

REPUBLIC OF RWANDA



MINISTRY OF ENVIRONMENT



Strategic Programme for Climate Resilience (SPCR) Rwanda

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Prepared by:



Lead MDB:



Supporting MDB:





FOREWORD

The Republic of Rwanda is honoured to present the Strategic Programme for Climate Resilience (SPCR) to the Sub-Committee for the Pilot Programme for Climate Resilience (PPCR). Rwanda's SPCR, a holistic and multi-sectoral climate resilience investment plan, demonstrates our country's commitment to building broad-based climate resilience as well as to the high-impact investment opportunities in our dynamic and results-oriented economy that seek to achieve the national sustainable development objectives.

Rwanda has been steadfast in support of global action on climate change. We are a signatory to the United Nations Framework Convention on Climate Change (UNFCCC) of 1992. In 2004, we signed the Kyoto Protocol and ratified it in 2005. As a member-country of the UNFCCC, Rwanda has consistently undertaken our obligations, including developing National Adaptation Programmes of Action (NAPAs) in 2007, and more recently Rwanda signed and ratified the Paris Agreement last year, with a Presidential Order ensuring the entry into force in November 2016. Our Nationally Determined Contributions (NDC) to the global effort, submitted in 2015, signalled our role in the community of nations collectively fighting climate change.

Domestically too, Rwanda has elevated climate change to a national development priority through its 2011 Green Growth and Climate Resilience Strategy (GGCRS), that has adequately informed the National Strategy for Transformation (NST). Across Rwanda's governance architecture, climate change has become a cross-cutting issue and climate change action has emerged as an ever more urgent imperative.

It is in this context that we have developed the SPCR as an investment vehicle for Rwanda to meet its climate change goals and to ensure that the country is well equipped to face the challenges brought on by climatic uncertainty. The SPCR has transformational potential for Rwanda's economy, and is a pivotal step in safeguarding the development gains against climate change impacts. The SPCR is based on a vision of Rwanda being able to not merely survive climate change, but *thrive*.

The climate resilience investments in this package amount to just over US \$ 500 million. This scale matches both Rwanda's climate resilience needs and its level of ambition to meet climate change threats head-on. As such, in relation to Rwanda's Official Development Assistance (ODA) level in 2015, this represents approximately 5% of Rwanda's total ODA over the SPCR's intended ten-year timeframe. We believe that the Rwandan government's commitment to enhancing adaptive capacity and to effective, efficient, and exemplary governance will translate into every dollar of this sum yielding exponentially larger, sustained, economy-wide climate resilience benefits.

It is an immense privilege for a single country like Rwanda to be chosen by the Climate Investment Funds (CIF) as a beneficiary under three of its high-impact programmes – the PPCR, the Forest Investment Programme (FIP), and the Scaling Up Renewable Energy Programme (SREP). Undoubtedly, these choices reflect the potential the CIF sees in Rwanda as well as a recognition of our ability to deliver. The SPCR embodies this same potential, and comes to the CIF with the same firm commitment to deliver. It is thus with great pleasure that we tender this document for your consideration, and thank you for your support.



Vincent BIRUTA

Hon'ble Minister of Environment

Rwanda



Claver GATETE

Hon'ble Minister of Finance and Economic Planning

Rwanda

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ABBREVIATIONS AND ACRONYMS

AfDB	African Development Bank
ASIP	Agriculture Sector Investment Plan
BCC	Budget Call Circular
BMP	Best Management Practice
CC	Climate Change
CGIAR-CCAFS	CGIAR Research Program on Climate Change, Agriculture and Food Security
CIF	Climate Investment Funds
COMESA	Common Market for Eastern and Southern Africa
CSA	Climate Smart Agriculture
CSO	Civil Society Organization
CTF	Clean Technology Fund
CV	Climate Variability
DDP	District Development Plan
DFI	Development Finance Institution
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EAC	East African Community
EBRD	European Bank for Reconstruction and Development
ECCAS	Economic Community of Central African States
EDPRS	Economic Development and Poverty Reduction Strategy
ENR	Environment and Natural Resources
EUR	Euros
EWSA	Electricity, Water and Sanitation Authority
FCPF	Forest Carbon Partnership Facility
FFS	Farmer Field Schools
FIP	Forest Investment Program
FMC	Forest Management Committees
FONERWA	Rwanda's Green Fund
FSSP	Forestry Sector Strategic Plan
GCCASP	Gender, Climate Change and Agriculture Support Program
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility

GGCRS	Green Growth and Climate Resilience Strategy
GHG	Greenhouse Gas
GII	Gender Inequality Index
GNI	Gross National Income
GoR	Government of Rwanda
HDI	Human Development Index
IADB	Inter-American Development Bank
ICT	Information and Communication Technology
IFC	International Finance Corporation
INDC	Intended Nationally Determined Contribution
IP	Investment Plan
IPM	Integrated Pest Management
IPPF	International Planned Parenthood Federation
ISFM	Integrated Soil Fertility Management
LAFREC	Landscape Approach to Forest Restoration and Conservation
LDC	Least Developed Country
LID	Low Impact Development
LVEMP	Lake Victoria Environment Management Project
M&E	Monitoring and Evaluation
m³	Cubic Metres
MCM	million cubic meters
MDB	Multilateral Development Bank(s)
MDGs	Millennium Development Goals
Meteo	Rwanda Meteorology Agency
MIDIMAR	Ministry of Disaster Management and Refugee Affairs
MIGEPROF	Ministry of Gender and Family Promotion
MINAGRI	Ministry of Agriculture and Animal Resources
MINALOC	Ministry of Local Government
MINEACOM	Ministry of Trade, Industry and East African Affairs
MINECOFIN	Ministry of Finance and Economic Planning
MINICOM	Ministry of Trade and Industry
MINILAF	Ministry of Land and Forestry
MININFRA	Ministry of Infrastructure
MINIRENA	Ministry of Natural Resources
MoE	Ministry of Environment

MoH	Ministry of Health
MT	Metric ton
NAEB	National Agriculture Export Development Board
NAPA	National Adaptation Programme of Action
NBI	Nile Basin Initiative
NBP	Nature Based Products
NDF	Nordic Development Fund
NEP	National Energy Policy
NEPAD	New Partnership for Africa's Development
NFC	New Forests Company
NFCS	National Framework for Climate Services
NFI	National Forest Inventory
NFMP	National Forest Management Plan
NFMS	National Forest Monitoring System
NFP	National Forestry Policy
NGO	Non-Governmental Organisation
NISR	National Institute of Statistics of Rwanda
NST	National Strategy for Transformation
NTFP	Non-Timber Forest Product
NTSC	National Tree Seed Centre
ODA	Official Development Assistance
odt	Oven Dry Tonnes
PES	Payment for Ecosystem Services
PMT	Protection Motivation Theory
PMU	Programme Management Units
PPCR	Pilot Programme for Climate Resilience
PPP	Public Private Partnership
PSTA	Pacific Sustainable Tourism Alliance
R&D	Research and Development
RAB	Rwanda Agriculture and Animal Resources Board
RDB	Rwanda Development Board
REDD+	Reducing Emissions from Deforestation, Forest Degradation
REL	Reference Emissions Level
REMA	Rwanda Environment Management Authority
RHA	Rwanda Housing Authority

RLMA	Rwanda Land Management Authority
RLMUA	Rwanda Land Management and Use Authority
RMA	Rwanda Mining Association
RNRA	Rwanda Natural Resources Authority
R-PP	Readiness Preparation Proposal
RTDA	Rwanda Transport Development Authority
RWF	Rwandan Franc
RWFA	Rwanda Water and Forestry Authority
RWH	Rainwater Harvesting
SCF	Strategic Climate Fund
SDGs	Sustainable Development Goals
SIDA	Swedish International Development Cooperation Agency
SIS	Safeguards Information System
SPAT	Strategic Plan for Agricultural Transformation
SPCR	Strategic Program for Climate Resilience
SPGS	Sawlog Promotion Grant Scheme
SREP	Scaling Up Renewable Energy in Low Income Countries Program
SSIT	Small-Scale Irrigation Technology
SSP	Sectors Strategic Plan
SUDS	Sustainable Urban Drainage Systems
SWG	Sectoral Working Group
UNCCD	UN Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	UN Framework Convention on Climate Change
USAID	United States Agency for International Development
USD	United States Dollars
WASAC	Water and Sanitation Corporation
WB	World Bank
WRM	Water Resource Management

REPUBLIC OF RWANDA

CURRENCY EQUIVALENTS

(Exchange Rate Effective October 18, 2017)

Currency Unit = Rwandan Francs (RWF)

1 US\$ = 844.155 RWF

1 RWF = 0.001 US\$

FISCAL YEAR

July 1 – June 30

SUMMARY OF SPCR: RWANDA

PILOT PROGRAMME FOR CLIMATE RESILIENCE Summary of Strategic Programme for Climate Resilience		
1. Country/Region	Rwanda	
2. SPCR Funding Request	Grant: USD	Concessional Loan: USD
3. National PPCR Focal Point	Bright Ntare, PPCR Focal Point	
4. National Implementing Agency	Ministry of Environment	
5. Involved MDBs	World Bank	African Development Bank
6. MDB PPCR Focal Point and Project/Programme Task Team Leader (TTL):	Kanta Kumari Rigaud Lead Environment Specialist Email: kkumari@worldbank.org Pablo Benitez Senior Environmental Economist, Email: pbenitez@worldbank.org	Laouali Garba Chief Climate Change Officer, Email: l.garba@afdb.org Siham Mohamed Ahmed Email: s.mohamedahmed@afdb.org
7. Description of SPCR		
(i) Key development challenges (vulnerability) related to climate change/variability:		
<ul style="list-style-type: none"> • Intensification of extreme weather events such as floods and landslides. These are already recurrent in Rwanda but will be exacerbated and be significantly more damaging due to climate change, posing a bigger threat to human lives and security, crops, livestock, and infrastructure; • Increased rainfall variability could lengthen drought periods, especially in the Eastern province; • Models indicate that Rwanda could lose over 1% of its GDP each year due to climate change related losses by 2030, and an even greater proportion thereafter (this estimate does not even factor in losses due to floods, which would raise GDP losses beyond the 1% annual figure); • Economic cost of climate change is estimated to be 300 Million USD per year to effectively address climate change impacts (Economics of Climate Change, 2009); and • Climate change is not gender neutral. Climate variability and extreme weather events have different vulnerabilities and risks for men and women, and in most cases, the adverse effect of climate change disproportionately affect women due to limited institutional, socioeconomic, and political participation. 		
(ii) Areas of intervention - sectors and themes		
<p>Sectors: Agriculture (Sustainable Intensification of Small-Scale Farming and Agricultural Diversity for Local and Export Markets), Sustainable Land Use Management, Integrated Water Resource Management, Disaster Management and Disease Prevention, Resilient and Efficient Transport Systems, Low Carbon Urban Systems, Climate Data and Projections</p> <p>Themes/Programmes: (a) Agricultural Driven Transformation, (b) Water Security for All - Strengthening Resilience in the Water Sector, (c) Climate Resilient Human Settlements, and (d) Stable and Sustainable Landscapes</p> <p>Cross-Cutting Themes: Technical Capacity Building and Strengthening Institutional Coordination, Integrated Land use and Spatial Planning, and Climate Services and Disaster Risk Reduction / Disaster Risk Management</p>		
(iii) Expected Outcomes from SPCR		
<ul style="list-style-type: none"> • Increased cross-sectoral collaboration for building climate resilience and mainstreaming climate change into socio-economic development in Rwanda; 		

- Increased resilience of vulnerable communities, particularly gender responsive resilience, and key infrastructure to withstand the effects of climate change and variability;
- Increased use of climate information by target groups (vulnerable communities, private sector, policy makers);
- Strengthened government capacity to coordinate, manage and implement Rwanda's SPCR;
- Increased investment by private sector into building climate resilience in the priority sub basins in a range of economic sectors;
- Improved engagement of key stakeholder groups, including Non-Governmental Organizations (NGOs), Civil Society Organizations (CSOs), youth organizations, women, academia and private sector, in initiatives to reduce the adverse consequences of climate change; and
- Increased sharing of best practices for mainstreaming climate resilience within Rwanda, regionally, continentally and globally.

