/trucks should be used - Only experienced drivers/operators should be employed - Except for areas secured by fencing, all active construction areas will be marked with high-visibility tape to reduce the risk accidents involving pedestrians and vehicles. - All open trenches and excavated areas will be backfilled as soon as possible after construction has been completed. Access to open trenches and excavated areas will be secured to prevent pedestrians or vehicles from falling in. - Adequate sanitary facilities will be available for workers and open range defecation will not be countenanced. - Construction workers will be provided with and educated to wear suitable Personal Protective Equipment (PPE) including hard hats, overalls, high-visibility vests, safety boots, earplugs, gloves etc. - Enforce use of PPEs at all times for all staff and laborers and ensure supervision of the same to minimize accidents - Construction workers should be educated to adhere to basic rules with regard to protection of public health, including most importantly hygiene and disease (HIV/AIDS) prevention.
Impacts on cultural heritage / archaeological interest / existing ecologically sensitive areas	<ul style="list-style-type: none"> - The pre-construction surveys should identify cultural heritage resources and existing ecologically sensitive areas that the project should avoid and by-pass these resources. - The Project should implement a chance find procedure and reporting system to be used by contractors in the event that a cultural heritage feature or ecologically sensitive item/issue is encountered.
Impacts on human health and public safety	<ul style="list-style-type: none"> - The Project will require all contractors to implement an Environmental, Health and Safety (EHS) plan which will outline procedures for avoiding health and safety incidents and for emergency medical treatment. This will be achieved by making it a component of contractual agreement. - Contractors will be required to wear suitable Personal Protective Equipment (PPE) including hard hats, high-visibility vests, safety boots and gloves and life vests as appropriate in accordance with the EHS plan. - Enforce use of PPEs at all times for all staff and laborers and ensure supervision of the same to minimize accidents - All construction and other workers will be sufficiently trained in the safe methods pertaining to their area of work to avoid injuries.
Labor Influx Management	<ul style="list-style-type: none"> - Develop site-specific measures before the contractor starts work, and update them as necessary to reflect project developments. Overall, adequate monitoring and adaptive management of the potential impacts from labor influx are key to properly addressing them and mitigating risks. Recruit as many local workers from the areas as possible. Provide training for the local communities to acquire skills needed for work

	<p>opportunities if there is reasonable time especially on monitoring and maintenance.</p> <ul style="list-style-type: none"> - Develop a Labour Influx Management Plan and Workers Camp Management Plan for all projects. Outline the contractor's responsibilities on influx management in contracts.
Impact on gender access to water for household use and household plots as well as impact on pastoralists and fisheries.	<ul style="list-style-type: none"> - The project will take into consideration the different needs for water and types of access which will be affected for each of these groups and provide relevant mitigation measures which will be decided with those affected. Some mitigation measures could include water points for household use and livestock; livelihood assistance to those whose whole or partial livelihood will be affected as a result of some of the possible investments such as dams. Specific impact and relevant measures will be covered by project specific social assessment.
HIV/AIDS Spread and other related public health diseases –Water borne diseases etc.	<ul style="list-style-type: none"> - Design HIV/AIDS awareness, sensitization and prevention program for each project that extends to the communities as a whole; - Design programs for reducing the spread of water borne diseases like Malaria, Bilharzia etc. in collaboration with the Ministry of Health
Labour and employment related impacts	<ul style="list-style-type: none"> - Ensure that the local communities are given priority in relation to employment and provided with training (skilled) to provide future labour in the project e.g. operation and maintenance. Ensure that workers are provided satisfactory working conditions and work environment including pay in accordance with the laws of the country - Ensure that child labour is not tolerated in the project; - The project to prepare redundancy plans and packages to be discussed with affected workers which will include re- training and re- tooling of affected workers and aim to avoid labor strife

4.4. Monitoring Plans and Indicators

4.4.1. Monitoring of Environmental and Social Indicators

The goal of monitoring is to measure effectiveness and compliance of the ESMP, determine whether interventions have resulted in dealing with negative impacts, whether further interventions are needed or monitoring is to be extended in some areas. Monitoring indicators will be very much dependent on specific project contexts.

Monitoring Levels-Overall Project Level

The sub-projects safeguard instruments (RAPs, ESMPs) will be prepared and implemented by WASAC who will also be responsible for appraising and approving sub-projects, organizing the management and implementation of the sub-projects, and supervising the implementation of the sub-projects, including the implementation of safeguards activities.

WASAC will be responsible for overall monitoring and reporting on compliance with the ESMF. WASAC will ensure that sub projects investments are screened, their safeguard instruments prepared, cleared and disclosed prior to sub project approval. Further, WASAC will ensure that contractors implement the specific sub project ESMP, and submit reports on ESMP implementation as required on quarterly basis for their review and that of the Lenders. Within WASAC, monitoring and surveillance of all the sub project investments will be undertaken by the Environmental and Social Safeguards Unit. The WASAC will report results of this monitoring to the Bank on a quarterly basis.

Bank's Monitoring Support

The Bank will provide the second line of compliance monitoring and commitments made in the ESMP through supervision visits in a less frequent manner and detail as compared to the first line of monitoring that will be undertaken by the WASAC. The Bank will further undertake monitoring during its scheduled project supervision missions and review of the submitted quarterly monitoring reports.

Sub Project Level Monitoring

The second level of monitoring will be at the sub project level where the safeguard instruments for the investments will and must include a monitoring plan for which the WASAC will be responsible for ensuring that monitoring is carried out. All sub project investments will be subject to mandatory annual environmental audit /supervision to ensure that they comply with the Organic Law.

Table 7: Monitoring indicator

Monitoring Level	Monitoring Issue	Verifiable Indicators	Responsibility
ESMF Level	Adequate dissemination of ESMF to stakeholders Capacity building and training programs	Record of consultations and meetings; Workshop reports	WASAC Ltd
Project Investment Level	Preparation of environmental and social impact assessment report Environmental permitting Monitoring and evaluation	<ul style="list-style-type: none"> Independent consultants hired to prepare ESIA and/ RAP documents Environmental Permits for sub projects Environmental Management Plans, Monitoring Reports, Annual Environmental Reports 	WASAC Ltd

Table 8: Project monitoring indicators and responsibilities

Impact issue	Proposed Action/ Measures	Implementation tool/criteria	Monitoring indicators (Inputs)	Monitoring Indicators (Outcomes)	Verification	Project stage	Responsibility
Solid waste disposal	Provide adequate waste reception facilities at construction camp sites Dispose of waste at approved waste collection sites	Waste management plan/Construction site management plan	Number of waste bins at site bins Availability of waste disposal plan Final disposal records	Percentage of workers who follow the solid waste disposal plan including use of receptacles Number of workers familiar and aware of the waste disposal plan at the construction sites	Weekly checks by project engineer	Construction Operation	Contact Project engineer

Waste oil/fuel disposal	Provide drums/containers for temporary storage on site of waste oil from equipment and vehicles. Dispose of waste oil through an approved agent	Waste management plan/Construction site management plan	Waste oil drums/containers on site Availability of waste disposal plan (waste oil)	Number of workers familiar and aware of the waste disposal plan Percentage of workers who follow the waste disposal plan including use of receptacles	Monthly checks by project engineer	Construction Operation	Contactor Project engineer
Air pollution	Purchase sound equipment/machinery for project Operate well maintained vehicles, trucks and other equipment Use good quality fuel and lubricants Suppress dust generation at project sites Switch off engines when not in use	Part of contract agreement Routine maintenance plan for machinery Purchase of fuel at recognized stations Schedule of works is to limit Water surfaces several times a day to reduce dust at the site.	Number of sound machinery and equipment purchased Availability of equipment and machinery maintenance plan Frequency of watering of surfaces to reduce dust related impacts	Percentage of workers following the good practices for equipment and machinery maintenance Verification of maintenance record by project engineers Self-check by contractor	Independent check by project engineers	Construction	Contactor /Project engineer
Noise pollution	Schedule of works is to be limited to daylight hours Compliance with the noise emission levels/standard Provision of PPE for workers for noise pollution Train workers on the use of PPEs for noise mitigation and reprimand those not complying	Part of contract agreement for the contractors	Recorded grievances Number of PPE procured for noise mitigation	Number of workers correctly and frequently using PPEs Number of workers aware of the emissions standards of REMA and complying with the same	Self-check by contractor	Construction	Contactor /Project engineer

Impacts on landscape	Landscaping of facilities after construction, and restoration of disturbed areas	Construction site maintenance and restoration plan.	Implementation of the plan	Quality of restored landscapes Number of disturbed sites successfully restored	Self-check by contractor	Construction	Contractor /Project engineer
Traffic impacts	Use only road worthy vehicles and trucks Use experienced drivers Contractors must provide driver training Establish speed limits, Enforce safe driving and take disciplinary action against repeat offenders.	Purchase sound vehicles and trucks /machinery for project Driver qualification recorded Traffic Safety Plan	Traffic incidence records Grievances Recorded	Number of drivers aware and familiar with the traffic safety plan Percentage of drivers who have not committed a traffic offence for the last 6 months Number of compliance (traffic) inspection and checks conducted by traffic department found to be satisfactory	Project engineers to verify	Construction	Contractor /Project engineer

Water pollution	<p>No garbage/refuse, oily wastes, fuels/waste oils should be discharged into drains or water bodies</p> <p>Fuel storage tanks/sites should be properly secured</p> <p>Maintenance and cleaning of vehicles, trucks and equipment should take place offsite.</p> <p>Provide toilet facilities for construction workers</p> <p>Construction activities, including camps to include measures to control runoff</p>	<p>Waste management plan Spill prevention and control plan</p> <p>Water Quality Plan to measure the quality of water including physical, chemical and biological.</p> <p>Implement an Integrated Pest Management Plan when using fertilizers and pesticides</p>	<p>Visibility of oil on water bodies</p> <p>Procurement and installation of water monitoring and measuring gauges</p> <p>On site erosion observed</p> <p>Proposed actions implemented</p> <p>Quality of water following periodic measurements</p> <p>No of pollution incidences recorded</p> <p>Number of complaints on pollution of water</p>	<p>Increased water quality upstream and downstream shown by periodic measurements</p> <p>Water samples collected showing compliance to water pollution standards</p>	<p>Daily self-checks by contractors</p> <p>Periodic reports on performance by contractor to project engineers</p> <p>Spot checks/audits by project engineers</p>	<p>Construction</p> <p>Operation</p>	<p>Contractors /Project engineers</p> <p>Project engineers</p>
-----------------	--	---	--	--	--	--------------------------------------	--