8. Expected key results from the Implementation of the Investment Strategy and corresponding selected indicators (consistent with PPCR Results Framework):

Results	Success Indicators:
1. Increased resilience of households, communities, businesses, sectors and society to climate variability and climate change	Where possible, provide gender disaggregated data to allow an analysis of the change and increase in benefits to women.
2. Strengthened climate responsive development planning	1. Numbers of people supported by the PPCR to cope with effects of climate change (Core Indicator)
3. Strengthened adaptive capacities	A1.2 Change in damage/losses (\$) from extreme climate events in areas at risks that are the geographical focus of intervention
4. Improved institutional framework in place	2. Degree of climate change integration in national planning (Core Indicator)
5. Use of climate information in decision making routinely applied	3. Extent to which vulnerable households, communities, businesses and public-sector services use improved PPCR supported tools, instruments, strategies, activities to respond to Climate Variability and Climate Change (Core Indicator)
6. Climate responsive investment approaches identified and implemented	4. Evidence of strengthened government capacity and coordination mechanism to mainstream climate resilience (Core Indicator)
7. Promote gender mainstreaming in policies, programmes and projects, women's access to climate services and gender equity in access and control over resources (land, access to credit)	5. Evidence showing that climate information products/services are used in decision making in climate-sensitive sectors
	6. Quality of and extent to which climate responsive instruments/ investment models are developed and tested (Core Indicator)
	7. Leverage funding from public and private investments in climate-sensitive sectors
	8. Number of beneficiaries trained in ways to build climate change resilience
	9. Increase (%) of human development index within the intervention areas

9. Projects concepts proposed under the SPCR

Investment Programme	Total (US \$)
1. Agriculture-Driven Prosperity	\$44 365 200
2. Water Security for All - Strengthening Resilience in the Water Sector	\$310 475 000*
3. Climate Resilient Human Settlements	\$150 727 500
4. Stable and Sustainable Landscapes	\$28 749 050*
Total SPCR	\$534 316 750

**Potential for projects in Program 2 and 4 to be combined and for cross-linkages to be explored.*

10. Timeframe - Approval Milestones		
Investment Programme	Phase 1	Phase 2
1. Agriculture-Driven Prosperity	See Chapter 9	See Chapter 9
2. Water Security for All - Strengthening Resilience in the Water Sector	See Chapter 9	See Chapter 9
3. Climate Resilient Human Settlements	See Chapter 9	See Chapter 9
4. Stable and Sustainable Landscapes	See Chapter 9	See Chapter 9
11. Key National Stakeholder Groups involved in SPCR design:		
Electricity, Water and Sanitation Authority (EWSA)	Ministry of Trade, Industry and East African Affairs (MINEACOM) Ministry of Health (MOH) National Agriculture Export Development Board (NAEB) Rwanda Agriculture and Animal Resources Board (RAB) Rwanda Development Board (RDB) Rwanda Environment Management Authority (REMA) Rwanda Housing Authority (RHA) Rwanda Land Management Authority (RLMA) Rwanda Meteorology Agency (Meteo) Rwanda Mining Association (RMA) Rwanda Transport Development Authority (RTDA) Rwanda Water and Forestry Authority (RWFA) Water and Sanitation Corporation (WASAC)	
Environment and Natural Resources Sectoral Working Group (ENR SWG)		
Ministry of Agriculture and Animal Resources (MINAGRI)		
Ministry of Disaster Management and Refugee Affairs (MIDIMAR)		
Ministry of Environment (MoE)		
Ministry of Finance and Economic Planning (MINECOFIN)		
Ministry of Infrastructure (MININFRA)		
Ministry of Lands and Forestry (MINILAF)		
Ministry of Local Government (MINALOC)		
12. Other Partners involved in SPCR:		
African Development Bank, Belgian Development Agency, UK’s Department for International Development, Global Green Growth Institute, United Nations (UNDP, UNEP), Embassy of the Netherlands, World Bank		

EXECUTIVE SUMMARY

Rwanda has been distinguished throughout Africa as a leader in economic growth and sustainable development. The national efforts spearheaded by the Government of Rwanda (GoR) to reduce poverty, tackle corruption and maintain high levels of economic growth have been lauded, and Rwanda is often referenced as having the most compelling turnaround story in Africa. There is, indeed, much to be celebrated. Since 2001, Rwanda's economy has been growing steadily at about 8%, with GDP per capita more than tripling from US\$211 in 2001 to US\$718 in 2014.¹ The growth in food crop production was more than twice that of population growth between 2007 and 2014.² Consumption and investment are set to drive further economic growth, off the back of population growth, urbanisation, and the migration of labour into higher value-added sectors.³ The Ministry of Finance quotes that in the past five years alone, more than one million Rwandans, 10% of the population, have pulled themselves out of extreme poverty.⁴

Yet, despite promising statistics, Rwanda still has a way to go before achieving middle-income status by 2020. Economic development will not happen in a vacuum. More specifically, sustainable economic development is inherently dependent on understanding, and harnessing, the environment and natural resources of Rwanda in order to achieve sustainable and equitable economic growth.

As is true of most African nations, Rwanda's contribution to climate change in the form of greenhouse gas emissions is negligible (although emissions from deforestation, agriculture, and land use, and increasingly transport and industry, are significant enough within Rwanda's carbon footprint to demand mitigation and responsible management). The impacts of climate change on Rwanda, however, are disproportionate to its contribution. Rwanda is, in fact, extremely vulnerable to climate change.

Recent global climate vulnerability and risk indexes placed Rwanda's climate change vulnerability rank anywhere between 132⁵ (based on the relative severity and magnitude of climate change impacts expected to be felt) and 7⁶ (based on the country's lack of adaptive capacity and marginal level of preparedness). Given the extremely high reliance of Rwanda's economy on the agriculture sector (like much of East Africa), Rwanda has also been assessed as being a high-risk nation in terms of climate risk exposure.⁷ At the sub-national level, Rwanda's efforts to develop a baseline climate change vulnerability index have revealed that the Eastern Province is most vulnerable to climate change, followed by the Western Province.⁸

In April of 2012, heavy rains in the Northern and Western provinces in Rwanda brought about massive flooding in the area. According to Rwanda Environment Management Authority (REMA), the estimated economic loss during the flooding totalled over 58 billion RWFs, roughly 1.4% of the overall GDP of 2011-2012. This one destructive season represents just how very vulnerable Rwanda is to climate variability and the very real economic costs when controls for floods and landslides are not in place.

The impacts of climate change are already being felt by all major sectors of Rwanda's economy, from agriculture, land, and water resources to human settlements, transport, and infrastructure. For instance, climate change is already manifesting through increased extreme weather, including heavy rainfall events (which trigger more landslides and greater flooding), greater unevenness in rainfall distribution, and more intense or prolonged droughts (which affect crop yields and both human and livestock health). For a country that is heavily agriculture dependent and generates a large share of its electricity from hydropower, such changes in rainfall patterns pose a real threat. And, since such effects will only intensify and become more deleterious in the future, Rwanda needs to prepare for anticipated impacts and proactively build climate resilience.

It is heartening to note that this preparation is well underway in Rwanda already. Rwanda is several steps ahead of similarly-situated low-income countries, and has made tremendous progress on putting strong, forward-looking, ambitious climate change policies, strategies, frameworks, and guidelines in place. A crucial component of this planning landscape is Rwanda's *Green Growth and Climate Resilience Strategy* (GGCRS), which lays out Rwanda's vision of being a developed, climate-resilient, low-carbon economy by 2050. The *National Strategy for Transformation, Vision 2050*, its Intended Nationally Determined Contribution (INDC), and the Sustainable Development Goals have also heavily shaped and informed the development of this SPCR.

PPCR and SPCR

The Climate Investment Funds (CIF) aims to promote international cooperation on climate change and support the efforts of developing countries on the path of low carbon and climate resilient development. Multilateral Development Banks, including the African Development Bank, the World Bank and its private arm, the International Finance Corporation (IFC), and other Multilateral Development Banks (IADB & EBRD) are the implementing agencies for CIF funded projects and programs.

CIF's financing mechanism is framed around two major trust funds, the Clean Technology Fund (CTF) and the Strategic Climate Fund (SCF). The CTF finances scaled-up demonstration, deployment and transfer of clean technologies, while the SCF finances targeted programs that pilot new approaches with the potential for scaling up. The SCF provides support to three targeted programmes: Forest Investment Program (FIP), the Pilot Program for Climate Resilience (PPCR) and Scaling Up Renewable Energy in Low Income Countries Program (SREP).

In 2015, Rwanda applied for and was granted support for the FIP and PPCR to prepare both its Investment Plan (IP) and Strategic Programme for Climate Resilience (SPCR). These programmes are supported by the World Bank and the African Development Bank. The PPCR is a recognition of the need for a programmatic approach to climate change resilience and supports countries in their climate resilient

development, reduction of poverty and push to reach the sustainable development goals. This SPCR is complemented by its sister document, the IP, and is complementary to its development.

To address these challenges, Rwanda has chosen a programmatic approach to the Strategic Programme for Climate Resilience (SPCR), one reinforced by the transformational shift from business as usual, sector-based approaches, to a fundamentally integrated programmatic approach that requires cross-ministerial collaboration and the integration of climate resilience into development imperatives. As Rwanda is undergoing a transformative national planning process, the SPCR is one of its vehicles to build strong national capacity, and do business unusually.

In line with the priorities of the *GGCRS*, the *National Strategy for Transformation, Vision 2050*, Intended Nationally Determined Contribution (INDC), and the Sustainable Development Goals (SDGs), Rwandan stakeholders have proposed four strategic investment programmes, each with their own components, coupled with three cross-cutting priorities.

Three key building blocks of climate change resilience have been chosen as cross-cutting priorities in Rwanda's SPCR. This is intended to ensure that every one of the investment programmes reflects some element of the three cross-cutting priorities. They are as follows:

- Technical Capacity Building and Strengthening Institutional Coordination;
- Integrated Land Use Planning and Spatial Planning; and
- Climate Services and Disaster Risk Reduction / Disaster Risk Management.

The four programmes of the SPCR are as follows:

- **Agriculture Driven Prosperity:** (1) climate-resilient value chain development; and (2) climate-smart agriculture and agroforestry. This investment programme would be implemented for an estimated US\$ 44.4 million. It would provide climate-smart strategic support to Rwanda's agriculture and agroforestry sectors, while implementing participatory adaptation and climate resilient infrastructure in targeted areas.
- **Water Security for All - Strengthening Resilience in the Water Sector:** (1) integrated strategic water resource planning and management; (2) catchment restoration; and (3) climate resilient water infrastructure. This investment programme would be implemented for estimated US\$ 310.5 million. It would focus on enhancing climate resilience of Rwanda's surface water and groundwater systems, promoting sustainable access to water, and reducing Rwanda's vulnerability in the face of increasing uncertainty in runoff. Herein, this programme will be referred to as "Water Security for All."

- **Climate Resilient Human Settlements:** (1) mainstreaming climate resilience into urban land use planning; (2) climate resilient stormwater management and drainage; (3) climate resilient waste management; and (4) sustainable, resilience-building transport. This investment programme would be implemented for estimated US\$ 150.7 million. It would focus on building population resilience to shocks and stresses by securing more reliable infrastructure and service delivery, and integrating climate change considerations into Rwanda's urban development.
- **Stable and Sustainable Landscapes:** (1) and landslide flood prevention, control and management in high-risk locations; (2) implementation and rollout of Rwanda's *National Framework for Climate Services*; and (3) landscape conservation in the context of fuelwood production and collection. This investment programme would be implemented for estimated US\$ 28.7 million. It would focus on safeguarding Rwanda's most fragile and disaster-prone landscapes, to reduce communities' vulnerability to floods and landslides and to enhance preparedness for a wide range of climate change impacts.

The four programmatic areas reflect the Government of Rwanda's priorities with regard to climate change and environment mainstreaming and have been designed against the following criteria:

- **Paradigm Shift Potential:** potential for scaling-up and replication; knowledge and learning potential; and systematic change towards low-carbon and climate-resilient development pathways (this criterion aligns with the PPCR Results Framework's focus on transformational impact);
- **National Ownership:** embedding climate resilience in national planning documents; coherence with existing policies; strategic engagement and sector coordination in planning and implementation; and capacity of implementing entity to deliver;
- **Economic Efficiency:** benefit-cost ratio of the project; impact per monetary unit; and cost-effectiveness; and
- **Gender and Vulnerable Peoples Impact:** pro-poor project agenda; and demonstrated ways in which project is inclusive.

Three of the SPCR's four investment programmes have elements that are strongly linked to the FIP. They are as follows:

- **Programme 1:** Component 2, Climate Smart Agriculture and Forestry, with a standalone project entitled *Development of Agroforestry and Sustainable Agriculture*. The FIP will also draw on Component 1, Climate Resilient Value Chain Development.

- **Programme 2:** Component 2, Catchment Restoration, can take advantage of the forest restoration to be undertaken through the FIP and will focus on the most vulnerable landscapes and the watercourses within these.
- **Programme 3:** There will be opportunities to adapt and apply restoration technologies developed under the FIP with regard to climate resilient human settlements.
- **Programme 4:** Component 3, Landscape Conservation in the Context of Fuelwood Production and Collection, identifies a specific activity on a Sustainable Fuelwood Management Project in South-western Rwanda. This is featured in the FIP's Project 2, *Sustainable Forest and Landscape Management*, which includes group and community woodlots at various scales.

Whilst each of the programmes has a national scope, they will also have portions implemented in priority sub-national locations (catchments or sub-catchments, secondary cities, rural settlements, or districts), as the case may be for each project. These locations have been selected as they exhibit vulnerability to climate variability and climate change, and are expected to face serious climate impacts in decades to come.

As each programme's components undergo their design process, they will attempt to capture lessons learned in particular technical areas and geographies, as well as best institutional approaches, cross-sectoral coordination opportunities, opportunities to exchange knowledge, and strengthen capacity building.

The design of this SPCR is aligned with other climate-resilient initiatives in Rwanda, and aims to draw upon multiple funding sources, including concessional, donor and private sector funding. The implementation will build on the comparative advantages of relevant stakeholders in Rwanda, including the Government, civil society, private sector, academia, and development partners, to ensure a participatory and sustainable response to climate change. To the maximum extent possible, the SPCR has been designed to employ existing or emerging implementation mechanisms, and thus facilitate partnerships and scaling-up.

This SPCR Submission includes three parts. Part A covers the background and rationale for the SPCR; Part B identifies the proposed investment programmes under the SPCR; and Part C provides a resource mobilization and finance strategy.



PART A

1 NATIONAL CONTEXT

1. Rwanda (between latitudes 1°04' and 2°51' south and longitudes 28°45' and 31°15' east) stands apart from many nations in Africa, demonstrating how a small, landlocked country with a fraught history can turn its trajectory around and become the very embodiment of stable, sustainable, and inclusive socio-economic development. Rwanda is bordered by the Democratic Republic of the Congo to the west, Uganda to the north, Tanzania to the east, and Burundi to the south.
2. Rwanda has five provinces (*intara*) plus the city of Kigali, which are subdivided into 30 districts (*akarere*). These districts are then divided into 416 sectors (*imirenge*), which are then divided into cells (*utugari*), which are further divided into villages (*imidugudu*).



Figure 1: Administrative Map of Rwanda (Nations Online, n.d.)⁹

3. In 2015, Rwanda's Gross Domestic Product (GDP) growth rate stood at an enviable 6.9%.¹⁰ Moreover, between 2001 and 2015, real GDP growth consistently averaged around 8% per annum. Poverty levels dropped from 44% of the population below the poverty threshold in 2011 to 39% in 2014, while inequality (measured by the Gini coefficient) fell from 0.49 in 2011 to 0.45 in 2014.¹¹

4. Rwanda's rank on the Human Development Index (HDI) remains low at 159 out of 188 countries (in 2016's Human Development Report), but it has displayed upward mobility over time, making over 100% gains in its HDI between 1990 and 2015; in that timeframe, Rwanda's life expectancy at birth increased by 31.3 years, mean years of schooling increased by 2.0 years, expected years of schooling increased by 5.1 years, and Rwanda's GNI per capita increased by a staggering 90.9%.¹²
5. Rwanda has taken big strides in commercial growth as well: in 2017, it ranked 56 out of 190 countries in the World Bank's "Ease of Doing Business" index (up from 59 in 2016). Rwanda's relative ease of starting a new business saw its score on this variable rise 33 ranks, from 109 in 2016 to 76 in 2017. Most striking perhaps is that Rwanda currently is ranked 2 of 190 countries in terms of ease of getting credit.¹³
6. Rwanda's story of recovery, resilience, and resurgence is remarkable, made even more so by the fact that its growth thus far has not come at significant expense of environmental integrity and ecological health. As a nation, it ranked 23rd (of 80 countries) in the 2016 Global Green Economy Index.¹⁴ Rwanda has over 200,000 hectares of protected areas.¹⁵
7. Approximately 20% of land cover is comprised of forests, which experienced an annual 8% increase between 2000 and 2005 due to a concerted afforestation effort.¹⁶ The GoR estimates suggest forest cover as of 2015 is even higher, at 29% of total area.¹⁷ Currently, Rwanda uses roughly 2% of its renewable freshwater, even as 90% of urban households and 83% of rural households have access to an improved water source.¹⁸
8. Overall, water is an abundant resource in Rwanda with vast potential for development. The country's water resources comprise of 101 lakes, hundreds of rivers, marshlands and groundwater. Due to its relief and its location in the African Great Lakes region, Rwanda has a very dense river network.¹⁹ The country's area (26,338 km²) is divided between the Congo River Basin in the west, and the Nile River Basin in the east. The Upper Nile Basin, which occupies 76% of the country's area (20,017 km²), drains 90% of the surface waters through the Nyabarongo and Akagera Rivers, the main tributaries of Lake Victoria.²⁰ In the north and west, Lakes Burera, Ruhondo and Kivu are deeper than 50 m. Other lakes (Mugesera, Sake, Bilira, Cyohoha, Rweru and Ihema) are shallower, with depths not exceeding 10 m.²¹
9. Nearly all (95%) of Rwanda's water resources originate from within the country and only about 5% from outside its territory, essentially Burundi. Rwanda has an estimated 9.5 billion m³ per annum of actual total renewable water and a per capita availability of close to 1,000 m³. Rwanda has nine Level 1 catchments: Lake Kivu, Rusizi, Upper Nyabarongo, Mukungwa, Lower Nyabarongo, Akanyaru, Upper Akagera, Lower Akagera, and Muvumba.

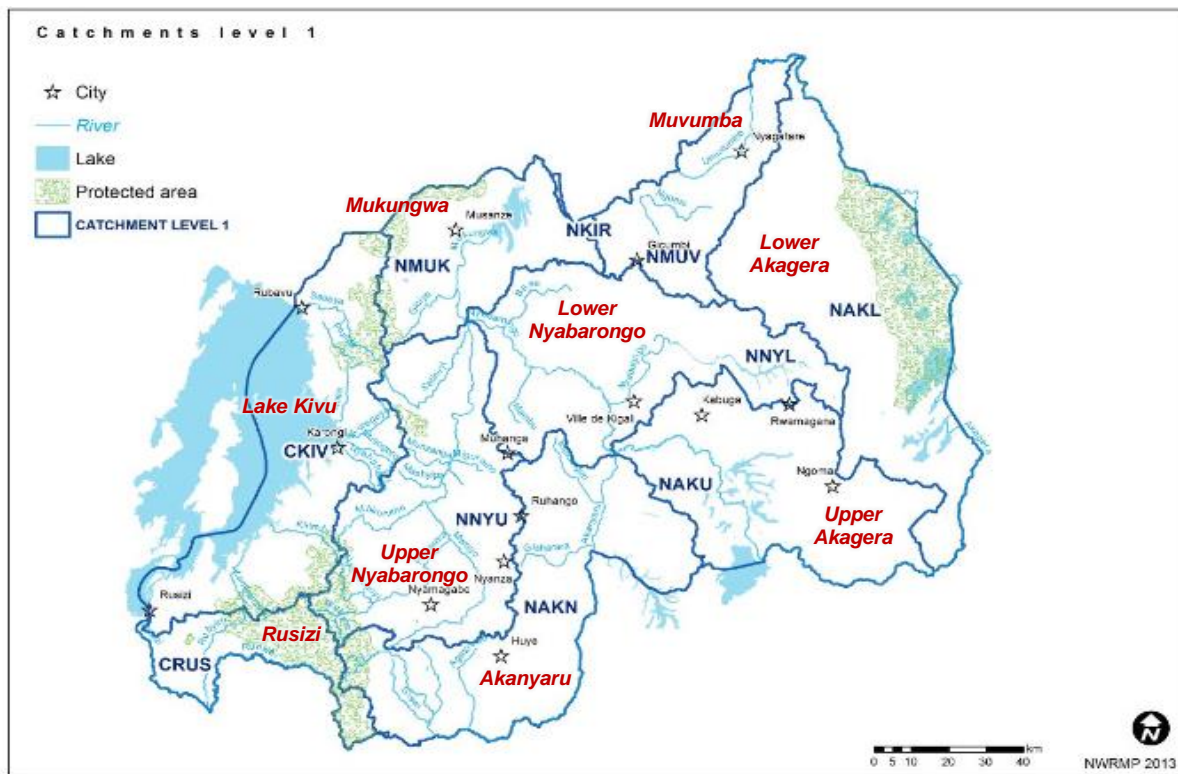


Figure 2: Level 1 Catchments (Adapted from MINIRENA, 2014)

10. Over the last three decades, however, Rwanda's water resources have been severely degraded, as evidenced by heavy sediments in rivers, pollution from agricultural chemicals and fertilisers, industrial effluents and municipal waste, and reduced water levels and flow volumes, causing shortages. Critical watersheds and water catchments have been converted into agricultural lands, resulting in destruction and drying up of many streams, and decline of ground water reserves. Watershed destruction, inappropriate settlements, inappropriate agricultural practices, and inadequate sanitation have led to increased siltation and sedimentation, increased pollution and increased risk of invasive aquatic weeds.
11. At the sub-national level, Rwanda's efforts to develop a baseline climate change vulnerability index have revealed that the Eastern Province is most vulnerable to climate change, followed by the Western Province.²² Existing climate change variability already takes a significant toll on Rwanda's economy (due to floods, seasonal variation in rainfall, drought etc.), but climate change is expected to exacerbate this, with models suggesting that Rwanda could lose over 1% of its GDP each year due to climate change related losses by 2030, and an even greater proportion thereafter (even without factoring in losses due to floods).

2 DEVELOPMENT CONTEXT AND CLIMATE RISKS

2.1 CURRENT CLIMATE CHARACTERISTICS

12. Rwanda has a temperate climate, with considerable differences across the country owing to the varying topography: mountains, valleys, and low-lying areas influence the temperature and rainfall. It is typically cooler and wetter in the west, mainly because of the high mountains, and warmer and drier in the east, where the elevation is lower.²³
13. Rwanda's average annual temperature is between 15-17°C in high altitude areas²⁴, 20°C to 21°C in the eastern plateau, 23°C to 24°C in Bugarama Valley, and 17.5°C to 19°C in the central plateau.²⁵ Since 1970, Rwanda has observed a 1.4°C rise in average temperature.²⁶ These trends are expected to continue in the future.

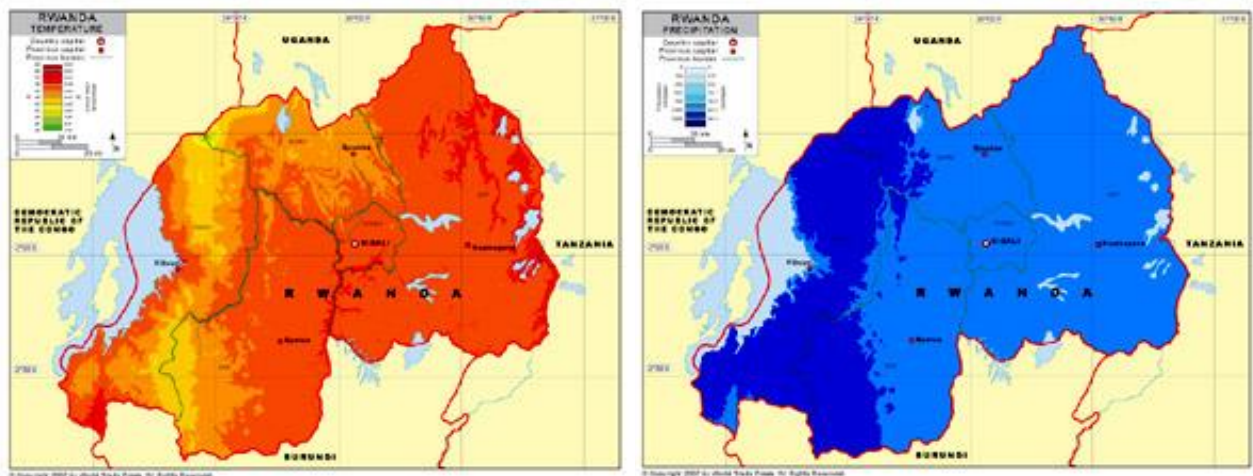


Figure 3: Maps of Temperature and Rainfall in Rwanda (World Trade Press, n.d.)

14. The current rainfall pattern shows high annual average precipitation above 1500 mm in mountainous western regions of the country and just below 700 mm in eastern regions. The country's rainfall pattern is characterized by four seasons: a short and wet season (September-November), a short and dry season (December-February), a long and wet season (March-May) and a long and dry season (June-August).²⁷
15. Shifts in the timing of precipitation have been reported in certain regions.²⁸ Rainy seasons are becoming shorter and more intense, especially in the northern and western provinces, which increases erosion risks in these mountainous parts of the country. Eastern regions have experienced serious rainfall deficits over several years over previous decades, alternated with rainfall excesses in other years.²⁹ This inter-annual variability in rainfall is driven by global and regional weather systems.³⁰

16. In recent years, higher temperatures, prolonged droughts, and elevated rates of evapotranspiration have led to disturbances in the hydrologic cycle and altered river flows.³¹ While Rwanda has not experienced serious water availability problems yet due to its relatively high precipitation rate, despite the lowering level of lakes and waterways, in the long-term, climate-related impacts such as changes in rainfall and temperature, and increases in floods and droughts, will impact water availability.³²
17. Rwanda is already experiencing the impacts of a warming planet, including increased and longer droughts and more frequent and severe floods leading to landslides.³³ In recent years, extreme weather events in Rwanda increased in frequency and magnitude, leading to significant losses including human lives.³⁴ Extreme events associated with El Niño and La Niña episodes have intensified. This includes droughts in the eastern and southern regions that have resulted in a series of severe famines, and heavy rainfall in northern and western regions has led to erosion, flooding, and landslides.³⁵ Some regions are also prone to erosion, forest fires and lightning strikes. The figure below illustrates the hazard-prone areas of Rwanda.

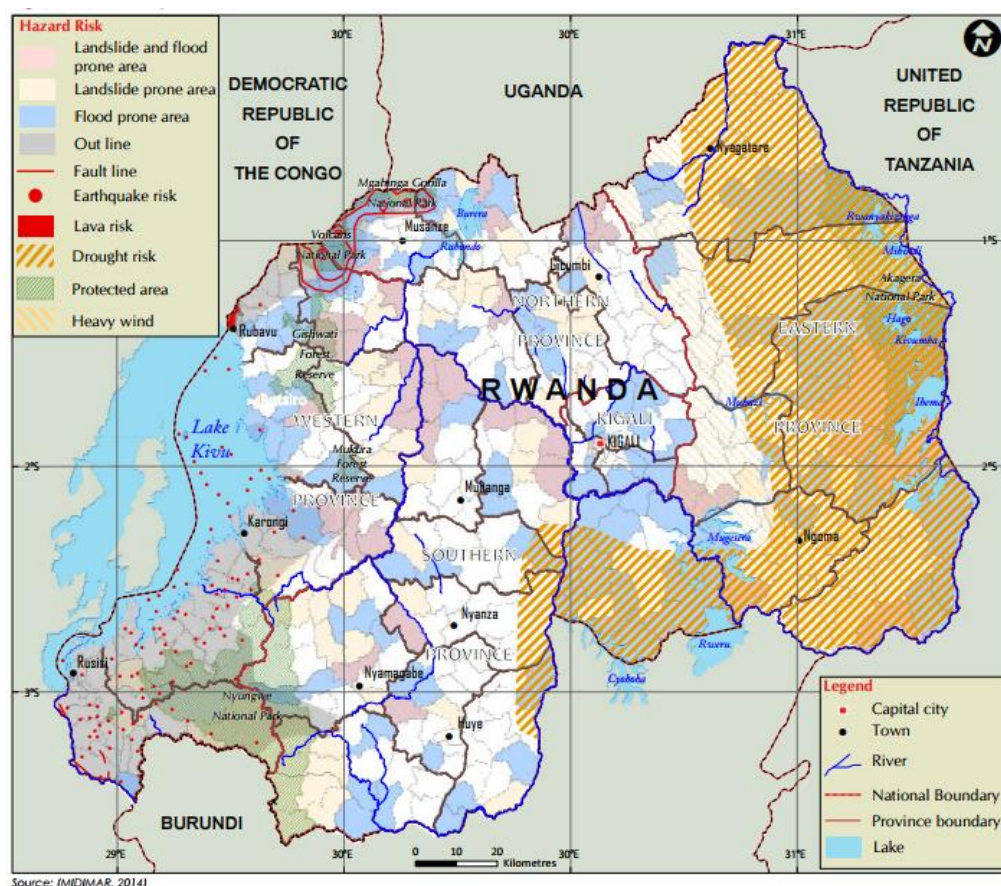


Figure 4: Hazard Prone Areas (REMA, 2015³⁶)