Impact on fauna and flora	<p>Avoid unnecessary exposure or access to sensitive habitat.</p> <p>Avoid protected areas, critical habitats or areas with significant biodiversity (wetlands)</p> <p>Regular inspection or monitoring should be carried out in sensitive areas e.g. swamps/ wetlands the area prior to start of work.</p> <p>Ensure proper storage and handling of potentially hazardous materials (including oil).</p>	<p>If a sensitive habitat is discovered in the work area or vicinity, Project activities should cease.</p> <p>The contractor should notify project engineers who will consult wildlife agency to determine the appropriate course of action.</p> <p>Hazardous material management plan/accident management plan.</p> <p>Awareness raising among contractor personnel</p>	Wildlife incidents recorded and reported	<p>Number or percentage of terrestrial flora and fauna unaffected by the sub projects</p> <p>Number of workers aware and sensitized on the need to conserve the flora and fauna</p> <p>Impact on terrestrial flora and fauna</p>	<p>Regular self-checks by contractor</p> <p>Spot checks and audit by contractor to the client</p>	<p>Construction</p> <p>Operation</p> <p>Maintenance</p>	Contractors /Project engineers /
---------------------------	---	--	--	--	---	---	----------------------------------

Table 9: Project monitoring indicators and Responsibilities-Social Impacts

Impact issue	Proposed Action/ Measures	Implementation tool/criteria	Monitoring indicators (Input)	Monitoring indicators (Output)	Verification	Project stage	Responsibility
Impacts on downstream water users	<p>Maintain Environmental Flows for river basins</p> <p>Ensure that abstraction of water complies with the water abstraction permits</p>	Environmental Flows Plan	<p>Presence of an Environmental Flows Plan calculated and approved by water abstraction agency</p> <p>Availability of Water Abstraction Permit from Water regulation agency</p>	Impacts on water uses and livelihoods downstream	<p>Regular spot checks by water regulation agency</p> <p>Periodic checks of the flows by environmental team</p>	<p>Construction</p> <p>Operation</p>	<p>Contractor WASAC REMA</p> <p>Water regulation agency</p>
Impacts on recreation and public areas	Place notices and warning signs at working areas	ESMP	Grievance records	Recreational Facilities and areas restored/protected	Warning signs/notices in place	Construction	Contractors/ Project engineers

Impacts on Human Health/ Safety and sanitation	<p>Cover buckets of trucks carrying construction materials such as sand, quarry dust, etc.</p> <p>Use road worthy vehicles/trucks and experienced drivers/operators</p> <p>Active construction areas to be marked with high-visibility tape</p> <p>Provide adequate sanitary facilities</p> <p>Provide PPEs for construction workers.</p> <p>Educate construction workers on site rules/regulation and hygiene and disease (HIV/AIDS) prevention.</p>	<p>ESMP</p> <p>Vehicle maintenance programme/plan in place</p> <p>Construction site management plan</p> <p>ESMP</p>	<p>Health and safety incident register</p> <p>Grievance records</p>	<p>Reduced accidents and hazards in construction sites</p> <p>Reduced incidence of diseases spread e.g. HIV/AIDS, and other STDs</p> <p>Increased understanding of workers on measures to reduce STDs/HIV/AIDS etc.</p>	<p>Health and safety plan under implementation</p> <p>Daily self-checks and verification by contractor</p> <p>Spot checks by project engineers</p> <p>Periodic reports by contractor to project engineers</p>	Construction	Contractors
Impacts on cultural heritage/ archaeological interest /existing aquatic infrastructure and services	Identify cultural heritage resources and existing ecologically sensitive areas.	<p>Pre-construction surveys / Chance Finds procedure</p> <p>Plan for accidental Cultural Finds</p>	Cultural/ archaeological resources/ existing infrastructure encounter incidence register	Number of workers familiar with the chance find procedures	<p>Chance finds procedure under implementation</p> <p>Daily self-checks and verification by contractor</p>	Preconstruction and construction and repairs/ recovery	Contractors
Impacts on Human Health and Safety	<p>Use suitable Personal Protective Equipment (PPE).</p> <p>Provide Training on use of PPE</p>	ESMP	<p>Health and safety incident register</p> <p>Grievance records</p>	Reduction in or increase in accidents due to use of or lack of use of PPEs	<p>ESMP under implementation</p> <p>Spot checks and observations by project engineers</p> <p>Periodic reports on performance by contractor to project engineers</p>	Pre-construction and construction, and repairs/ recovery	Contractors

Labour related impacts (Employment)	Ensure that the local communities are given priority in relation to employment and provided with training (skilled) to provide future labour in the project e.g. operation and maintenance	Human Resource Management Plan	Number of local residents employed in sub projects	Number of local residents employed in sub projects	Employment Records	Pre-construction and construction, and repairs/recovery	Contractors/EA
-------------------------------------	--	--------------------------------	--	--	--------------------	---	----------------

4.5. Monitoring Roles and Responsibilities

4.5.1. *Water and Sanitation Corporation (WASAC)*

WASAC will be solely responsible for the environmental and social monitoring of all the subproject component activities. WASAC will be required to prepare periodic (monthly, quarterly and annual) monitoring reports for all sub projects subjected to further environmental analysis for submission to the AfDB and REMA. WASAC will be responsible for appraising and approving sub-projects, organizing the management and implementation of sub-projects, and supervising the implementation of sub-projects, including the implementation of safeguards activities.

4.5.2. Rwanda Environment Management Authority (REMA)

The Organic Law on environment places the responsibility of environmental protection on REMA as the coordinating agency. REMA is charged with the overall role of providing oversight in regard to monitoring for all project activities that have potential impacts on the environment in Rwanda. REMA will undertake periodic monitoring of the investment projects by making regular site inspection visits to determine compliance with the investment projects ESIA's approved and will further rely on the submitted annual audit reports submitted for each investment project annually as required by Organic Law as a way of monitoring.

4.5.3. Rwanda Development Board (RDB)

RDB will provide approvals and ESIA license to all the subproject investments based on the ESIA reports submitted, without RDB's approval implementation of the investment project will not move forward.

4.5.4. WASAC -Social and Environmental Specialist

WASAC has a strong team of environmental and social Specialists who will provide oversight, screening of sub projects, preparation of ToRs for ESIA's, facilitation, coordination, review of ESIA's, monitoring and evaluation of all the sub projects. The environmental and social specialists will submit quarterly monitoring reports of all active investments under implementation to the AfDB.

5. SUB-PROJECT REVIEW, COORDINATION & IMPLEMENTATION ARRANGEMENTS

5.1. Sub Project Safeguards instrument review and approval

The Organic Law require that all projects be subjected to a review and screening process in order to determine whether a full scale ESIA is necessary or otherwise. This is done through preparation of a project report which will be prepared by WASAC. Each investment will need to be reviewed independently for potential environmental and social impacts. In cases where a full scale ESIA is required, it will be paramount that the feasibility studies occur concurrent with the ESIA study in order to ensure that the findings of the ESIA are incorporated in the feasibility study at the design stage. This will ensure that environmental sound design including proposed mitigation measures as well as alternatives are incorporated in the feasibility reports at the design stage hence avoiding design change at an advanced stage.

The Proposed Environmental Category of the Additional Financing to Rwanda Water Supply and Sanitation program is category 2 under AfDB ESAP. In addition to this overall ESMF and upon the availability of all design information, WASAC will undertake sub-project screening and request terms of reference in RDB for preparing the ESMP based on the screening determination.

No sub project support will be provided until (i) WASAC has presented the AfDB with a certified copy of the positive conclusion of the relevant national authority or - as the case may be - the AfDB determines that no further environmental review is required, and (ii) the AfDB has reviewed and cleared the environmental documentation and issued its formal no objection.

Consultation and Disclosure Requirements: In addition to the environmental documentation requirements described above, AfDB ISS provide the following consultation and disclosure requirements:

Consultation should occur at least twice, once near the beginning of the ESA process and once when a draft final report has been disclosed. During the ESA process, the consultant shall consult groups affected by the subproject and local administration about the subproject's environmental aspects and take their views into account. The consultant shall initiate such consultations as early as possible. Consultations with stakeholders should take place only ones after a draft ESA report is prepared. In addition, the applicant shall consult with such groups throughout project implementation as necessary to address EA-related issues that affect them.

For meaningful consultations, the consultant shall apply the following disclosure requirements:

- The applicant shall provide relevant material in English and/or the local language (as appropriate) in a timely manner prior to consultation;
- The consultant shall make the draft ESIA report including a detailed summary of the ESIA's conclusions available at a public place accessible to groups affected by the subproject and local NGOs.

5.2. Screening and subproject preparation

Screening of subproject will commence right at the project inception phase as soon as the specific sub project details are known including nature and scope, proposed location and area among other parameters. Screening is expected to happen concurrently with the project specific feasibility studies so that any potential impacts identified through screening are immediately incorporated into the feasibility study hence ensuring that environmental sound design of the sub projects occurs right at the project design phase. The screening process could result in any of the following determination; -

1. A stand-alone ESMP or
2. No further environmental study
3. Abbreviated Resettlement Action Plan

5.3. Who prepares a screening checklist?

RDB is the institution designated to make a decision on whether a full scale ESIA/ESMP is necessary for proposed investments or otherwise. To make this determination, a project brief must be submitted to RDB in order to make a determination and this is part of the screening. The project/screening report will be prepared by WASAC Environmental Officer and then submitted to RDB for further determination.

The Bank also requires that sub project investments are screened in order to make a determination as to whether a full scale ESIA/ESMP, or no further environmental studies are needed for investments.

5.4. Process for screening, preparing and approving RAPS/ARAPS

Activities planned under Additional Financing for Rwanda Sustainable Water and Sanitation program is likely to have minimal involuntary economic displacement related to project related land acquisition. Therefore, the AfDB operation Safeguard (OS) 2: Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation is triggered. The specific objectives of this OS is to avoid involuntary resettlement where feasible, or minimize resettlement impacts where involuntary resettlement is deemed unavoidable after all alternative project designs have been explored. Preliminarily designs show that some minimal land is required especially for water Treatment Plants, water reservoirs, water intake and pipeline. For this reason and in compliance with

national requirements and AfDB OS 2, resettlement instruments will be prepared, approved and implemented. This section describe the process for ARAP preparation and approval Process.

5.4.1. Screening Mechanism for Abbreviated Resettlement Action Plans

Abbreviated Resettlement Action Plans a (RAP) which would be prepared shall include measures to ensure compliance with Rwanda and AfDB policy directives. Furthermore, the implementation schedule of these policy measures should ensure that no individual or affected household would be impacted by any subproject's civil works activity before compensation is provided. Subproject screening is used to identify the types and nature of potential impacts related to the activities proposed under the project and to provide adequate measures to address the impacts.

Screening for resettlement issues shall be part of the environmental and social screening. Measures to address resettlement shall ensure that PAPs are:

- Informed about their options and rights pertaining to displacements
- Included in the consultation process and given the opportunity to participate in the selection of technically and economically feasible alternatives;
- Provided prompt and effective compensation at full replacement cost for; and
- Losses of assets and access attributable to the subprojects.
- Enabled to restore and preferably improve their living standards compared to pre-project ones.

Therefore, the first stage in the process of preparing the individual resettlement plans is the screening process to identify the land acquisition and land use needs that will cause resettlement. The resettlement and compensation plans will contain the analysis of alternative sites undertaken during the land screening process.

5.4.2. Scope of Abbreviated Resettlement Action Plans A(RAPs)

Overall responsibility for preparing an ARAP will be the responsibility WASAC with the support of outsourced consultant. The SPIU shall ensure that an ARAP that conforms to the Rwanda regulation and the AFDB OS 2 is developed and fully implemented prior to commencement of construction works. The ARAP is a detailed time bound plan of action plan outlining the following among others: - resettlement objectives, strategic options, responsibilities, approvals, entitlements, actions; compensation budget, and monitoring and evaluation. The process to be followed in preparing an ARAP shall involve several steps as outlined in the following sections.

5.4.3. Preliminary Assessments

The initial preliminary assessments and surveys should include (i) potential social impacts, (ii) direct consultations with individuals and groups who are expected to be directly affected by project activities; and (iii) identification of the major population groups that may be affected by the proposed project.

5.4.4. Preliminary information on the subproject design and screening checklist

Screening is required to be prepared by WASAC as early as possible. The required information shall include a description of the nature, scope and location of the proposed project impacts, accompanied by location maps and any other details as may be required by the SPIU. If the screening indicates that a subproject results in its present layout the physical or economic displacement, advice to consider feasible alternative sub-project designs to avoid or at least minimize physical or economic displacement, while balancing environmental, social and financial costs and benefits will be sought.

If the screening indicates that the project has potential for land acquisition, impact on assets, loss of livelihood or restriction of resource use, then A-RAP needs to be prepared. A screening checklist form has been developed (See Annex 1) which will be incorporated into the Project's Implementation Manual. The screening checklist will be completed by the WASAC environmental and social safeguard specialist with the support of the subproject design team.

5.4.5. Baseline and socio-economic data

An important aspect of preparing an ARAP is to establish appropriate socioeconomic baseline census to identify the persons who will be displaced by the individual subproject, to determine who will be eligible for compensation and assistance, and to discourage opportunists who are ineligible for compensation. This shall be carried out to provide baseline data on various factors including the following:

- **Identification of current occupants of the affected area**, to establish the basis for the design of any resettlement program and to exclude subsequent inflows of people from eligibility for compensation and resettlement assistance;
- **Standard characteristics of affected households**, including a description of production systems, labour, and household organization; and baseline information on livelihoods (including, as relevant, production levels and income derived from both formal and informal economic activities) and standards of living (including health status) of the PAPs;
- **The magnitude of the expected loss** of assets, total or partial, and the extent of impact; Baseline data for sub-project RAPs will include number of persons; number, type, and area of the houses to be affected; number, category and area of residential plots and agricultural land and crops to be affected; and productive assets to be affected as a percentage of total productive assets.
- **Information on vulnerable groups** or persons for whom special provisions may have to be made; Identification of the potentially affected people on the individual and household levels, vulnerable groups (persons with disabilities, women, children, the elderly, female headed households, affected internally displaced people, affected internally displaced households, etc.)
- **Provisions to update information** on affected peoples' livelihoods and standards of living at regular intervals to ensure most recent information at the time of impact ;

- **Land tenure and transfer systems**, including an inventory of common property natural resources from which people derive their livelihoods and sustenance and any issues raised by different tenure systems in the project area;
 - Those who have formal legal rights to the land they occupy;
 - Those who do not have formal legal rights to land, but have a claim to land that is recognized or recognizable under the national laws including those measures put in place by the draft land policy; or
 - Those who have no recognizable legal right or claim to the land they have occupied before the cut-off date.
- **The patterns of social interaction** in the affected communities, including social networks and social support systems, and how they will be affected by the project;
- **Public infrastructure and social services** that will be affected; and
- **Social and cultural characteristics of affected communities**, including a description of formal and informal institutions (e.g., community organizations, ritual groups; and Non-Governmental Organizations (NGOs)) that may be relevant to the consultation strategy and to designing and implementing the resettlement activities.

The preliminary assessments and information and the socio-economic baseline data will assist in determining the cut-off date, period of registration of claims and valuation of land and immovable assets. In summary, the census consolidates information that (i) provides initial information on the scale of resettlement to be undertaken; (ii) gives an indication of further socio-economic research needed to quantify losses to be compensated and, if required, to design appropriate development interventions; and (iii) establishes indicators that can be measured at a later date during monitoring and evaluation. The purpose of the socio-economic study is also to collect baseline data within the chosen/targeted sites/areas/homesteads/villages thereby enabling the social assessment of potentially affected populations/communities/homesteads/villages. Detailed calculation of individual and household economies and identification of all impacts will be undertaken as part of the socioeconomic study and be the determinant in the potential compensation process.

The socio-economic study and baseline census will be carried out by WASAC with support from the subproject design team and the subproject supervision consultant. On completion of the socio-economic study and the baseline census, WASAC will prepare an Abbreviated Resettlement Action (A-RAP) to guide implementation of any compensation payments resulting from project related land acquisition.

5.4.6. Preparation of a sub-project ARAP and approval process

An ARAP shall be prepared by WASAC supported by their consultants in consultation with the local authorities and community leaders for subprojects that have been determined to result in potential involuntary displacement from project related land acquisition. All sites that trigger OS 2 and their resettlement and compensation plans would be subject to the final approval of the

Bank to ensure compliance with bank safeguards.

Where the impacts on the entire displaced population are minor (i.e. if affected people are not physically displaced and less than 10% of their productive assets are lost) or fewer than 200 people are displaced (economically or physically) for the entire project, and then the bank will approve the preparation of an Abbreviated Resettlement Plan (ARAP). For impacts that are not considered minor, the preparation of a full Resettlement Plan (RAP) is required for each site. Key steps in RAP/ARAP preparation include:

- **Socio Economic Survey**

To enable identification of the numbers and socioeconomic data of the PAPs, a socioeconomic survey should be conducted. This should include quantitative household survey of the project affected persons or households. The objective of the quantitative household survey will be to generate a baseline description of pertinent demographic and social characteristics of the affected households. The target population for the quantitative household survey will be those affected persons within the project area. The socio-economic survey will be initiated by the WASAC and their consultants with support from the subproject supervision consultant.

- **Project Affected Person's Census**

To determine the population of those affected, PAPs census should be undertaken. The methodology will encompass all people adversely affected by the project, regardless of their legal status – landowner, holder of land rights, tenant, and illegal squatter – or whether they are actually living on an affected site at the time of the census. The lack of land title does not disqualify people from resettlement assistance. Private landowners and holders of rights to land as well as any person currently occupying public or private land for shelter, business purposes or other sources of livelihood (caretakers, squatters, scavengers) should be included in the census. The census will serve five important and interrelated functions:

- Establishing a list of legitimate beneficiaries before the subproject's onset that counters spurious claims from those moving into the project area solely in anticipation of benefits,
- Provide indicators for monitoring and evaluation;
- Provide initial information on the scale of resettlement to be undertaken
- Laying a framework for subsequent socioeconomic research needed to establish fair compensation rates and to design, monitor and evaluate sustainable income restoration or development interventions,

- **Preparation of asset inventory**

To prepare inventory of the land and development on it, a field team should visit the affected area to carry out an asset valuation survey. The team should include village resettlement committee representative, local administration and a representative of the PAPs among others. During the survey, each asset should be enumerated and inscribed on an inventory and a valuation of the asset carried out. The values of each asset should then be recorded in a register and shown to the affected persons for agreement. The register will be signed and a copy given

on the spot to the affected person. The document will state when the affected person will be notified, and that the inventory will not be official until a second signed copy, verified by project supervisory staff, is returned to the affected person. At this time, a copy of the grievance procedure will also be given to the affected person as stated in the grievance redress mechanism.

- **Public consultations and participation**

Public consultation and participation by the affected communities and individuals is an essential element of the land acquisition, compensation and resettlement process. Throughout the process, and particularly during screening, all stakeholders must be adequately consulted and involved. The need for stakeholder's consultation is to secure the informed participation and consent of all people affected. The consultation should be particularly focus in the following areas;

- Alternative project design
- Assessment of project impacts
- Resettlement strategy
- Compensation rates and eligibility for entitlements
- Choice of resettlement sites and timing of relocation
- Development of opportunities and initiatives
- Development of procedures for redressing grievances and resolving disputes
- Mechanisms for monitoring and evaluation and for implementing corrective actions

Public consultation will take place at the inception of the planning stages when the potential land areas are being considered. The participation process would evolve to meet the needs of the project affected communities and therefore would be an on-going activity taking place throughout the entire project development cycle. For example, public consultation would also occur during the preparation of the (i) the socio-economic study, (ii) the resettlement and compensation plan (iv) the environmental impact assessment and (v) during the drafting and reading of the compensation contract.