2.2 CLIMATE CHANGE AND VARIABILITY

18. In Rwanda, climate change is expected to result in increased temperatures, intensified rainfall, and prolonged dry seasons. Each region in Rwanda will experience these challenges differently: the mountainous west of the country is subject to erosion, parts of the central north and south will see severe floods, and the east and southeast will endure droughts and desertification.³⁷ While these types of impacts have always existed throughout human history, how they are now manifesting bears the fingerprints of climate change.
19. Projections estimate a rise of up to 2.5°C by mid-century, up from the 1970 average.³⁸ It is expected that the number of hot days will continue to rise.³⁹ In addition, increases in average maximum and minimum monthly temperatures ranging from 1.5-2.7°C and 1.7-2.8°C, respectively, are expected.⁴⁰
20. Future rainfall projections indicate even greater unevenness in rainfall distribution, and more extremes in rainfall volumes and seasonality. Average annual rainfall may increase by up to 5-10% by the 2030s from 1970.⁴¹ Frequent rainfall deficits are expected in parts of the Eastern Province (Bugesera, Nyagatare, Gatsibo, Kayanza, Ngoma, Kirehe) and the Southern Province (Nyanza, Gisagara), while increased rainfall is expected in parts of the Western, Northern and Southern Provinces. Rainfall is expected to be more intense in the rainy seasons, and indeed these projections are often uncertain; dry seasons will be longer and dryer, bringing new challenges for water management, storage and drainage.⁴²
21. Due to climate change, the negative impacts seen from today's climate variability are likely to become worse.⁴³ This includes an increase in extreme events including severe droughts and floods. Seasonal droughts are expected to be prolonged, which will cause problems especially in the east and south-east.⁴⁴ An intensification of heavy rainfall is also projected, meaning that more rainfall will occur during only a few storms, thus increasing the risk of disasters such as floods and landslides. These can lead to greater human mortality, contamination of water sources, loss of crops, and damage and destruction to homes and critical infrastructure.⁴⁵

2.3 VULNERABILITY TO CLIMATE IMPACTS

22. Accepting the United Nations Environment Prize for Policy Leadership, President Kagame said: "The environment is at the heart of Rwanda's development. By protecting our natural heritage, including the endangered mountain gorilla and ancient rainforests, and by involving everyone in conservation, we are ensuring that our development is sustainable and brings prosperity to all citizens."⁴⁶ This is a recognition that even as the country is heralded for its progressive environmental policies and forward

thinking on climate change, Rwanda's survival and growth is implicitly tied to the well-being of the natural environment. This linkage makes it vulnerable to climate change and variability.

23. **Economic Vulnerability:** Existing climate change variability already takes a significant toll on Rwanda's economy (due to floods, seasonal variation in rainfall, drought etc.); the impacts have been felt by all major sectors of Rwanda's economy, from agriculture, land, and water resources to human settlements, transport, and infrastructure. For instance, climate change is already manifesting through increased extreme weather, including heavy rainfall events (which trigger more landslides and greater flooding), greater unevenness in rainfall distribution, and more intense or prolonged droughts (which affect crop yields and both human and livestock health).
24. For a country that is dependent on its natural resources, through intensive agriculture and hydropower, changes in rainfall patterns pose a real threat. And, since such effects will only intensify and become more deleterious in the future, Rwanda needs to prepare for anticipated impacts and proactively build climate resilience.
25. The Institute of Policy Analysis and Research estimates that Rwanda will need more than 527 billion RWF in the next 15 years to come up with climate change mitigation initiatives. Models also suggest that Rwanda could lose over 1% of its GDP each year due to climate change related losses by 2030, and an even greater proportion thereafter (even without factoring in losses due to floods).⁴⁷
26. **Social Vulnerability:** An evaluation of social vulnerability to climate change ranks Rwanda first among all African countries in terms of natural resource dependency.⁴⁸ Eighty percent of the country relies on agriculture for their livelihood and more than 30% of the GDP comes from the sector.⁴⁹ Thus, factors which make agriculture vulnerable (such as climate change) directly affect Rwanda's vulnerability.
27. On the positive side, social vulnerability is reducing steadily through socio-economic development. Poverty levels dropped from 44% of the population in 2011 to 39% in 2014, while inequality (measured by the Gini coefficient) fell from 0.49 in 2011 to 0.45 in 2014.⁵⁰ Rwanda's rank on the Human Development Index (HDI) still remains low at 159 out of 188 countries (in 2016's Human Development Report), but it has displayed upward mobility over time, making over 100% gains in its HDI between 1990 and 2015; in that timeframe, Rwanda's life expectancy at birth increased by 31.3 years, mean years of schooling increased by 2.0 years, expected years of schooling increased by 5.1 years, and Rwanda's GNI per capita increased by a staggering 90.9%.⁵¹
28. Rwanda's status as one of the most densely populated countries in the world, with 415 people per square kilometre, is well known.⁵² Coupled with a high population growth of 2.4% per annum in 2014 and an average urbanization growth rate of 6.4% per annum, physical space in Rwanda is at an absolute premium.⁵³ In Kigali, the pressure is even greater with an urbanisation growth rate of 9%.⁵⁴

What this translates to is not only, as the Minister of Infrastructure put it, a problem of “economic pressures in the distribution of wealth and economic opportunities in one city,” but a paramount need to ensure that there is an inclusive development approach to city planning and growth.⁵⁵

29. **Gender and other Vulnerable Groups Vulnerability:** In Rwanda, the vulnerable social groups include women, children, elderly, youth, people with disabilities, incapacitated, conflict and post-conflict affected groups, ethnic minorities, and people living with HIV/AIDS. Vulnerable communities have an integral role to play in the development of an effective and efficient medium and long-term adaptation plan in Rwanda. The vulnerable social groups are particularly at risk in relation to climate change, therefore, this SPCR will enhanced the ability of the vulnerable social groups to anticipate, cope with, and recover from the adverse effects of climate change by providing improved access to climate information for better engagement in productive agricultural and economic activities, investing in social networks or social support systems that facilitate collective efforts to cope with adverse effects of climate change such as early warning systems and disaster preparedness to build resilience at the community, household and individual level.
30. Existing power imbalances between men and women cause women to bear most negative effects of climate change-induced disasters. Moreover, the fact that women are primarily responsible for households' water availability and food security suggests their burdens will increase disproportionately due to climate change.⁵⁶ This is an important consideration in Rwanda, and one that the country intends to tackle head on.
31. One of the key areas of concern is violence against women. The GoR notes that gender-based violence among women and girls remains an area of serious concern. In 2010, at least 56 % of women aged 15-49 years had experienced physical or sexual violence.⁵⁷
32. At present, the HDI Gender Inequality Index (GII) value for Rwanda is 0.498, ranking of 159 out of 188 countries, which indicates there is still substantial progress to be made. However, Rwanda has the highest percent of women in Parliament (64%) in the world and a 32% rate of women's participation in all decision-making local government bodies, which is laudable.
33. Over recent decades, research has shown that involving women in development is a critical factor in achieving the eradication of poverty and improving overall socio-economic development. The GoR's country partnership framework report (FY14-FY18) affirms that Rwanda has made significant gains in its commitment to achieving gender equity: "The overall goal is that by 2020 “girls and boys will have achieved equity of voice, participation, and access to every area of economic growth and poverty reduction represented in national policy and law”. The specific target areas are:

- Gender equity in halving the proportion of people living below the poverty line by 2015;
 - Gender equity in a reduced income disparity;
 - Gender equity in increased GDP per capita;
 - Gender equity within the increased average GDP growth rate; and
 - Gender equity in progress toward the MDGs.⁵⁸
34. According to the UN Food and Agriculture Organization, if women had the same access as men to agricultural resources, production would increase by 20-30%, with the possibility of reducing the number of food insecure people in the world by 12-17%. At the same time, education and economic empowerment of women has significant impact on reducing poverty: educated mothers are more than twice as likely to send their children to school as mothers with no education; women reinvest up to 90% of their incomes back into their households, compared to 30-40% by men (International Planned Parenthood Federation). In addition, women's unpaid labour is estimated to contribute up to 50% of GDP in some developing countries. Thus, the socio-economic benefits of investing in improving the economic and educational status of poor women in developing countries cannot be ignored.
35. In Rwanda, more female-headed households live in poverty than those headed by males (47% compared to 44%, respectively). Women's literacy rates are lower than men's (60% compared to 70%, respectively), which further constrains already limited opportunities in terms of accessing resources, and participating in the overall decision-making processes in the households. In rural areas, the primary source of economic vulnerability for women can be the divorce/death of a husband, important in terms of women's access to assets as social norms and intra-family arrangements determine ownership and access to assets (i.e. land ownership, livestock, non-farm business assets).
36. Women and children often bear the worst brunt of natural disasters - not only directly, but also indirectly. Since women are often left out of the disaster planning processes, when it comes to emergency preparedness, they tend to have less knowledge about looming disasters and how to protect themselves. Taking a gender differentiated approach to addressing the impacts of climate change and variability can lead to more robust strategies that reduce the vulnerabilities of both women and men, resulting in an overall better future for all. Removing gender-based inequalities and social exclusion enhances the abilities of communities to cope with and recover from disaster risks and climate events.
37. Women face challenges in many aspects of social and economic life (i.e. harmful social norms, overburden from domestic and care work, discriminatory customary practices, among others). Women are primarily responsible for subsistence farming, in charge of collecting water and fuelwood, but have limited access to extension services and financial facilities. In the event of negative climate shocks (i.e. droughts/floods), women feel particularly vulnerable given their reliance on natural resources for

livelihood, which can lead to negative coping strategies (i.e. behaviours in the reduction of food intake). Gender inequality amplifies in the face of extreme events because it leads to a loss of access to resources (i.e. land and livestock), loss of social cohesion networks in the community and increased potential for gender-based violence.

38. This SPCR will support the implementation of diverse integrated strategies to enable women and men to cope and adapt to the effects of climate change. In each of the four programmes, the SPCR provides gender considerations that can help to shape a robust, and gender inclusive project design that may provide resources or various forms of support needed to cope with the impacts of climate change.
39. **Agriculture Vulnerability:** While the statistics vary, the Rwandan agricultural sector is the main employer, a key contributor to GDP, and wholly responsible for the food security of the country. Agriculture is critical to Rwanda's growth and reduction of poverty. The small country of just 2.6 million hectares dedicates more than 76% of the land to agriculture. Rwanda has three main agriculture seasons: Season A, starting in September and ending in February of the following year; Season B starting in March and ending in June of the same year; and Season C (for marshlands), starting in July and ending in September of the same year.
40. In Rwanda, women have higher propensity to work in agriculture than men in the rural population working in agriculture (92% compared to 77%, as per 2012 population census), yet women are less represented in agribusiness; they account for only 24% of the agro-dealers in Rwanda. About 25% of the (rural) households in Rwanda are headed by women.
41. In Rwanda, 80% of farm households practice small-scale, subsistence, rain-fed farming, using traditional technologies and practices that make it particularly vulnerable. According to the 2016 Season A survey, only 1.6% of agricultural operators practiced irrigation, translating to an average crop yield that was low compared to potential yields, and production that was exposed to risks such as weather-related shocks as well as pest and disease outbreaks.⁵⁹
42. The prolonged droughts in the eastern and southern regions and unpredictable rains and floods in the northern and western regions are also having negative impacts on agricultural production. Agricultural production is further hampered by deforestation and soil erosion; recurrent droughts threaten agriculture, particularly due to the rain-fed nature in Rwanda. Added to this, rising temperatures influence crop and livestock productivity through crop failure and increased diseases and pests. In much of Rwanda's highland agriculture, rising temperatures make way for new pests that were previously unable to survive at the higher altitude.
43. Although subsistence farmers are most affected, the vulnerability to climate variability and change extends to all aspects of the agricultural value chain. Rwanda's high dependency on tea and coffee in

the export sector, may be affected by rainfall variability, giving way to lower annual production volumes.⁶⁰ Temperature rise may also mean that the hospitable climate for growing tea must increase in altitude, which then reduces the potential land available for production. While crop substitution on land previously used for tea is possible, the export value of these crops will not be able to rival tea.