- **Eligibility criteria for various categories of PAPS**

The involuntary acquisition of land results in relocation or loss of shelter; and loss of assets or access to assets or loss of income sources or means of livelihood, whether or not the PAPs must move to another location or not. Meaningful consultations with the affected persons, local authorities and community leaders will therefore allow for establishment of criteria by which displaced persons will be deemed eligible for compensation and other resettlement assistance. In accordance to OS 2 requirements, categories of PAPs eligible for compensation and resettlement include:

- (a) Those who have formal rights to land including customary/communal land, traditional and religious rights recognized under Rwandan Law.

- (b) 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 Rwanda or become recognized through a process identified in the resettlement plan.
- (c) Those who have no recognizable legal right or claim to the land they are occupying, using or getting their livelihood from before the cut of date.

Determination of the eligibility of PAPs to be compensated shall be done through a transparent and legal process, taking into consideration the most stringent applicable laws and standards all between laws of Rwanda and the AfDB's ISS and local customs. Compensation will be paid only to those persons:

- The process will involve review of tenure documents owned by occupants, interviews with households and groups in the affected area. Local Authorities and the Ministry in charge of lands will also help in this assignment that will be undertaken by WASAC or and its consultants if needed.
- PAPs covered in (a) and (b) will be compensated for the land they lose, and other assistance ensuring that they are (i) informed about their options and rights pertaining to resettlement, (ii) consulted and provided with technically and economically feasible resettlement and (iii) provided prompt and effective compensation at full replacement cost for losses of assets attributable directly to the project.
- Land for land compensation will be applied to PAPs who might lose their land. All PAPs irrespective of their status or whether they have formal titles, legal rights or not, squatters or encroaching illegally on land, are eligible for assistance if they occupied the land before the entitlement cut-off date.

Persons who encroach on the area after the socio-economic study (census and valuation) are not eligible for compensation or any form of resettlement assistance. There will therefore be a package of compensation and other resettlement measures to assist each category of eligible PAPs to achieve the objectives of the policy. Eligibility criteria will also be determined by loss of property, loss of wages and cut-off date.

6. CAPACITY BUILDING, TRAINING AND BUDGET

6.1. Institutional Capacity for ESMF Implementation

The principal institution that will provide overall coordination including administration of the program is the WASAC. WASAC is well equipped with professionals who are conversant with the Banks safeguard requirements and have over the years received training on environmental and social risk management. WASAC will assign Social Safeguards and Environmental Safeguards officers who will be responsible for supervising the implementation of safeguards instruments and ensure that the subproject activities comply with the ESMF. An additional social safeguard specialist is proposed to enhance the capacity of the PIU to ensure effective implementation.

6.2. Training and capacity building requirements

The effectiveness of environmental and social management plans in the implementation of subproject activities requires training of program key actors on identification, validation, monitoring and implementation of identified mitigation measures. The training activities should target WASAC Staff working on the program, staff of construction companies, operating agents, local authority in project areas. The project level Grievance redress mechanism, resettlement committees shall also be included. The training topics will be centered around: (i) environmental and social issues of Sanitation and Water projects and environmental assessment procedures, (ii) hygiene and safety, requirements of national legislation, AfDB Integrated Safeguards System requirements, environmental monitoring of construction sites. The objective of the training is to enhance their competence in environmental assessment, environmental control of work and environmental monitoring so they can play their roles more effectively in the implementation of subprojects.

6.3. ESMF Implementation Budget

The estimated total cost for ESMF implementation cannot be estimated because of variation from project to project. The table below however, highlights the key indicative aspects that would require a cost budget.

Table 6: Indicative ESMF Budget for the ESMF implementation

	Indicative Budgetary Item	No	Unit cost (USD\$)	Total cost (USD\$)
1.	Stakeholders trainings/ consultation forums	5	3,000	15,000
2	Preparation and implementation of specific instruments (ESMPs and RAPs)	8*2	10,000	160,000
3	Monitoring and evaluation of ESMP implementation	FF	40,000	40,000
4	Compensations for PAPs	FF	400,000	400,000
5	Implementation of grievance redress mechanism	Sum	sum	30,000
6	Training and capacity building	Sum	sum	50,000
	Total			695,000

7. PUBLIC CONSULTATION AND DISCLOSURE

7.1. ESMF Disclosure

The AfDB disclosure policies require that the ESMF is disclosed as well as ESIA/ESMP/ARAPs reports for subprojects are made available to project affected groups, local NGOs, and the public at large prior to commencement of subproject works. Public disclosure of ESMP/ARAP reports is also a requirement of the Rwanda's environmental procedures.

WASAC in collaboration with RDB will make available copies of the ESMF/ESIAs on the respective websites and offices of the ministries. Public notice in the media should be used to serve as information source to the public. However, the ESIA/ESMP will have to be advertised in the local newspaper, website of RDB and WASAC.

7.2. Public Consultation

7.2.1. Overview

Public consultation and stakeholder engagement is the basis for building strong, constructive, and responsive relationships that are essential for the successful management of a project's environmental and social impacts. Stakeholder engagement is an on-going process that involves the following elements; stakeholder analysis and planning, disclosure and dissemination of information, consultation and participation, grievance mechanism and on-going reporting to affected communities.

7.2.2. Purpose

- To prepare communities on potential emergency scenarios that could be caused by the project and can affect the community.
- To build a trusting relationship with the affected communities and other interested stakeholders based on a transparent and timely supply of information and open dialogue.
- To ensure effective engagement with local communities and other key stakeholders throughout all phases of the project.
- To actively build and maintain productive working relationships, based on principles of transparency, accountability, accuracy, trust, respect and mutual interests with affected communities and other stakeholders.

7.3. Public consultations and participation

Public participation and community consultation has been taken up as an integral part of social and environmental assessment process of the project. Consultation was used as a tool to inform project affected people, beneficiaries and stakeholders about the proposed activities both before and after the development decisions are made. It assisted in identification of impacts associated with the subprojects as well as the needs of the population likely to be impacted. This participatory process helped in reducing the public resistance to the project. Initial Public participation and consultation has been carried out with key institutions involved in the program design. Further consultation are planned

during the development of the site specific ESMPs for the subprojects. The objectives of those consultations is to minimize probable adverse impacts of the project on affected communities and to achieve speedy implementation of the project through raising awareness among the community on the benefits of the project.

7.4. Stakeholders

Discussions with decision making bodies, key stakeholders, sector institutions and technical experts were made from the very concept stage and will continue throughout the Program development cycles to completion. Key stakeholders and authorities with whom consultations were made at the project study areas were:

At national level:

- Ministry of Environment(MoE);
- Ministry of Land and Forestry(MINILAF)
- Rwanda Water and Sanitation Corporation Limited(WASAC Ltd)
- Rwanda Environment Management Authority (REMA)
- Rwanda Development Board (RDB).
- Rwanda Water and Forestry Authority(RWAF)
- Rwanda Land Use and Management Authority

At local level:

- Districts officials
- Potential Project Affected People (PAPs).

List of consulted people and those to be consulted during ESMPs preparation are attached in Annex 7.

7.5. Public participation – methods and process

During the Public consultation, the study team applied different participatory methods, namely; interviews, one-to-one discussions, focused group discussions (FGD) and official meetings with stakeholders. Stakeholders consulted were informed on the proposed project and by using the key guiding questionnaires, the study was able to guide discussions and obtain relevant information on the likely impacts of the project activities.

8. CONCLUSION AND RECOMMENDATIONS

The Government of Rwanda (GoR) has prepared this ESMF to guide the implementation of the Additional Financing to the Rwanda Sustainable Water Supply and Sanitation Program to ensure the Program's effective implementation and full compliance with Rwandan and AfDB's environmental and social safeguards Requirements.

The policy, legal and institutional frameworks for the implementation of the ESMF has been scoped and all the applicable environmental and social standards have also been identified. Public consultation and participation process were also organized with major government implementing agencies with provision for site specific consultations with affected communities during preparation of the ESMPs. This report provides potential environmental and social impacts associated with the subproject activities as well as guidelines for their mitigation. It also provides the program's environmental and social management process right from the identification stage through to completion. The ESMF also includes requirement for capacity building to the existing safeguard team of the SPIU through the appointment of one social safeguards specialist to ensure effective implementation and monitoring during subproject implementation.

Identified anticipated environmental and social impacts include air pollution, water pollution, noise pollution, soil erosion and landslides, loss of land and assets on that land, loss of livelihoods, public safety, impacts on physical cultural resources and natural habitats. Given the nature and locations of the subproject component activities, the potential project impacts associated with the program are of a site specific nature and extent that can be controlled through proposed mitigation measures proposed in the ESMF and the ones to be developed within the site specific ESMPs and ARAPs.

To comply with both AfDB and national requirements, in addition to the provision of this ESMF it is recommended to:

- (i) to prepare and implement ESMPs for the identified subprojects;
- (ii) to prepare and implement Abbreviated Resettlement Action Plan for each subprojects where required to avoid, minimize and/or compensate for residual impacts.

REFERENCES

1. AFDB, Integrated Safeguards System , 2013
2. East African Community, 2004. East African protocol on environment and natural resources management.
3. EDPRS II 2013-2018, Economic Development and Poverty Reduction Strategy.
4. ESIA Guidelines, REMA 2007
5. Government of Rwanda, 2008. Ministerial order No. 003/2008. Relating to the requirements and procedure for Environmental Impact Assessment, 2008.
6. Government of Rwanda, 2008. Ministerial order No. 004/2008. Establishing the list of works, activities and projects that have to undertake Environmental Impact Assessment, 2008.
7. Government of Rwanda, 2008. Ministerial order No. 007/2008. Establishing the list of Animal and plant species, 2008.
8. Government of Rwanda, 2004. National Land policy.
9. Government of Rwanda, 2008. Organic law 04/2005 of 08/04/2005. Organic law determining the modalities of protection, conservation and promotion of the environment in Rwanda.
10. Government of Rwanda, 2005. Organic law N° 08/2005 of 14/07/2005. Determining the use and management of Land in Rwanda.
11. MINITERE (2003), the Rwandan Environmental Policy.
12. WASAC, master plan of hydraulic and sanitation, detailed studies for drinking water and elaborations of tender of Nyanza, Ruhango and Muhanga districts, in the southern province, 2013;
13. WASAC, Environmental and Social Impact Assessment (ESIA) report towards water supply project in Ngororero District, horizon 2040
14. Technical and economic feasibility study for drinking water supply project of 7 towns in Rwanda, Muhanga Town, 2012
15. Technical and economic feasibility study for drinking water supply project of 7 towns in Rwanda, Karongi Town, 2012;
16. WASAC, pre-feasibility study for five (5) selected sites for large scale water supply projects in Eastern Province pre-feasibility study for five (5) selected sites for large scale water supply projects in Eastern Province, 2014;
17. WASAC, Feasibility study for water supply project in Iwara Region, Virunga national park belt,

ANNEXES

Annex 1:SCREENING CHECKLIST

1. Subproject information

Subproject name [type here]
 Location [type here]
 Estimated cost (USD) [type here]

TYPE OF PROJECT OR ACTIVITY

2. Sub Project activities

- ☐ Construction of WTP
- ☐ Construction water Intake
- ☐ Construction of Water Reservoir
- ☐ Construction Water Pumps
- ☐ Construction Water pipeline

Please give more details: [type here]

For all projects, an Environmental and Social Management Plan (ESMP) will be required. In addition, the following studies may be required:		
Will this project affect vulnerable and marginalized groups? If yes, a Vulnerable and Marginalized Groups' Plan will be required	<input type="checkbox"/>	<input type="checkbox"/>
Will the project require land for its development, and therefore displace individuals, families or businesses from land that is currently occupied, or restrict people's access to crops, pasture, fisheries or forests, even, whether on a permanent or temporary basis. If yes, a Resettlement Action Plan will be required	<input type="checkbox"/>	<input type="checkbox"/>
Will the investment project involve the construction of small mini hybrids?	<input type="checkbox"/>	<input type="checkbox"/>
Will the Project:	Yes	No
Adversely affect natural habitats nearby, including forests, rivers or wetlands?	<input type="checkbox"/>	<input type="checkbox"/>
Require large volumes of construction materials (e.g. gravel, stone, water, timber, firewood)?	<input type="checkbox"/>	<input type="checkbox"/>
Use water during or after construction, which will reduce the local availability of groundwater and surface water?	<input type="checkbox"/>	<input type="checkbox"/>
Affect the quantity or quality of surface waters (e.g. rivers, streams, wetlands), or groundwater (e.g. wells, reservoirs)?	<input type="checkbox"/>	<input type="checkbox"/>
Be located within or nearby environmentally sensitive areas (e.g. intact natural forests, mangroves, wetlands) or threatened species?	<input type="checkbox"/>	<input type="checkbox"/>
Lead to soil degradation, soil erosion in the area?	<input type="checkbox"/>	<input type="checkbox"/>
Create waste that could adversely affect local soils, vegetation, rivers and streams or groundwater	<input type="checkbox"/>	<input type="checkbox"/>
Create pools of water that provide breeding grounds for disease vectors (for example malaria or bilharzia)?	<input type="checkbox"/>	<input type="checkbox"/>
Involve significant excavations, demolition, and movement of earth, flooding, or other environmental changes?	<input type="checkbox"/>	<input type="checkbox"/>
Affect historically-important or culturally-important site nearby?	<input type="checkbox"/>	<input type="checkbox"/>
Require land for its development, and therefore displace individuals, families or businesses from land that is currently occupied, or restrict people's access to crops, pasture, fisheries, forests or cultural resources, whether on a permanent or temporary basis?	<input type="checkbox"/>	<input type="checkbox"/>
Result in human health or safety risks during construction or later?	<input type="checkbox"/>	<input type="checkbox"/>
Involve inward migration of people from outside the area for employment or other purposes?	<input type="checkbox"/>	<input type="checkbox"/>
Will the Project:	Yes	No
Result in conflict or disputes among communities?	<input type="checkbox"/>	<input type="checkbox"/>
Affect indigenous people, or be located in an area occupied by indigenous people?	<input type="checkbox"/>	<input type="checkbox"/>
Be located in or near an area where there is an important historical, archaeological or cultural heritage site?	<input type="checkbox"/>	<input type="checkbox"/>
Result in a significant change/loss in livelihood of individuals?	<input type="checkbox"/>	<input type="checkbox"/>
Adversely affect the livelihoods and /or the rights of women?	<input type="checkbox"/>	<input type="checkbox"/>
If you have answered Yes to any of the above, please describe the measures that the project will take to avoid or mitigate		

environmental and social impacts
[type here]
What measures will the project take to ensure that it is technically and financially sustainable?
[type here]

If the answer to any of questions “Yes”, please use the indicated Annexes or sections(s) of the ESMF for guidance on how to avoid or minimize typical impacts and risks.

When considering the location of an investment, rate the sensitivity of the proposed site in the following table 10 according to the given criteria. Higher ratings do not necessarily mean that a site is unsuitable. They do indicate a real risk of causing undesirable adverse environmental and social effects, and that more substantial environmental and/or social planning may be required to adequately avoid, mitigate or manage potential effects.

CONCLUSION

Which course of action do you recommend?

☐ **ESMP** ☐ **ARAP is the reference document with reference to resettlement issues**

☐ **OTHER ENVIRONMENTAL/SOCIAL PLANS**

☐ There are no environmental or social risks

[Type here]

If an ARAP is required, will the project Displace or restrict access for less than 200 individuals, or if over 200, are losses for all individuals less than 10% of their assets?

If Yes, Prepare an abbreviated RAP ☐

If No, Prepare a full RAP ☐

Full details of resettlement requirements are provided in the accompanying Resettlement Policy Framework.

Completed by: [type here]

Name: [type here]

Position: [type here]

Date: [type here]

Completion of this screening form will facilitate the identification of potential environmental and social impacts, determination of their significance, assignment of the appropriate environmental category, proposal of appropriate environmental mitigation measures, or recommend the execution of an ESIA/ESMP, if necessary. Development of project reports will follow a systematic process as follows;

- Review of TORs with the implementing partners for adequacy
- Familiarization with project design
- Familiarization with projects area of influence
- Identification of the relevant statutes and AfDB Operational Safeguards
- Determination/ Identification of all stakeholders to subprojects
- On-the-ground investigations of the bio-physical baseline
- Consultations with stakeholders
- Impact prediction and interpretation
- Identification of mitigation measures
- Development of environmental management plans with complete with budget and identification of responsibilities
- Finalization of project report

- **Statutory content of Project Reports:**

The first step of the ESIA/ESMP process is for a developer to submit an application for ESIA/ESMP of a proposed project to RDB in the form of a Project Brief. RDB registers the Project Brief as the developer's formal application for an ESIA/ESMP. The purpose of a Project Brief is to provide sufficient information on the project for the screening process. According to the flow chart provided in the ESIA/ESMPs General Guidelines, the screening process shall take 10 working days, starting from the ESIA/ESMPs application. Once a project report is submitted to RDB, a decision is made by RDB and in the event that RDB, based on the project report submitted makes a decision that an ESIA report must be prepared, the WASAC is required to identify independent registered expert(s) to prepare the ESIA/ESMP report.

Project briefs are normally prepared as a means of informing RDB of the proposed development. RDB advises on the need or otherwise for an ESIA/ESMP. The ESIA regulations allow for approval of proposed subprojects at the Project Report Stage and have been effectively used by RDB to grant Environmental Licenses to small projects without requiring a full ESIA.

Project investment is approved. Where RDB and lead agencies ascertain that a project report has disclosed adequate mitigation for identified impacts, the project is approved by RDB upon which, conditions attached to grant of an Environmental License are issued. Once these are fulfilled, an Environmental License is also issued subject to conditions which will be specific to the sub project in question. Among these is the requirement that the scheme design should not be altered without approval by RDB. As well, an audit report is required of each project after the first year of completion.

RDB may not approve the project if the any subproject activities Report discloses potential for major irreversible adverse impacts.

Table 7: Possible Outcomes of RDB Review of Project Reports

Outcome	Recommendation	Important precautions
Project found to have no significant Social and Environmental Impacts or Project report discloses sufficient mitigation measures	An Environmental License will be issued by RDB	Project report must disclose adequate mitigation measures and show proof of comprehensive consultations within the area of influence.
Significant adverse social and environmental impacts found or Project Report fails to disclose adequate mitigation measures.	A full cycle ESIA will be required by RDB	As above
A proponent is dissatisfied with the outcome of the RDB review.	An Appeal is provided for	

In the event that a Project cannot be approved by RDB on the basis of a Project Report, the proponent will be advised to undertake full cycle ESIA leading to development of a fully-fledged Environmental and Social Impact Assessment Study Report.

• **Scoping and Scoping Process**

The formulation of the Terms of Reference is a required step of the ESIA process as mentioned in the Ministerial Order No. 003/2008. According to the General Guidelines, scoping is the first step of the environmental impact study phase and requires the input of relevant Lead Agencies, stakeholders and the developer to determine what should be included in the study and the alternatives to be considered. An important step of the scoping procedure involves the formulation of the Terms of Reference (ToR).

Any relevant comments raised by the public after review of Project Briefs of IL-3 and IL-2 projects will also be incorporated in the ToR. The Ministerial Order No. 003/2008 implies that RDB shall submit the ToR to the developer, but that the developer may also prepare the ToR provided they are approved by the authority before conducting the study. At the end of the scoping exercise, the scoping report produced is submitted to RDB for review. When ToR have been approved by RDB, they are sent to the developer as authorization to commence the environment impact assessment study. The Ministerial Order 03/2008 specifies that within 30 calendar days after the starting document has been received and after its analysis (screening phase), the RDB shall submit the Terms of Reference to the project developer for the environmental impact study.

• **Assessment and reporting**

The Ministerial order 03/2008 specifies that the proponent shall select the experts for conducting the ESIA study from a list of experts that is published by the Ministry in charge of the environment. RDB ensures that the experts chosen by the developer to undertake the study have appropriate specializations for doing so. The General ESIA Guidelines specify the environmental assessment process leading to the ESIA report.