44. Lastly, confined grazing (zero-grazing, cut-and-carry) has replaced grassland pastoralism in most areas of the country. Droughts, particularly in the east and parts of the south, resulting in reduced water and feed availability, will affect the livestock sector. These losses will, in turn, affect the dairy value chain.
45. **Water Vulnerability:** Although Rwanda is considered to have sufficient water resources, it is highly vulnerable to current climatic variability through flood and drought episodes. As rainfall variability is related to overall impacts on hydrological flow, water storage and availability, climate-related impacts on water resources lead to more floods and dry spells, while groundwater recharge diminishes.
46. In recent years, climatic patterns have become less predictable. The possibility of more extreme climatic events, such as prolonged drought, has raised concerns for water access, even in areas hitherto known to be water secure. With reduced and increasingly unreliable rainfall, agriculture – the biggest water user – is expected to rely more on irrigation. This will, undoubtedly increase the pressure on water resources. Therefore, in the near future, Rwanda’s main water resource management (WRM) challenge will be meeting increasing multiple water demand for internal use and transboundary needs, as it balances declining water availability, ecosystems degradation, pollution and climate change. Moreover, because of increasing population pressure and declining water quality and quantity, access to clean water will feature as a problem. Coordinated internal use and enhancing trans-boundary water cooperation are some of the critical and immediate priorities for the GoR.⁶¹
47. **Energy Vulnerability:** In order for Rwanda to meet the 2018 target of connecting 70% of Rwandans to the national grid, a near tripling of the current connected number, which is a strong driver in Rwanda’s efforts to reduce rural poverty from 45% to 20% by 2018, Rwanda will need to think carefully about how it builds a low carbon energy mix.⁶² Rwanda’s INDC application has supported an increase in renewable energy and aims to harness diversified energy potential to support the creation of off-farm jobs and growth in commercial activities.⁶³ As the Rwandan middle class grows, and demand for energy increases, Rwanda will position itself to draw on the private sector, as outlined in the *National Energy Policy* and the NST, to help drive large investments in the energy sector.
48. **Land and Natural Resource Vulnerability:** In Rwanda, 90% of the population depends on the land for survival and prosperity. Services and products supported by ecosystems are critical for the health and economic well-being of communities, as well as for the greater economy of Rwanda. These

ecosystems are highly exposed and sensitive to climate variability.⁶⁴ The most current environmental risks due to climate change include: prolonged seasonal drought, dry spells in rainy seasons, and recurrent droughts.⁶⁵ A wide range of non-climate stressors, such as erosion, invasive species, population growth, and overexploitation and poaching of natural resources, also affect the natural environment, and may be exacerbated by climate change.⁶⁶

49. Climate change impacts in densely populated Rwanda are amplified by a fast-growing population, with a large portion (45%) of the population living below the poverty line and increasing competition for dwindling natural resources.⁶⁷ For example, due to population pressure, much of Rwanda has been deforested – with resulting soil degradation and erosion – which worsens the impact of drought.⁶⁸
50. Urbanisation is also leading to high pressure on urban land, with new and increasing conflicts between different land uses.⁶⁹ This has led to unsustainable and unsafe land use practices, including: settlements on steep slopes and in floodplains, deforestation, overcrowding in urban areas, and poor waste management.⁷⁰ This makes it critical for Rwanda to incorporate sustainability and climate change adaptation measures into land use and tenure policies now, to accommodate larger future generations and to reduce climate change risks through mitigation efforts implemented today.⁷¹
51. **Transport Vulnerability:** Principal impacts of climate change in Rwanda that have implications for the transport sector are temperature rise and change in precipitation patterns. A transport sector working paper (part of Rwanda's Green Growth and Climate Resilience Strategy) noted, "Climate change is a threat to transportations systems in a number of ways. The most obvious is the infrastructure systems that transport modes rely on. Routes and supporting ground works can be damaged and destroyed by excessive climatic variation, from flooding washing away surfaces and preventing access, to excessive heating deforming and damaging structures. This is of increased importance in countries reliant on few modes and routes, such as Rwanda. The damaging of a key transport route can cripple a nation's economy for months if not years, severely hampering development in the long term. Extreme climatic events also increase the cost of designing, constructing and maintaining transport infrastructure."⁷² Thus, transportation infrastructure and systems in Rwanda need to take into account future climatic conditions that are likely to be different from the conditions today's infrastructure is designed for.⁷³
52. **Cities and Settlement Vulnerability:** Principal impacts of climate change with implications for urban development and the built environment are temperature rise and change in precipitation patterns. These create additional impacts such as increased humidity in some regions and certain parts of the year, increased dryness and aridity in some regions and certain times of the year, an expected increase in extreme events such as wildfires, floods, and – particularly relevant for Rwandan cities – landslides.⁷⁴ The already arid eastern part of the country is expected to experience longer, more frequent, and more

intense drought conditions, while the northern part of the country will likely witness more flooding and damage from intense rainfall events.⁷⁵ These climatic changes are likely to further strengthen rural-urban migration trends as rural livelihoods become more precarious. Rwandan cities and urban areas must adapt these to anticipated threats.

53. **Health and Disease Vulnerability:** Rwanda's high annual precipitation rates and climate variability already bring high risks from vector and water-borne diseases. Increases in temperatures and changes in future rainfall patterns will likely result in an increase in numerous health risks and the proliferation of diseases.
54. Work done by REMA on mainstreaming climate change into the health sector indicates that the potential increase in water-related epidemics could range from 12 to 27% for malaria and from 11 to 17% for schistosomiasis.⁷⁶ Given the number of pathogens (i.e. approximately two thousand known pathogens of humans and several thousand pathogens of livestock) and the evidence of strong links of many to climate, it seems conceivable that a significant change in climate this century will impact on at least some of them, possibly exposing human or animal populations to new disease risks.⁷⁷
55. The worsening food security situation that could be sparked by climate change has negative impacts on health, particularly that of already vulnerable groups such as children, pregnant women, elderly people and the poor.⁷⁸ REMA further notes that the effects of prolonged droughts include: reduction the availability of clean water for drinking, cooking and hygiene; increase food insecurity and access to an adequate and balanced diet; reduce incomes and livelihoods of agricultural households; increase poor economic performance at a macro-level as a result of agricultural failure; and disrupt water supply and power production, thereby reducing the availability of water and power to health centres.⁷⁹
56. The country has also experienced major floods over several consecutive years, resulting in serious health problems, displacement, large-scale erosion, and damage to infrastructure.⁸⁰ In some parts of the country, this led to significant losses including human lives, as well as an increase in incidences of malaria, cholera, meningitis and other waterborne diseases.

2.4 BUILDING CLIMATE RESILIENCE

57. Rwanda remains vulnerable to climate change, and there is still a pressing need to address climate change vulnerability in all major sectors in Rwanda. Addressing Rwanda's vulnerability to climate change calls for interventions that are focused on and explicitly target climate change impacts and consequences.
58. In Rwanda, it has become clear that sustainable socio-economic development is inherently dependent on understanding, and harnessing, the environment and natural resources of the country, in order to

achieve sustainable and equitable economic growth. By the same token, climate change – which is in itself a systemic challenge arising from a complex interaction of factors – must also be addressed consistently through a system-wide approach.

59. **If Rwanda is to safeguard its hard-fought development gains and not lose them incrementally to climate change, it must ensure that its entire development apparatus is climate-resilient, lest the system as a whole be straitjacketed or handicapped by the damaging impacts of climate change.**
60. In this context, Rwanda has made tremendous progress in putting strong, forward-looking, ambitious climate change policies, strategies, frameworks, and guidelines in place. A crucial component of this landscape is Rwanda's Green Growth and Climate Resilience Strategy (GGCRS). The GGCRS, adopted in 2011, lays out Rwanda's vision of being a developed, climate-resilient, low-carbon economy by 2050, and carves out fourteen programmes of action that are intended to build and strengthen adaptive capacity and to collectively enhance Rwanda's resilience to climate change. This is meant to enable Rwanda to have robust local and regional knowledge to be able to respond and adapt to changes in climate and the resulting impacts, supporting other African countries as a regional services hub to do the same.⁸¹ The GGCRS represents a progressive first step towards climate resilience and a foundation for future climate change resilience interventions – including those encapsulated in the SPCR – to build on.

3 INSTITUTIONAL AND GOVERNANCE CONTEXT

61. Rwanda's planning and procedural ecosystem is extremely robust, with sectoral, district, national and supporting regional strategies linked to a centralized planning process. At the core of each planning document is the implicit drive to reduce poverty and increase economic development.

3.1 KEY DEVELOPMENT PLANS, POLICIES AND STRATEGIES

62. Rwanda has made significant progress in its efforts to identify the country's climate change risks and vulnerabilities, and has put in place key policy and strategic instruments that provide guidance on climate change response – in terms of both mitigation and adaptation. Environmental resource management and protection is guided by the **National Policy on Environment (2003)**, which aims to improve human well-being, the judicious utilization of natural resources, and the protection and rational management of ecosystems for sustainable and fair development of Rwanda. In order for Rwanda to tackle climate change, this national policy needs to be mainstreamed into the national vision and sector strategies.
63. At the policy and strategy level, protection of environment and sustainable natural resource management is one of the three cross-cutting areas in **Vision 2020**. In fact, Rwanda's Vision 2020 clearly defines the future of the country. Currently, the major areas of attention are the mainstreaming of environmental sustainability into productive and social sectors and reducing vulnerability to climate change.⁸² Vision 2020 aims to transform Rwanda from a subsistence agriculture economy to a knowledge-based society earning 900 USD per capita, making Rwanda a middle-income country by 2020. The **Economic Development and Poverty Reduction Strategy (EDPRS)** is the framework for achieving Vision 2020 and the **Sustainable Development Goals (SDGs)**.
64. Rwanda has been committed to addressing the challenge of climate change since 1998 when it ratified the United Nations Framework Convention on Climate Change (UNFCCC) and later the Kyoto Protocol in 2003.⁸³ Rwanda submitted its Initial National Communication to the UNFCCC in 2005, **National Adaptation Programmes of Action (NAPA)** in 2006, the Second National Communication in 2012, and the Intended Nationally Determined Contributions (INDCs) in 2015.
65. The **Green Growth and Climate Resilience Strategy (GGCRS)** aims to guide the process of mainstreaming climate resilience and low carbon development into key sectors of the economy.⁸⁴ The GGCRS identifies climate change responses and recommended areas of intervention across fourteen different Programmes of Action, which are meant to build and strengthen adaptive capacity and to collectively enhance Rwanda's resilience to climate change across the major sectors of Rwanda's

economy. Since the GGCRS came into effect, Rwanda has consistently integrated climate change adaptation responses in its EDPRS, and aligned several GGCRS-recommended interventions with the targets and priorities under the EDPRS. This has given effect to the GGCRS to a certain degree. However, there is a recognition amongst government as well as non-governmental stakeholders that Rwanda needs to take additional concerted steps to realize GGCRS objectives and to translate the GGCRS into large-scale, on-the-ground implementation. To this end, Rwanda must draw a critical mass of funding support to enable strategic, high-impact, technically viable, and financially bankable climate-resilient investments.

66. The Government of Rwanda has recognised the strong links between poverty and the environment / natural resources and, therefore, the principles and objectives of environmental management and sustainable natural resource use have now been largely mainstreamed in public policy and planning, as well as in the programming of Rwanda's main development partners.
67. Rwanda has also looked at ways to assess and support the implementation of environment and climate change activities. It has provided checklists for environment and climate change mainstreaming into development sectors and district planning, in an attempt to ensure that climate change, as stipulated by **Economic Development and Poverty Reduction Strategy 2 (EDPRS 2)**, remains at the forefront of sectoral and cross-sectoral planning.
68. Although mainstreaming of environment and climate change into sectors strategic plans (SSPs), as well as districts' development plans (DDPs), has improved, a more targeted and effective environmental and natural resources and climate change (ENR & CC) mainstreaming is needed in Rwanda, particularly for the new planning period under the **latest EDPRS, the National Strategy for Transformation (NST)**. The NST's segment on environment, natural resources, and climate change is likely to focus on the four priority areas that have provisionally been selected for inclusion at the time of writing, namely: sustainable agriculture; sustainable urbanisation; sustainable industries; and sustainable energy.⁸⁵ This also follows the aspirations of the new **Vision 2050** and the Green Growth and Climate Resilient Strategy (GGCRS).
69. Other national documents, like the sector based strategies for climate change and/or environmental resources, have attempted to provide sectoral and programmatic guidance to the effects and mitigation and adaptation solutions, but require significant strides in implementation as well as real budgetary expenditures to see tangible improvements in these sectors.
70. **Appendix F contains a more detailed sector-level overview of the policies and legislation that have climate implications. In addition, more detailed overviews of each of the themes were conducted for the Gap and Needs Analysis (i.e. the preceding phase of this project).**

3.2 KEY INSTITUTIONS

71. The Rwanda Environment Management Authority (REMA) is a public institution under the Ministry of Environment (MoE) responsible for ensuring that issues relating to the environment and climate change are integrated into all national development programs. To achieve its objectives, REMA has been working with government Institutions, the private sector, and civil society, with the support of development partners.
72. The Fund for Environment and Climate Change (FONERWA) was launched in 2014, with aim of being the engine of green growth, mobilising and channelling domestic and international financing to public and private environment and climate change projects. The fund supports projects that align with the country's commitment to a strong and prosperous green economy.⁸⁶

3.2.1 NATIONAL GOVERNMENT

73. At the national level, the MoE and the Ministry of Land and Forestry (MINILAF), previously under one ministry known as the Ministry of Natural Resources (MINIRENA), are responsible for designing and monitoring national policies related to climate change and environment. REMA, through the Department of Climate Change, is the official organ in charge of implementing national policies related to climate change and environment.⁸⁷
74. The Ministry of Finance and Economic Planning (MINECOFIN)'s is responsible for macroeconomic management, resource mobilisation and allocation for public investments, planning and coordinating economic activities across sector Ministries and more recently ensuring population issues are integrated into sector priority setting. MINECOFIN is a member of the Environment and Natural Resources (ENR) Sector Working Group (SWG), and provides guidance to the overall strategic planning process for the ENR sector. With the help of FONERWA and MINECOFIN, the inclusion of environment and climate change into the Budget Call Circular (BCC) has allowed for check-lists and indicators to integrate environment in sectoral and district plans.
75. Although REMA and MoE are the lead institutions for climate change activities in Rwanda, many other ministries and government departments are also involved in climate change-related activities and are critical stakeholders in the national programme. As identified in the INDC⁸⁸:

“Successful implementation of the actions requires a close coordination and collaboration between: MoE, REMA and all potential stakeholders from private sector, civil society and public institutions including Ministry of Land and Forestry, Ministry of Agriculture and Animal Resources, Ministry of Trade and Industry, Ministry of Local Government, Ministry of Infrastructure, Ministry of Education, Ministry of Health, the Ministry of Finance and Economic Planning, Ministry of Disaster

Management and Refugee Affairs, Rwanda Meteorology Agency, National Institute of Statistics, Rwanda Development Board, Rwanda Standards Board, Rwanda Agriculture and Animal Resources Board; Rwanda Energy Group; Water and Sanitation Corporation; Rwanda Natural Resources Authority, Rwanda Water and Forestry Authority, Rwanda Biomedical Centre, Rwanda Transport Development Agency; Rwanda Housing Authority; Rwanda Revenue Authority; National Industrial Research and Development Agency, research centres, and universities.