During the investigation phase of the ESIA process, the initial state of the environment is firstly analyzed, using scientific data, photographs of the area, or any other geophysical recordings. Furthermore, potential socio-environmental impacts are identified and analyzed. This includes environmental, social and economic impacts. Also, mitigation measures are identified, viable alternatives are considered and a schedule and details for a monitoring system is developed.

Thereafter, ESIA experts produce an Environmental Impact Report which includes an Environmental Management Plan (EMP) and submits it to the developer. The developer reviews the report and can, if found to be necessary, attach a supplementary addendum with additional information to the report. Thereafter, the developer submits the report to the RDB.

- **Review process**

The Organic Law (2005) determines that the RDB or any other person given a written authorization by the Authority shall examine and approve the ESIA. According to the Ministerial Order 003/2008 the RDB shall analyze the ESIA report to verify its conformity to the Terms of Reference. The RDB will also check the document for completeness before passing them on to lead agencies and stakeholders for review. Copies are forwarded to relevant lead agencies, local governments and general public for them to provide comments that would be useful for making a final decision about approval of the proposed project.

Within RDB, ESIA documents are reviewed by two committees, namely; a Technical Committee and an Executive Committee. ESIA documents submitted to RDB are first reviewed by a Technical Committee. The ESIA documents are then also reviewed by the Executive Committee, which makes the final decision on acceptability of a proposed project. The review by Executive Committee shall emphasize implications of identified impacts, their mitigation measures and input from public hearings. According to the Ministerial order 03/2008, Article 8, the RDB shall accept the ESIA report or request for additional information from the developer within 20 working days. These timeline of 20 days may be extended by RDB. If a public hearing is held an additional 30 days can be required from the date of the public hearing notification.

- **Decision-making**

When the review of ESIA documents is completed, the Executive Committee shall decide to either approve the project with or without conditions, or reject it. The public hearing report and environmental impact report are used for taking this decision, which is expressed in a Record of Decision document. If the project is approved through a Record of Decision, two permitting documents are issued: an Implementation and Operations Order (IOO) and an ESIA Certificate of Authorization.

- **Monitoring, Compliance and Enforcement**

According to Rwanda's General Guidelines, monitoring should be done during both construction and operation phase of the project.

- **Public participation requirements for ESIA process stages**

The Organic Law requires that the public must be informed and consulted on a proposed development. Also, Article 9 of Ministerial Order No. 003/2008 states that stakeholders must be given the opportunity to comment on the environmental impact report and express their views concerning the impact of the proposed project. According to the General ESIA Guidelines, there are three major stages at which public involvement occurs in the ESIA process: (1) before commencing an ESIA study, (2) as part of a public consultation phase that occurs during the study, and (3) after completion of the ESIA report.

1. After receiving a Project Brief, RDB determines in collaboration with a lead agency whether a public hearing is necessary.
2. During the ESIA study the public is further consulted by ESIA experts. This is particularly done during the scoping process and any other crucial stages considered necessary by the Authority.

3. After the ESIA report has been submitted, it is published by RDB and copies are made for relevant stakeholders. As part of the review process of the ESIA report, a public hearing and post-public hearing consultations can be held, if deemed necessary by RDB.

The General Guidelines recognize several ways for public participation. They mention that it depends on circumstances of each ESIA which of the following methods are considered appropriate:

- Public review of Environmental Impact Report,
- Informal group meetings with local community groups and leaders,
- Workshops,
- Public displays or bulletin boards posted in communities,
- Public notification and calls for written comments on proposed project/activities,
- Participation in scoping processes,
- Survey of a groups or individuals who are representative of the various interests being affected by a proposal,
- Consultation with focus groups to identify issues specific to certain stakeholders,
- Comment and review of the ESIA,
- Distribution of relevant documents to the interested members of the public.

Under the provisions of the Ministerial Order, RDB generally is responsible for managing the public hearing process and providing publicity for the hearing. Where a lead agency is the developer, the RDB will organize the public hearings. For private projects, they are organized by the private developers. During a public hearing, the developer will be given time to deliver a presentation to stakeholders, describing the project, perceived impacts and proposed mitigation measures.

For completeness, the developer may also discuss findings of the impact assessment study. If a public hearing is held during scoping, the developer should be available to describe the project, potential impacts and proposed mitigation measures to stakeholders. Developers may adopt their legal counsels or ESIA experts as either principal or secondary speakers during presentation at public hearings. On completion of this process, RDB compiles a public hearing report. More detailed guidelines for public hearings are provided in Chapter 6 of the General guidelines.

- **Access to information**

The ESIA report is made available to the public and also the Policy Brief in case the RDB decides that a public hearing shall be held at that stage already. Both the Ministerial Order and the General Guidelines specify requirements for public notice, and the requirements for publicizing project proposals are similar, but not in precise agreement. The Ministerial Order, which was issued later, requires publishing the project proponent's name and address as well as the project details using at least one of the following means to provide notice of the day, time and venue for the public hearing:

- Publishing a notice twice in any local newspapers;
- Running four (4) radio announcements;
- Putting up posters at the site of the proposed development.

- **Public comments in decision-making**

The comments of the public are considered in different stages of the ESIA process. The ESIA Guidelines determine how RDB shall react to public comments on the ESIA report during the review process. They stipulate that once RDB is satisfied with particular concerns of the public, it shall require the developer to carry out a more in-depth study of specific aspects of contention in order to take into account all the necessary measures to address the issues raised by the public. They also specifically mention that where a lead agency or government ministry/department is the developer, the same process and requirements have to be held.

RDB will provide terms of reference for subprojects environmental and social Impacts assessments. Furthermore, the ESIA General Guidelines promulgate that RDB shall consider public views when deciding whether or not to approve a proposed project.

- **Overall Project Compliance and Reporting**

The ESMF will be utilized by WASAC. Table 8 provides a summary of the stages and institutional responsibilities for the screening, preparation, assessment, approval and implementation of the Program activities.

Table 8: Screening Responsibilities.

No.	Stage	Institutional responsibility	Implementation responsibility
1.	Screening of Environmental and Social Infrastructure Project to assist in project formulation using checklist	WASAC ,	Environmental Officer (EO) /Safeguard specialists in WASAC
2.	Determination of appropriate environmental assessment level/ category	RDB	-
3.	Implementation of environmental assessment If ESIA is necessary	WASAC to hire ESIA consultants	Environmental Officer (EO) /Safeguard specialists in WASAC
3.1	Preparation of Terms of Reference	RDB and WASAC	RDB and WASAC Environmental Officer
3.2	Validation of ESIA/ESMP TOR	RDB / AFDB	RDB and WASAC Environmental Officer
3.3	Selection of Consultant	WASAC	Environmental Officer (EO) /Safeguard specialists in WASAC
3.4	Realization of the ESIA, Public Consultation Integration of environmental and social management plan issues in the tendering and project implementation	WASAC 's ESIA consultants	WASAC 's ESIA consultants
4.	Review and Approval	RDB / AFDB	
4.1	ESIA Approval (Category A, high-risk B)	RDB / AFDB	
4.2	Simple ESIA/ESMP Approval (Category B and C)	RDB /AFDB	
5.	Public Consultation and disclosure	WASAC 's ESIA consultants	WASAC 's ESIA consultants
6.	Surveillance and monitoring	WASAC 's ESIA consultants /REMA/AFDB	Environmental Officer (EO) /Safeguard specialists in WASAC
7.	Development of monitoring indicators	WASAC 's ESIA consultants	Environmental Officer (EO) /Safeguard specialists in WASAC

Annex 2: Content of an Abbreviated Resettlement Plan

An abbreviated plan covers the following minimum elements:

- (a) A census survey of displaced persons and valuation of assets;
- (b) Description of compensation and other resettlement assistance to be provided;
- (c) Consultations with displaced people about acceptable alternatives;
- (d) institutional responsibility for implementation and procedures for grievance redress;
- (e) Arrangements for monitoring and implementation; and

Annex 3: Resettlement screening form

Sub-project name	(e.g. District, Sector, Cell etc.)
Subproject Location include map/sketch	(e.g. new construction, rehabilitation, periodic maintenance)
Type of activity	
Estimated Cost (Rwandan Francs)	
Proposed date of Commencement of Work	
Technical Drawing/ Specifications Renewed (circle answer)	Yes No

This report is to be kept short and concise.

Annex 4: General environmental management conditions for construction contracts

1. General

In addition to these general conditions, the Contractor shall comply with any specific Environmental and Social Management Plan (ESMP) or Environmental and Social Management Plan (ESMP) for the works he is responsible for. The Contractor shall inform himself about such an EMP, and prepare his work strategy and plan to fully take into account relevant provisions of that EMP. If the Contractor fails to implement the approved ESMP after written instruction by the Supervising Engineer (SE) to fulfill his obligation within the requested time, the Owner reserves the right to arrange through the SE for execution of the missing action by a third party on account of the Contractor.

Notwithstanding the Contractor's obligation under the above clause, the Contractor shall implement all measures necessary to avoid undesirable adverse environmental and social impacts wherever possible, restore work sites to acceptable standards, and abide by any environmental performance requirements specified in an ESMP. Key areas to consider include:

- **Worksite/Campsite Waste Management**

- All vessels (drums, containers, bags, etc.) containing oil/fuel/construction materials and other hazardous chemicals shall be banded in order to contain spillage. All waste containers, litter and any other waste generated during the construction shall be collected and disposed of at designated disposal sites in line with applicable government waste management regulations.
- All drainage and effluent from storage areas, workshops and camp sites shall be captured and treated before being discharged into the drainage system in line with applicable government water pollution control regulations.
- Used oil from maintenance shall be collected and disposed of appropriately at designated sites or be re-used or sold for re-use locally.
- Entry of runoff to the site shall be restricted by constructing diversion channels or holding structures such as banks, drains, dams, etc. to reduce the potential of soil erosion and water pollution.
- Construction waste shall not be left in stockpiles along the road, but removed and reused or disposed of on a daily basis;
- If disposal sites for clean spoil are necessary, they shall be located in areas, approved

by the SE, of low land use value and where they will not result in material being easily washed into drainage channels. Whenever possible, spoil materials should be placed in low-lying areas and should be compacted and planted with species indigenous to the locality.

✓ **Material Excavation and Deposit**

The Contractor shall obtain appropriate licenses/permits from relevant authorities to operate quarries or borrow areas.

- The location of quarries and borrow areas shall be subject to approval by relevant local and national authorities, including traditional authorities if the land on which the quarry or borrow areas fall in traditional land.

✓ **New extraction sites:**

- Shall not be located in the vicinity of settlement areas, cultural sites, wetlands or any other valued ecosystem component, or on high or steep ground or in areas of high scenic value, and shall not be located less than 1km from such areas.
- Shall not be located adjacent to stream channels wherever possible to avoid siltation of river channels. Where they are located near water sources, borrow pits and perimeter drains shall surround quarry sites.
- Shall not be located in archaeological areas. Excavations in the vicinity of such areas shall proceed with great care and shall be done in the presence of government authorities having a mandate for their protection.
- Shall not be located in forest reserves. However, where there are no other alternatives, permission shall be obtained from the appropriate authorities and an environmental impact study shall be conducted.
- Shall be easily rehabilitated. Areas with minimal vegetation cover such as flat and bare ground, or areas covered with grass only or covered with shrubs less than 1.5m in height, are preferred.
- Shall have clearly demarcated and marked boundaries to minimize vegetation clearing.

• **Site rehabilitation and Soil Erosion Prevention**

- To the extent practicable, the Contractor shall rehabilitate the site progressively so that the rate of rehabilitation is similar to the rate of construction.
- Always remove and retain topsoil for subsequent rehabilitation. Soils shall not be stripped when they are wet as this can lead to soil compaction and loss of structure.
- Topsoil shall not be stored in large heaps. Low mounds of no more than 1 to 2m high are recommended.
- Re-vegetate stockpiles to protect the soil from erosion, discourage weeds and maintain an active population of beneficial soil microbes.
- Locate stockpiles where they will not be disturbed by future construction activities.

- To the extent practicable, reinstate natural drainage patterns where they have been altered or impaired.
- Remove toxic materials and dispose of them in designated sites. Backfill excavated areas with soils or overburden that is free of foreign material that could pollute groundwater and soil.
- Identify potentially toxic overburden and screen with suitable material to prevent mobilization of toxins.
- Ensure reshaped land is formed so as to be inherently stable, adequately drained and suitable for the desired long-term land use, and allow natural regeneration of vegetation.
- Minimize the long-term visual impact by creating landforms that are compatible with the adjacent landscape.
- Minimize erosion by wind and water both during and after the process of reinstatement.
- Compacted surfaces shall be deep ripped to relieve compaction unless subsurface conditions dictate otherwise;
- Revegetate with plant species that will control erosion, provide vegetative diversity and, through succession, contribute to a resilient ecosystem. The choice of plant species for rehabilitation shall be done in consultation with local research institutions, forest department and the local people.

- **Traffic Management**

- Location of access roads/detours shall be done in consultation with the local community especially in important or sensitive environments. Access roads shall not traverse wetland areas.
- Upon the completion of civil works, all access roads shall be ripped and rehabilitated.
- Access roads shall be sprinkled with water at least five times a day in settled areas, and three times in unsettled areas, to suppress dust emissions.

- **Disposal of Unusable Elements**

- Unusable materials and construction elements such as electro-mechanical equipment, pipes, accessories and demolished structures will be disposed of in a manner approved by the SE. The Contractor has to agree with the SE which elements are to be surrendered to the Client's premises, which will be recycled or reused, and which will be disposed of at approved landfill sites.
- As far as possible, abandoned pipelines shall remain in place. Where for any reason no alternative alignment for the new pipeline is possible, the old pipes shall be safely removed and stored at a safe place to be agreed upon with the SE and the local authorities concerned.

- AC-pipes as well as broken parts thereof have to be treated as hazardous material and disposed of as specified above.
- Unsuitable and demolished elements shall be dismantled to a size fitting on ordinary trucks for transport.

- **Health and Safety**

- In advance of the construction work, the Contractor shall mount an awareness and hygiene campaign. Workers and local residents shall be sensitized on health risks particularly of AIDS.
- Adequate road signs to warn pedestrians and motorists of construction activities, diversions, etc. shall be provided at appropriate points.
- Construction vehicles shall not exceed maximum speed limit of 40km per hour.

- **Contractor's Health, Safety and Environment Management Plan (HSE-MP)**

- Within 6 weeks of signing the Contract, the Contractor shall prepare an EHS-MP to ensure the adequate management of the health, safety, environmental and social aspects of the works, including implementation of the requirements of these general conditions and any specific requirements of an ESMP for the works. The Contractor's EHS-MP will serve two main purposes:
 - For the Contractor, for internal purposes, to ensure that all measures are in place for adequate HSE management, and as an operational manual for his staff.
 - For the Client, supported where necessary by a SE, to ensure that the Contractor is fully prepared for the adequate management of the HSE aspects of the project, and as a basis for monitoring of the Contractor's HSE performance.

The Contractor's EHS-MP shall provide at least:

- a description of procedures and methods for complying with these general environmental management conditions, and any specific conditions specified in an ESMP;
- a description of specific mitigation measures that will be implemented in order to minimize adverse impacts;
- a description of all planned monitoring activities (e.g. sediment discharges from borrow areas) and the reporting thereof; and
- the internal organizational, management and reporting mechanisms put in place for such.

The Contractor's EHS-MP will be reviewed and approved by the Client before start of the works. This review should demonstrate if the Contractor's EHS-MP covers all of the identified impacts, and has defined appropriate measures to counteract any potential impacts.

- **HSE Reporting**

The Contractor shall prepare bi-weekly progress reports to the SE on compliance with these general conditions, the project EMP if any, and his own EHS-MP. An example format for a Contractor HSE report is given below. It is expected that the Contractor's reports will include information on:

- HSE management actions/measures taken, including approvals sought from local or national authorities;
- Problems encountered in relation to HSE aspects (incidents, including delays, cost consequences, etc. as a result thereof);
- Lack of compliance with contract requirements on the part of the Contractor;
- Changes of assumptions, conditions, measures, designs and actual works in relation to HSE aspects; and
- Observations, concerns raised and/or decisions taken with regard to HSE management during site meetings.
- It is advisable that reporting of significant HSE incidents be done "as soon as practicable". Such incident reporting shall therefore be done individually. Also, it is advisable that the Contractor keeps his own records on health, safety and welfare of persons, and damage to property. It is advisable to include such records, as well as copies of incident reports, as appendixes to the bi-weekly reports. Example formats for an incident notification and detailed report are given below. Details of HSE performance will be reported to the Client through the SE's reports to the Client.

- **Training of Contractor's Personnel**

The Contractor shall provide sufficient training to his own personnel to ensure that they are all aware of the relevant aspects of these general conditions, any project EMP, and his own EHS-MP, and are able to fulfill their expected roles and functions. Specific training should be provided to those employees that have particular responsibilities associated with the implementation of the EHS-MP. General topics should be:

- HSE in general (working procedures);
- emergency procedures; and
- social and cultural aspects (awareness raising on social issues).

- **Cost of Compliance**

It is expected that compliance with these conditions is already part of standard good workmanship and state of art as generally required under this Contract. The item "Compliance with Environmental Management Conditions" in the Bill of Quantities covers these costs. No other payments will be made to the Contractor for compliance with any request to avoid and/or mitigate an avoidable HSE impact.

Annex 5: Key information to be included in the subproject brief

Key information that should appear in the project brief to be submitted to RDB for terms of reference include:

- a) Name, title and address of the developer
- b) Name, purpose, objectives and nature of project including attributes such as project size, design, planned activities, what are the likely sources of funds (whether conformed or not), the type of funding (whether local or foreign, grants or credit), and the local contribution (including the beneficiary communities especially if a local road);
- c) The type/ category of infrastructure to be constructed
- d) The activities the infrastructure will serve – whether international, national, regional or local (within district); and of what economic or social importance;
- e) A description of the spatial dimensions including length or surface and location
- f) Where the materials for construction will be sourced from- e.g. excavation of materials (soil/ earth, rock, tones, sand,..) from within what distance;
- g) Names and addresses of owners of land or property thereof where the infrastructure will be located (and for road, where it will pass) and/ or where construction materials will be extracted. Present a summary description of the soil types and rock structure and grading in terms of suitability for construction (indicate whether this is based on laboratory analysis or expert opinion);
- h) Numbers and if possible, Names and exact addresses of all parties who are likely to be affected by the project and the scale of effect. Provide information about land tenure/ownership of the area affected (including those with and without title deeds) and whether public, institutional or individual private ownership;
- i) Description of the biophysical characteristics (including all species of flora, fauna) and legal status of the areas where the proposed infrastructure will be located. Indicate where there are physical or natural barriers like escarpments, Rocky Mountains, rivers, natural forests, permanent swamps. A map (may be a sketch not to exact scale) of where the proposed infrastructure will be located and shade the areas likely to be affected;
- j) Description of the social, cultural and economic activities of the areas where the proposed infrastructure will be constructed or will pass if it is a road (including cultural sites, social investments like schools, human settlements, burial sites/ memorial grounds,..) economic activities like markets, commercial centres, industries or large scale commercial farms and/ or forest plantations; and other surface and aerial infrastructures like airfields, electricity and telecommunication lines, water supply and/ or sewage pipes;
- k) Projections of use (traffic volume) and estimated lifetime when the road will be decommissioned or require re-construction;

- l) Describe possible alternative sites/ routes considered for the same project and the comparative scores in terms of economic and financial viability, technical feasibility, social acceptability and/ ecological/ environmental sustainability;
- m) Overview of the governance arrangements including local administrative structures, policies strategies and plans of Government regarding land and natural resources management, infrastructure development, urban and rural development, conflict management;
- n) Opinions of local leaders and other opinion leaders if preliminary consultations have been made or better still when and how the District plans to do it;
- o) Full contacts of the person responsible for the project (on behalf of the proponent: This is because ESIA work involves decision making and accountability and there must be some specific and known person (or designate) to be held accountable.

Annex 6: Sample ToRs for ESIA/ESMP study for subprojects

1. Background Information:

Describe the pertinent background issues. This should include a brief description of the major components of the proposed project, a statement of the need for the project, the objectives it is intended to meet, the implementing agency, a brief history of the project (including alternatives considered), its status and timetable, and a list any associated projects. If there are other projects in progress or planned within the region that may compete for the same resources, they should also be identified here.