To coordinate and monitor the implementation of actions in different sectors, Rwanda has set up different bodies and institutional arrangements to operationalise these actions. Specifically, these are: Green Economy Technical Coordinating Committee and FONERWA, as a national green fund to mobilize additional internal and external climate funds. MoE has been accredited as implementing entity for Adaptation Fund and Green Climate Fund (GCF), while REMA has been nominated as national designated authority for GCF. (These institutions are based on a sector-wide approach and work closely with development partners, civil society, academia and the private sector.)”

In order to keep gender considerations central to planning and implementation, the key stakeholders for mainstreaming gender equality is the Ministry of Gender and Family Promotion (MIGEPROF), which has put in place a National Gender Policy to help guide the sectors.

3.2.2 LOCAL GOVERNMENT

76. The Ministry of Local Government (MINALOC) is responsible for the establishment and coordination of good governance programs and policies, and high-quality territorial administration that promote national economic, social and political development. The Ministry implements a number of programs ranging from good governance, decentralization, community development, local finance and social protection.⁸⁹ To mainstream climate change into district processes, Rwanda is assessing and supporting the implementation of environment and climate change activities. This is achieved by providing checklists for environment and climate change mainstreaming into development sectors and district planning, in an attempt to ensure that climate change remains at the forefront of sectoral and cross-sectoral planning across the various levels of government.

3.2.3 CIVIL SOCIETY

77. For Rwanda to succeed in its efforts of climate mainstreaming, civil society organisations (CSOs) have to be mobilised. Where capacity gaps are identified in public sector institutions, interventions should be supported by CSOs. Added to this, CSOs should be supported in its efforts to implement the projects and programmes within their areas of operation, such as developing needed technical skills,

institutional support and logistical resources for the implementation of specific actions.⁹⁰ It is recommended that when each programme and subsequent components go through their design phase, civil society is brought in to help shape, implement, and monitor each programme.

3.2.4 PRIVATE SECTOR

78. As the future engine of growth, the private sector has a primary interest in environmental stewardship, especially in Rwanda where most of the development hinges on the health and productivity of ecosystems. Entrepreneurs' ability and self-drive to identify business opportunities and to design innovative solutions to many challenges will have to be leveraged to address Rwanda's emerging environmental challenges, which are inherently global. Therefore, specific incentives to encourage best practices in environmental sustainability and value-adding investments in the environment and natural resources sector should be promoted. This is also in accordance with the Rwanda's policy of private sector-driven economic development.⁹¹
79. There is scope to expand the role and overall involvement of the private sector in climate action at the national levels. FONERWA's portfolio, as well as Resources Efficient and Cleaner Production Centre (RECP), demonstrates growing interest of private sector actors in the rapidly evolving climate change landscape.

3.3 INSTITUTIONAL COORDINATION

80. Rwanda's governance architecture is characterised by higher levels of institutional capacity than much of Africa, and indeed most LDCs worldwide. One consequence of this is that individual ministries and authorities are often staffed by highly qualified and trained individuals who are well-versed in issues relating to their sector. Ministries and authorities are demonstrably accomplished in terms of planning, designing interventions, and managing implementation and reporting in their respective sectors. However, an aspect that merits strengthening is **inter-sectoral coordination and joint efforts across multiple government agencies**. The practice of joint Imihigo (performance-based contracting involving multiple entities, especially in the form of Public-Private Partnerships) is a step in this direction, but hasn't fully taken root yet.
81. This is especially true of interventions that are aimed at climate adaptation and building climate resilience. While most sectors in Rwanda have already taken initial steps towards identifying sector climate change vulnerability and introducing administrative instruments, programmes and projects that reduce vulnerability and build adaptive capacity, there remain sectors that have not been early movers on climate change adaptation and thus need to catch up. These early efforts, however, have tended to take shape through siloed, sector-specific channels. Even the GGCRS, which articulates the need for

resilience across sectors, is implemented piece-meal by individual ministries and departments representing varied sectors.

82. As climate change is a systemic challenge arising from a complex interaction of factors, it must also be addressed consistently system-wide. This is because activities in one sector of the economy could exacerbate detrimental impacts of climate change in other sectors. As a corollary, climate change resilience in any one sector could, if well integrated with other sectors and well designed to avoid unintended maladaptation elsewhere, have co-benefits in other sectors and create a positive, system-wide ripple effect of climate change adaptation.
83. Thus, there is a need for a more **cross-sectoral, systemic approach to climate resilience in Rwanda**. This could be catalysed by ensuring that climate change adaptation interventions are designed and implemented in ways that account for inter-sectoral linkages, co-benefits, trade-offs between sectors, and which leverage adaptation work taking place in one part of the economy to strengthen adaptation in another. There is benefit, therefore, to shaping a more holistic programme of climate resilience that makes socio-economic, ecological, and institutional systems stronger across the board in the face of climate change, and which provides a coherent framework within which all sectors can collectively enhance climate resilience in Rwanda.
84. The proposed implementation arrangements, discussed in Chapter 7, seek to facilitate the integration of climate resilience thinking across various ministries responsible for key issues in Rwanda's sustainable development. The proposed arrangements build on existing institutional arrangements in Rwanda that will allow for continued integration into the national budgeting process.



PART B

4 RATIONALE FOR SPCR SUPPORT

86. The SPCR has the ability to drive the type of transformational approach to climate change resilience that Rwanda is seeking. Much of the past work on climate change adaptation has been piece-meal, or once-off projects in specific sectors. However, to build economy-wide climate change resilience, a multi-sectoral approach is called for, which the SPCR's programmatic framing is well suited to catalyse.
87. Through its robust policy and regulatory frameworks and through projects already initiated, Rwanda has demonstrated a firm commitment to tackling climate change. Responding to climate change is consistently treated as a national priority, and there is political will to act. There is also a sound understanding of climate change impacts, built on a credible and scientific evidence base.
88. This momentum that exists in Rwanda for climate change action and building climate resilience needs support to be sustained. As a small developing country, Rwanda is resource-constrained and there is a mismatch between what is needed to strengthen and embed climate change resilience in Rwanda, and the available domestic support (which gets distributed amongst a range of pressing needs beyond climate change).
89. Support would enable Rwanda to expand existing climate change resilience efforts that have already shown promising results, and to scale up pilot programmes and demonstration projects. It would also allow Rwanda to introduce projects to new locations that have climate change vulnerability, and to increase the reach of initiatives that have already been shown to be replicable.
90. Rwanda's institutional framework, especially at a decentralized level, provides an enabling environment for an implementation approach which is flexible and adapted to local needs. Support for climate resilience interventions would yield strong results in such an environment, with local buy-in ensuring the project approaches and outcomes would be responsive to local needs.
91. The SPCR also has the ability to support an ecosystem of climate change resilience actions that cover the breadth of Rwanda's political economy, from information, to institutions, to infrastructure ("the three Is"), and to drive mainstreaming of gender considerations into climate change resilience and broader development in Rwanda.
92. Some key factors underpinning the rationale for SPCR support include the following:

- Despite noteworthy adaptation efforts to date, Rwanda remains vulnerable to climate change, and there is still a pressing need to address climate change vulnerability in all major sectors in Rwanda.
- Addressing Rwanda's vulnerability to climate change calls for interventions that are focused on and explicitly target climate change impacts and consequences. In other words, while broader development initiatives are critical for and do contribute to more dispersed resilience in Rwanda (and thereby also build resilience in terms of the population's capacity to deal with climate variability and climate change shocks and stresses), they alone cannot reduce specific climate change vulnerabilities in sectors and regions. For this, interventions must be tailored to the particular vulnerability being tackled, and the corresponding adaptive capacity to respond to the specific challenge must be strengthened. This requires deliberate climate change solutions, starting from the project conceptualization stage through project design, and project implementation, which the SPCR can support.
- Climate resilience solutions that operate in a continuum, or in an ecosystem of solutions, are likely to bring added value to climate resilience efforts in Rwanda. There is a need for adaptation interventions that not only improve adaptive capacity in one sector, but are designed to have co-benefits in other sectors. Future climate change resilience measures must not operate in isolation, but should instead be operationalized with inter-sectoral interlinkages. Water resources are often the appropriate connective strand for such cross-sectoral approaches, and this may be especially appropriate in a country like Rwanda that experiences water scarcity and shortages despite having an overall abundance of water, and where climate change is only going to exacerbate the unevenness and unpredictability of water availability and access (and where sectors such as agriculture and forestry are already at odds over water allocation and restrictions, and where trade-offs exist regarding allocations between water supply for domestic and industrial purposes versus agricultural purposes).
- Rwanda's INDC application has supported an increase in renewable energy and looks to increased energy potential to support the creation of off-farm jobs and a diversification of commercial activities. Even Rwanda's INDC does not provide an estimated costing or budgetary envelope for the country's commitments. Thus, the SPCR provides an excellent opportunity to begin developing a robust financial estimate of Rwanda's climate resilience investment needs and providing investment to some of the outlined goals.
- The level of need for programs and projects that target climate change resilience is higher than the Rwandan government's budgetary envelope. At present, climate change mainstreaming in the government's financial and budgetary mechanisms has resulted in climate change not being

recorded as a separate line item or budgetary category in Rwanda. Climate change has consciously and strategically been included under the larger budget category for environment and natural resources. Thus, presently it is not possible to disaggregate the budgets proposed, approved, disbursed, and spent on climate change, from other environmental and natural resources activities. While this makes assessing the level of need for climate change investment in each sector impossible (without a parallel process of costing and financial assessment which is outside the purview of this current assignment), it is feasible to regard the combination of sectors' proposed environment and sustainable development-related activities as a proxy for a climate change investment needs wish-list. Such numbers significantly outweigh the government's budgetary ceiling, indicating gaps that external investment identified in the SPCR can fill.

5 PARTICIPATORY APPROACH TO THE SPCR

5.1 DEVELOPING THE SPCR

93. Rwanda's SPCR has emerged from an extensive consultative process, with a series of stakeholder engagements, both in and out of Kigali, field visits, briefings, individual expert interviews, technical working group sessions, and presentations over the course of six months.
94. In designing and facilitating stakeholder interactions, the government of Rwanda has made every attempt to ensure diversity in the participants, and that the needs and interests of a wide spectrum of actors are addressed. The concerns of vulnerable groups have been kept in mind, as well as the priorities of non-national governments in Rwanda (i.e. provincial and local governments).
95. Over the course of six months, through a sequence of workshops that built on each other, the SPCR was developed in an iterative manner. The discussions and input in each stakeholder session informed the evolution of the SPCR in its subsequent stage. The vast majority of participants from different sectors and agencies remained engaged throughout the process, becoming intimately familiar with the SPCR and its constituent elements. This consistent engagement not only helped the SPCR develop in a cogent, coherent, and comprehensive manner, it also contributed to the capacity building of the cohort of stakeholders who were involved over time, giving them greater insights into investment frameworks as well as climate change resilience.
96. A full list of engagements, including individuals who participated, their institutional affiliations, the name, date, and theme of the event they participated may be referred to in the SPCR's Appendixes. In addition to sector consultations, FONERWA carried out consultations with civil society, the private sector, donors, and gender mainstreaming representatives. Readers are encouraged to review Appendix C's detailed accounts of the participatory process behind the SPCR. A summary of major events has been provided here.

Table 1: Summary of Participatory Process in Developing the SPCR

Date	Event
10 - 13 April 2017	Inception Meeting and kick-off workshop with core stakeholders
15 - 19 May 2017	Joint Technical Mission (<i>including stakeholder workshop at Lemigo Hotel and field visits</i>)
19 - 23 June 2017	Internal Technical Mission (<i>including stakeholder consultations with ENR sector working group in Musanze</i>)
28 - 31 August 2017	MDB Technical Mission (<i>including presentation at ENR sector working group in Kigali and technical working group sessions for the SPCR's four programmes</i>)
2 - 6 October 2017	Joint Technical Mission (<i>including national validation workshop and high-level meeting with Minister of Environment</i>)

5.2 IMPLEMENTING THE SPCR

97. The SPCR has been designed to enable participation by a broad spectrum of Rwandans in all stages of the climate change resilience efforts chosen for investment. The vast majority of activities under the SPCR's programmes involve explicit stakeholder engagement and consultation, and/or training and capacity building events, all of which provide a rich opportunity for greater public involvement in SPCR implementation.
98. In particular, institutional arrangements have been designed so that project governance involves persons from outside Rwanda's government. As the institutional architecture for each programme indicates, the Programme Management Units (PMUs) will be supported by members from the private sector, academia, NGOs, civil society, community-based organizations, and others beyond the ministry officials directly involved in administering the projects.
99. It is recommended that, during the detailed project design phase, explicit consultations with local government, the private sector, and civil society be conducted. Moreover, in order to address the needs of especially vulnerable groups and pay particular attention to gender, further stakeholder engagement and participation will need to be conducted with these special constituencies given primary importance.
100. The final results framework of the SPCR has ensured indicators that emphasize public participation in the implementation of the SPCR.

6 SPCR PRIORITY FOCUS

6.1 SPCR STRATEGIC FOCUS

101. The genesis of the SPCR is rooted in the eight Programmes of Action of the GGCRS: sustainable intensification of small-scale farming; agricultural diversity of markets; sustainable land use management; integrated water resource management; disaster management and disease prevention; resilient transport systems; low carbon urban systems; and climate data and projections.

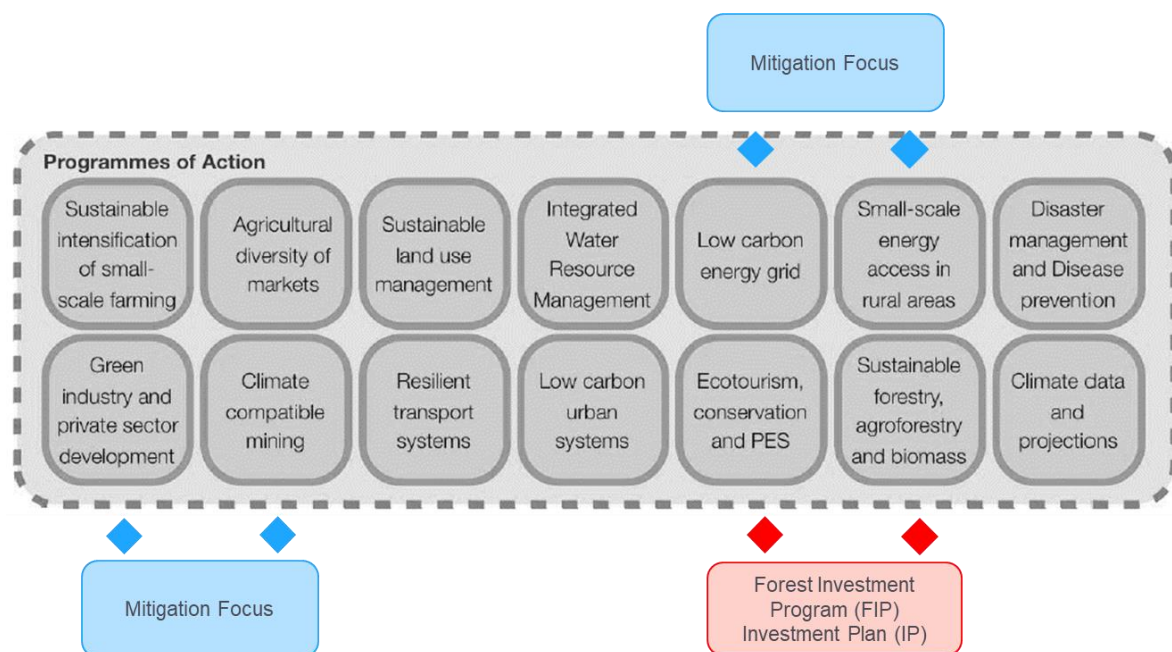


Figure 5: GGCRS Programme Areas of Relevance to the SPCR

102. The immense added value of the SPCR and of climate change resilience investments helps to move Rwanda's climate change adaption efforts away from a combination of disparate, once-off adaptation projects towards a programmatic approach. The evolution from the above Programmes of Action in the GGCRS to a multi-sectoral programme has been remarkably organic.
103. A crucial step in the development of the SPCR involved capturing priorities from eight GGCRS Programmes of Action into the four SPCR programmes. At the start of this transition, the eight GGCRS Programmes of Action that pertain to climate change adaptation were re-organized into groupings or clusters, with emerging cross-cutting themes. This was done through extensive stakeholder consultation and evaluation.

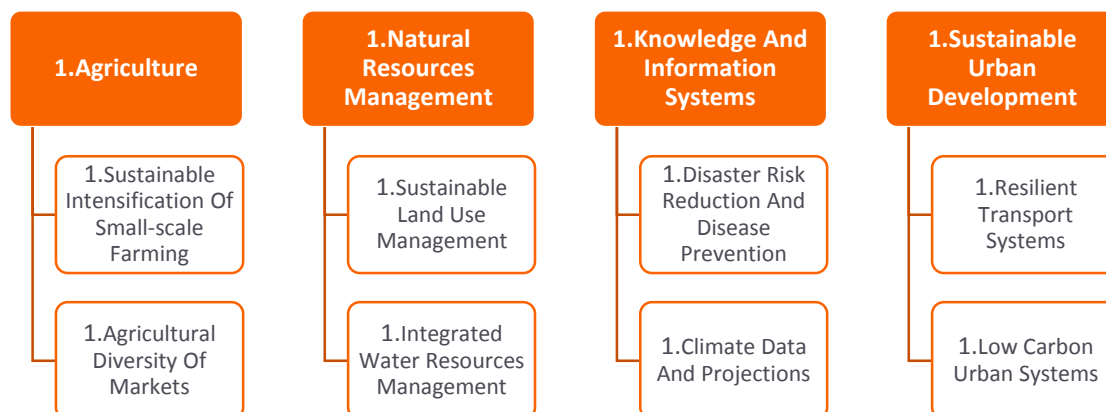


Figure 6: Moving from the GGCRC to the SPCR

104. These four groupings then lent themselves to being moulded into four discrete but interconnected investment programmes. The final evolution, which represents the innovation worthy of SPCR programmes and was also informed by stakeholder participation and guidance, developed the four groupings into four truly integrated programmes, with corresponding components and projects that are aligned with Rwandan priorities. These are discussed in detail in Chapter 8.

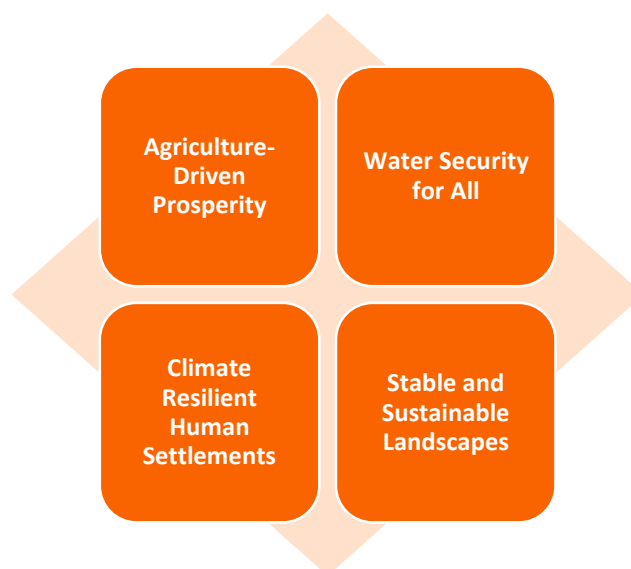


Figure 7: The Four Investment Programs of the SPCR

105. The four programmatic areas reflect the Government of Rwanda's priorities with regard to climate change and environment mainstreaming and have been designed against the following criteria:

- **Paradigm Shift Potential:** potential for scaling-up and replication; knowledge and learning potential; and systematic change towards low-carbon and climate-resilient development pathways (this criterion aligns with the PPCR Results Framework's focus on transformational impact);
- **National Ownership:** embedding climate resilience in national planning documents; coherence with existing policies; strategic engagement and sector coordination in planning and implementation; and capacity of implementing entity to deliver;

- **Economic Efficiency:** benefit-cost ratio of the project; impact per monetary unity; and cost-effectiveness; and
- **Gender and Vulnerable Peoples Impact:** pro-poor project agenda; and demonstrated ways in which project is inclusive.

6.2 SPCR STRATEGIC CROSS-CUTTING COMPONENTS

106. Three key building blocks of climate change resilience have been chosen as cross-cutting priorities in Rwanda's SPCR. This is intended to ensure that every one of the investment programmes reflects some element of the three cross-cutting priorities. The cross-cutting priorities, and the rationale for elevating them into overarching themes, are as follows:

Table 2: Cross-Cutting Priorities for the SPCR

Technical Capacity Building and Strengthening Institutional Coordination	Integrated Land Use Planning and Spatial Planning	Climate Services and Disaster Risk Reduction / Disaster Risk Management
Theme One	Theme Two	Theme Three
At its core, climate change resilience stems from adaptability and flexibility to cope with variability, change, stresses, and unexpected events. The degree of uncertainty in climate projections and the range of possible climate scenarios for the medium to long-term future necessitate that societies be nimble and have the wherewithal to manage change. This kind of dynamism and flexibility cannot exist without effective, adaptable, and flexible institutions that are geared to deal with variation and change. To manage climate change adequately, Rwandan institutions must both understand the implications of climate change and be capacitated (technically and otherwise) to design and implement solutions, and to do so in a coherent, coordinated, aligned manner.	How a society manages populations and activities across its territories has a significant impact on its ability to protect those populations and activities from climate change (as well as to mitigate its climate change contribution through emissions reductions). While Rwanda is increasingly aware of locations of high risk and vulnerability, it has not yet taken large strides in addressing such vulnerability through directed land use change. It has also not yet effectively used spatial planning tools and approaches to proactively integrate climate change resilience into the country's development future. All sectors can benefit from greater reliance on and use of spatial planning and land use planning to enhance climate resilience.	Actionable information sits at the heart of decision-making, and is even more critical for decision-making in the face of uncertainty. In Rwanda, both government agencies working to build climate change resilience and reduce climate change vulnerability, as well as communities working to be better prepared for and respond to climatic hazards, need more decision-relevant climate information. In order to be effective, the information must be conveyed in ways that allow the target audience to easily understand key messages, and grasp what their response should be. To prioritize the safety and well-being of its citizens and its productive economic activities against climatic hazards, Rwanda must integrate disaster risk reduction and management across all sectors.

6.3 RWANDA SPCR LOGICAL FRAMEWORK & RELATION TO PPCR LOGIC MODEL

107. The PPCR logical model and framework have been prepared by the CIF based on first-hand experience of the pilot countries and MDBs. A preliminary analysis across SPCR countries revealed that most pilot countries do not have the capacity to establish a complex M&E system. Thus, the revised model (December 2012) provides a basis for future monitoring and evaluation of the impact, outcomes and outputs of PPCR-funded activities. The PPCR's logical framework is captured in the figure below.

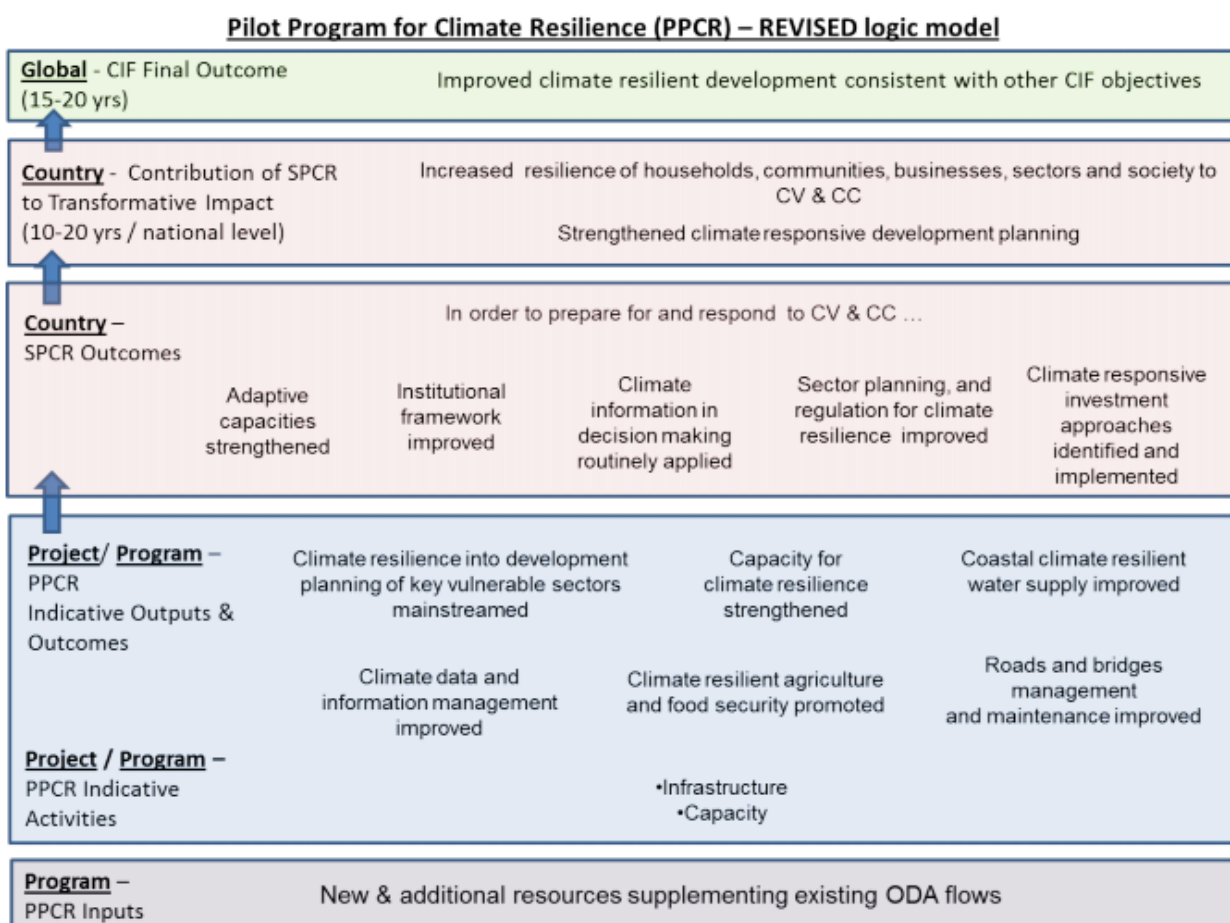


Figure 8: PPCR Logframe (CIF)

108. In recognition of the importance of outcomes emphasized by the PPCR, and the value of PPCR indicators in guiding and evaluating climate change resilience activities, Rwanda's SPCR has ensured close alignment between its four investment programmes and the PPCR results framework. Each one of the SPCR's projects contribute to one or more of the PPCR's priority outcomes. This alignment is depicted in the table below.