2. Objectives: Summarize the general scope of the environmental assessment and discuss its timing in relation to the project preparation, design, and execution processes.

3. Study Area: Specify the boundaries of the study area for the assessment (e.g., water catchment area and land use), as well as any adjacent or remote areas that should be considered with respect to specific impacts (temporary infrastructure). The project could have different study areas corresponding to the level of impact.

4. Scope of Work: Define the tasks. In some cases, the tasks to be carried out by a consultant will be known with sufficient certainty to be specified completely in the terms of reference. In other cases, specialized field studies or modeling activities will need to be performed to assess impacts. In that case, the consultant will define particular tasks in more detail after some period of assessment and will submit the detailed scope of work to the District for approval at a later date. Task 4 in the Scope of Work (below) is an example of the latter.

Task 1: Describe the Proposed Project: Provide a brief description of the relevant parts of the project using maps of appropriate scale where necessary and include the following information:

- Project justification;
- Location; General layout, size, and capacity;
- Pre-construction activities;
- Construction activities;
- Schedule of activities;
- Staffing and support;
- Facilities and services;
- Operation and maintenance activities;
- Required offsite investments;
- Life span.

[Note: specify any other type of information relevant to the description of the project category.]

Task 2: Describe the Environment

Assemble, evaluate, and present baseline data on the relevant environmental characteristics

of the study area. Include information on any changes anticipated before the project commences. Modify the list below to show critical project information (e.g., information relevant to the project category and other project-specific information). Avoid compiling irrelevant data. Present environmental characteristics of the study area on a map to facilitate the understanding.

[a] Physical environment: geology; topography; soils; climate and meteorology; ambient air quality; surface and groundwater hydrology; coastal and oceanic parameters; existing sources of air emissions; existing water pollution discharges; and receiving water quality.

[b] Biological environment: flora; fauna; rare or endangered species; ecologically important or sensitive habitats, including parks or reserves, and significant natural sites; species of commercial importance; and species with potential to become nuisances, vectors, or dangerous (of project site and potential area of influence of the project).

[c] Socio-cultural environment: population; land use; planned development activities; community structure; employment; distribution of income, goods and services; recreation; public health; cultural/ historic properties; tribal peoples; and customs, aspirations, and attitudes.

Task 3: Describe and analyse the legislative and regulatory framework and issues

Describe the pertinent regulations and standards at international, national, regional and local levels that govern environmental quality, health and safety, protection of sensitive areas, protection of endangered species, site, and land use control. ToRs should specify those that are known and should require the consultant to investigate for others.

Then review and analyse relevant laws, regulations and guidelines that govern the conduct of the assessment or specify the content of the report, including international treaties, national laws and/ or regulations and/ or guidelines on environmental reviews and impact assessments.

Task 4: Determination of the Potential Impacts of the Proposed Project

Distinguish between positive and negative impacts, direct and indirect impacts, and immediate and long-term impacts. Identify impacts that are unavoidable or irreversible.

Wherever possible, describe impacts quantitatively, in terms of the affected environmental components (e.g., area, number) and environmental costs and benefits. Assign economic values when feasible. Characterise the extent and quality of available data, explaining significant information deficiencies and any uncertainties associated with the predicted impacts. If possible, develop ToRs to conduct research to obtain the missing information. Identify the types of special studies likely to be needed for this project category.

The engineering plans should reflect "best practice" in alignment and construction to ensure that potential negative environmental impacts are minimised (e.g., through measures to prevent soil erosion risk, ensure proper drainage, and provide for waste disposal, landfill material, and used oil.

Task 5: Analyze the Alternatives to the Proposed Project

Describe alternatives that were examined in the course of developing the proposed project and identify other alternatives, which would achieve the same objectives. The concept of alternatives extends to site, design, technology selection, construction techniques and phasing, and operating and maintenance procedures. Compare alternatives in terms of potential environmental impacts; capital and operating costs; suitability under local conditions; and institutional, training, and monitoring requirements. When describing the impacts, indicate which are irreversible or unavoidable and which can be mitigated. Try to quantify the costs and benefits of each alternative, incorporating the estimated costs of any associated mitigating measures. Include the 'no project' alternative to demonstrate environmental conditions without the project.

Task 6: Develop the Management Plan to Mitigate Negative Impacts

The Environmental Management Plan focuses on three generic areas: mitigation measures, institutional strengthening and training, and monitoring. The emphasis on each of these areas depends on the context-specific project needs.

Mitigation of environmental impact: Recommend feasible and cost-effective measures to prevent or reduce significant negative impacts to acceptable levels. Quantify the impacts and estimate the costs of the mitigation measures.

Consider compensation to affected parties for impacts that 'cannot be mitigated'. The plan should include proposed work programs, budget estimates, schedules, staffing and training requirements, and other necessary support services to implement the mitigation measures. Summarize the environmental impacts and mitigation measures using a map at the same scale as that of the road design.

Institutional strengthening and training: Identify institutional needs to implement environmental assessment recommendations. Review the authority and capability of institutions at local, provincial, regional, and national levels and recommend how to strengthen the capacity to implement the environmental management and monitoring plans. The recommendations may cover such diverse topics as new laws and regulations, new agencies or agency functions, inter-sectoral arrangements, management procedures, training, staffing, operation and maintenance training, budgeting, and financial support.

Monitoring: Prepare detailed arrangements to monitor the implementation of mitigation measures and the impacts of the project during construction and operation. Include in the plan an estimate of capital and operating costs and a description of other required inputs (e.g., training and institutional strengthening).

Task 7: Organize and facilitate public consultations, in accordance with the provisions of

the General ESIA guidelines and other attendant legislation.

Task 8: Prepare the ESIA Report: The ESIA report should be concise and limited to significant environmental issues. The main text should focus on findings, conclusions, and recommended actions supported by summaries of the data collected and citations for any references used in interpreting data. Detailed data should be presented in appendices or in a separate volume.

The ESIA report according to the outline below:

- Executive Summary;
- Introduction
- Policy, Legal, and Administrative Framework;
- Description of the Proposed Project; "
- Description of the existing Environment;
- Significant Environmental Impacts and Mitigation Measures;
- Analysis of the Alternatives;
- Emergency Plan;
- Environmental Management Plan (including Monitoring Plan);
- Conclusion and recommendation
- List of References;
- Appendices:
 - Terms of reference;
 - List of the ESIA team;
 - Records of Interagency and Public/ NGO Communications;
 - Data and Unpublished Reference Documents.

8. Consulting Team: Identify the expertise to include on the ESIA team. Environmental assessment requires interdisciplinary analysis. Members of the team could consist of people with the following specializations: rural sociology (in the case of rural roads); human geography; and/or terrestrial ecology (e.g., wildlife, plant, and conservation ecology).

9. Other Information: List data sources, project background reports and studies, relevant publications, and other items to which the consultant's attention should be directed.

Annex 7: List of institutions/people consulted /to be consulted

No	Institution	Contact person	Position	Contact
1	Rwanda Environment Management Authority	Duhuze Remy Norbert	Director of Regulation and pollution Control	0788612725
2	Rwanda Water and Forest Authority	KARURANGA Dismas	In charge of Water Quality	0788779208
3	Rwanda Development Board	Smeon Harerimana	ESIA review specialist	0788353048
4	Ruhango District	Byiringiro Emmanuel	Director of Agriculture and Natural Resources	0782567144
5	Nyagatare District	Murenzi Emmanuel	District Environmental Officer	0783589143
6	WASAC Ltd	Dominique MUREKEZI	Ag. Coordinator, SPIU	dmurekezi@wasac.rw
7	WASAC Ltd	Albert YARAMBA	National WS&S project Manager	ayaramba@wasac.rw
8	WASAC Ltd	Benoit NYIRIGIRA	Water Program Manager, SPIU	bnyirigira@wasac.rw
9	WASAC Ltd	Eric NTAMUKUNZI	Water Engineer, SPIU	entamukunzi@wasac.rw
10	WASAC Ltd			
11	WASAC Ltd	Eric HABUMUREMYI	Water Specialist, SPIU	ehabumuremyi@wasac.rw
12	WASAC Ltd	James HAKIZIMANA	Water Engineer, SPIU	jhakizimana@wasac.rw
13	WASAC Ltd	Eric HABUMUREMYI	Water Specialist, SPIU	ehabumuremyi@wasac.rw
14	WASAC Ltd	James HAKIZIMANA	Water Engineer, SPIU	jhakizimana@wasac.rw
15	WASAC Ltd	Regis NSHIMYUMUREMYI	Water Engineer, SPIU	rnshimyumuremyi@wasac.rw
16	WASAC Ltd	Speciose NYIRABAHIRE	Social safeguards Specialist	snvirabahire@wasac.rw
17	WASAC Ltd	Jean Baptiste DUSHIMIMANA	Procurement Specialist	jbdushimiyimana@wasac.rw
18	WASAC Ltd	Francine Aimée UMUHOZA MBATEYE	Environmentalist& Planning Officer	fumuhoza@wasac.rw

People and Institution to be consulted during ESMPS preparation and Implementation

1	Nyanza District	Water and Sanitation Engineer		
		District environmental Officer		
3	Ruhango District	Water and Sanitation Engineer		
		District environmental Officer		
4	Muhanga District	Water and Sanitation Engineer		
		District environmental Officer		
5	Nyagatare District	Water and Sanitation Engineer		
		District environmental Officer		
6	Karongi District	Water and Sanitation Engineer		
		District environmental Officer		
7	Musanze & Nyabihu & Rubavu District	Water and Sanitation Engineer		

		District environmental Officer		
8	Gatsibo District	Water and Sanitation Engineer		
		District environmental Officer		
9	Ngoma District	Water and Sanitation Engineer		
		District environmental Officer		
10	Ministry of Environment	Water Resources Expert		
11	Rwanda Environmental Management Authority	Regulation and Pollution Control department		
12	Rwanda Water and Forestry Authority	Water and Forestry department		
13	Rwanda Land Use and Management Authority	Land administration and Land use department		
14	Potential projects affected people	Local Communities in Project areas		