Table 3: Rwanda SPCR Logical Framework

RWANDA SPCR LOGICAL FRAMEWORK				RELEVANT ELEMENTS FROM THE PPCR LOGICAL MODEL
GENERAL OBJECTIVE				COUNTRY PPCR TRANSFORMATIVE IMPACT
To mainstream climate change in the most economically important and sectors most vulnerable to climate				A1. Increased resilience of households, communities, businesses, sectors and society to climate variability and climate change A2. Strengthened climate responsive development planning
Programme 1: Agriculture-Driven Prosperity	Programme 2: Water Security for All	Programme 3: Climate Resilient Human Settlements	Programme 4: Stable and Sustainable Landscapes	PPCR PROGRAM OUTCOMES
<p>To improve Rwanda's agriculture adaptive capacity against climate risks and hazards by improving the productivity of agriculture and subsistence farming.</p> <p>To build inclusive (gender inclusion, vulnerable groups and youth) resilience in selected value chains.</p> <p>(As well as B1, B2, B3, B4, and B5)</p>	<p>To promote water security for all in Rwanda in the face of socio-economic development and climate change, through improved and integrated water resource management, effective institutions and resilient infrastructure.</p> <p>To promote water security for all (especially of women and other vulnerable social groups) in the implementation and use of resilient infrastructure.</p> <p>(As well as B1, B2, B3, B4, and B5)</p>	<p>To improve climate resilience of the country's built environment by designing and constructing in ways that allow infrastructure and service delivery in human settlements to be more resilient to temperature and rainfall extremes as well as extreme weather, and to enable rural and urban socio-economic growth, and thereby reinforces broad-based resilience to climate change.</p> <p>To increase economically viable and environmentally sustainable livelihood options with a strong focus on integrating women's specific needs and reducing vulnerability to increased climate variability" or say special attention to gender dimensions.</p> <p>(As well as B1, B2, B3, B4, and B5)</p>	<p>To enhance Rwanda's adaptive capacity against climatic risks and hazards by strengthening landscape based resilience, building technical and managerial capacity for the complete value-chain of climate services, and supporting communities in efforts to reduce landscape degradation and instability, thereby reducing overall disaster risk and vulnerability.</p> <p>To build inclusive (gender inclusion, vulnerable groups and youth) stable and sustainable landscapes.</p> <p>(As well as B1, B2, B3, B4, and B5)</p>	<p>B1. Strengthened adaptive capacities B2. Improved institutional framework in place B3. Use of climate information in decision making routinely applied B4. Strengthened climate responsive development planning B5. Climate responsive investment approaches identified and implemented</p>

109. Transformation in Rwanda will arise by the expected results for each of the 4 programme areas resulting in outcomes for the programme. The programme outcomes will result in the transformative impacts. The expected results from each component link to the programme outcomes as follows:

Table 4: Rwanda SPCR Programme Outcomes

Expected results	Programme Outcomes
Programme 1: Agriculture Driven Prosperity	
Improved climate resilient value chains identified	B2, B4
Investment leveraged from the private sector to support climate-resilient adaptation in selected agricultural and agroforestry areas	B5
Increased cross-sectoral collaboration for mainstreaming climate resilience in national and local planning documents and projects; and	B1, B2, B3, B4, B5
Increased agricultural production and added value from agroforestry resources to increase climate resilience.	B1, B4
Programme 2: Water Security for All	
Effective and efficient water management in the face of socio-economic development and climate change;	B1, B2, B3, B4, B5
An integrated approach to water resource management;	B1, B2, B3, B4, B5
A high-level understanding of the surface and groundwater resources;	B3
Systems that alert decision-makers and citizens of impending water-related climate disasters;	B1, B3
Rehabilitated catchments that provide agricultural opportunities;	B1, B3, B4
Resilient infrastructure that is adaptable to the impacts of climate change, which also ensures that water users are more climate resilient;	B1, B3
Increase access to water resources and improved livelihoods for women and girls; and	B1
Improved household and community resilience due to reliable service delivery in terms of waste management.	B1
Programme 3: Climate Resilient Human Settlements	
Reduced risk of damage to human settlements from future climate change impacts including rising temperatures, heavy rainfall, flooding, wildfires etc. (with a focus on reduced risk of women and vulnerable groups);	B1, B3, B4
Improved preparedness for and response to large volumes of water from heavy precipitation, through better drainage and storm-water management, in targeted secondary cities and associated communities (especially amongst women and vulnerable groups);	B1, B2, B3, B4
Improved household and community resilience due to reliable service delivery in terms of waste management, as well as improved resource-efficiency (from re-use and recycling) that will strengthen longer-term economic resilience in the face of resource constraints sparked by climate change;	B1, B2, B4
Enhanced robustness of district roads and of the Nyabarongo bridge to face the impacts of climate change, and reduced risk of depreciation of asset value from climatic stresses; and	B3, B4
Increased cross-sectoral collaboration to develop and strengthen climate change resilience in human settlements, at the national level, in secondary cities, as well as district level (in the districts involved).	B2, B4, B5
Programme 4: Stable and Sustainable Landscapes	
Reduced risk of erosion, landslides, floods, as well as droughts in targeted geographic locations and associated communities, including for women and vulnerable groups;	B1, B3, B4
Improved preparedness for and response to floods and landslides in targeted geographic locations and associated communities, especially amongst women and vulnerable groups;	B1, B2, B3, B4
Adoption of more sustainable livelihoods options and income-generating activities in targeted communities, with a particular focus on women and vulnerable groups;	B1, B3

Enhanced provision of tailored climate services by Meteo Rwanda to end-users, through a more client-oriented approach, and improved project management and service delivery capacity (including through increased involvement of women in climate services); and Increased cross-sectoral collaboration to develop and strengthen landscape and ecosystem-based climate change resilience, at the national as well as district level (in the districts involved, including the Eastern Province).	B3, B5 B2, B4
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6.4 KNOWLEDGE AND LESSONS LEARNED

110. Knowledge generation and learning potential are critical considerations that have been factored into the development of the SPCR. The design of this SPCR provides ample opportunities for learning-by-doing, given the ambitious scope of the SPCR and its activities.
111. On an SPCR level, it will be important to establish central capacity, through the Steering Committee, as well as each programme's PMUs, that is dedicated to enabling learning-by-doing within the project and that is aimed at documenting lessons learned for wider applications beyond Rwanda.
112. Each project will need to detail a strategy to document learning, not only within Rwanda, but also for regional and global audiences, during the project design stage. The lessons learned may extend to particular technical areas or geographies, institutional approaches, cross-sectoral coordination, ways to exchange knowledge, capacity building, methods to promote the interests of women and vulnerable groups etc.
113. A significant focus of each programme, and indeed a core principle of the SPCR, is to build capacity to deal with the effects of climate change. Through the SPCR, capacity can be build and monitored in three related ways - built infrastructure capacity to deal with climate change; the capacity of organisations to make decisions relating to climate resilience that bring about systemic, cross-cutting resilience and are in the best interest of vulnerable populations; and the capacity of individuals to deal with the effects of climate change. Each of the projects, will need to think about ways to speak to all three of these levels.
114. Knowledge products are a useful tool to solidify internal learning, and provide opportunities to reflect on lessons learned throughout the various phases of the SPCR. They also provide external participants, who have not been a part of the SPCR process, an opportunity to easily interact with and learn from the transformational work undertaken during the SPCR. Knowledge products can be developed from information generated through monitoring of projects. Some examples of knowledge products may include: policy briefs, fact sheets, research and survey reports, data sets and information on many Rwandan ministry web portals.

7 IMPLEMENTATION ARRANGEMENTS

7.1 INSTITUTIONAL RESPONSIBILITIES

115. In Rwanda, past efforts focusing on cross-cutting, economy-wide climate change resilience have not been reflected in correspondingly cross-sectoral and multi-institutional governance arrangements. Typically, any one major programme or project falls within the ambit of one ministry that leads implementation and is accountable for results. This has sometimes resulted in insufficient coordination between different institutions.
116. The SPCR has been developed keeping in mind that climate change impacts have a system-wide effect and that truly systemic climate change resilience needs to bring together all major sectors and key players in the economy. This would suggest the need for climate change resilience efforts to be designed, developed, and implemented collaboratively.
117. Implementation of the SPCR will draw on existing institutional arrangements to ensure that the SPCR is streamlined into national processes. As shown in the figure above:
- The Steering Committee will be comprised of members from the Environment and Natural Resources Working Group, co-chaired by MINECOFIN.
 - In order to ensure that there is strategic coordination amongst all of the programmes, FONERWA, within their governmental mandate, will support the integration and streamlined reporting for each of the programmes.
 - Each of the programmes has a relevant ministerial chair. Once the components and projects are further elaborated, more specific institutional arrangements will be drawn up. At present, each described ministry will lead the PMU, supported by relevant ministries from different sectors, other governmental institutions, members of civil society, academia, NGOs and the private sector.
118. Once programmes are fully developed in SPCR and ready for implementation, it is recommended that, using existing government frameworks where possible, cross-programmatic institutional arrangements should be designed to enable true multi-sectoral approaches to climate change resilience in Rwanda.

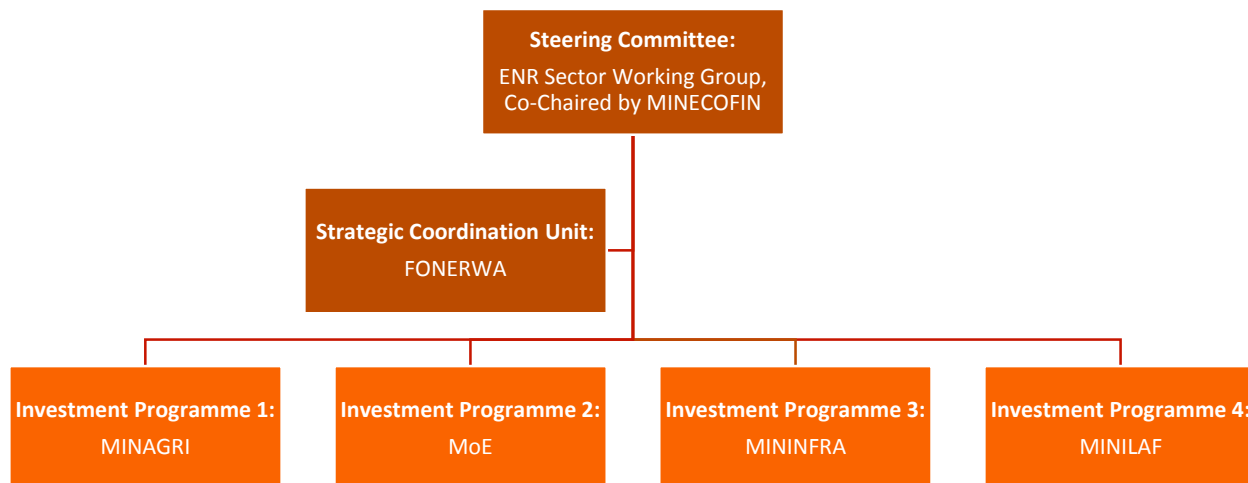


Figure 9: Illustrative Implementation Arrangements

7.2 COHERENCE BETWEEN FIP AND SPCR

119. Rwanda has developed a Forestry Investment Plan (FIP) in parallel with the SPCR. The key overarching issues to be tackled in the FIP are the huge imbalance in wood supply and the low productivity of trees and forests. Tackling these will result in improved economic development, better livelihoods, more employment opportunities, stable and sustainable landscapes in addition to reduced GHG emissions, and much increased carbon storage. The proposed projects are intended to be synergetic by focusing on: (i) Agroforestry to stabilise farm land, increase soil structure and fertility and enhance farm production and income opportunities; (ii) Rehabilitation of public forests and improving private and group tree planting to improve productivity and delivery of service values; and (iii) increasing efficiency along the wood supply chain to provide rapid reduction of the wood supply gap.
120. Forestry is a key sector for climate change response in Rwanda, and for climate-related investment. Rwanda is a recipient of REDD+ Readiness Grants from both the Forest Carbon Partnership Facility (FCPF) and the UN REDD+ Readiness program.
121. In developing the FIP, the Government of Rwanda has prioritized the scale up of the country's successful pilot landscape interventions and preservation efforts to transform the country's rural sector into a more sustainable and low carbon economy, through sustainable forest management and preservation of national forest ecosystems. This work is nicely aligned with the World Bank's project, Landscape Approach to Forest Restoration and Conservation (LAFREC), which supports the application of the landscape approach to forest restoration and conservation for the improvement of ecosystem functions and services in the Gishwati - Mukura landscape, and possibly adjacent parts of the Nile-Congo Crest. It also links to the African Development Bank (AfDB)'s project, Rwanda

Sustainable Woodland Management and Natural Forest Restoration Project (PGReF), which intended to reduce the deforestation and the poverty rate in all eight districts of Southern Province of Rwanda.

122. In developing the SPCR and FIP in tandem, Rwanda has been very conscious of the thematic interlinkages between the two, and has shaped the development process of both investment plans so that there is maximum opportunity for cross-pollination of ideas and identification of valuable synergies.
123. Common ground has been identified by the teams developing the SPCR and the FIP, including the critical role of forestry and agroforestry in improving the agriculture sector's climate resilience, in watershed and catchment management, and in the reduction of ecosystem fragility with a view to reducing disaster risk.
124. Three of the SPCR's four investment programmes have elements that are strongly linked to the FIP. They are as follows:
 - **Programme 1:** Component 2, Climate Smart Agriculture and Forestry, with a standalone project entitled *Development of Agroforestry and Sustainable Agriculture*. The FIP will also draw on Component 1, Climate Resilient Value Chain Development. Although at least initially, much of the produce from agroforestry is likely to be directly consumed, products such as honey and other apicultural products could have high potential value for wider trading.
 - **Programme 2:** Component 2, Catchment Restoration, can take advantage of the forest restoration to be undertaken through the FIP-IP and will focus on the most vulnerable landscapes and in particular on watercourses within these. In cases of severe degradation, SPCR hard restoration can be complemented by tree planting to provide long-term stabilisation. Such restored tree cover, which will be predominantly indigenous and multipurpose species, will be managed by extractive use and the single tree selection system to avoid prejudice to the service values.
 - **Programme 3:** There could be opportunities to adapt and apply restoration technologies developed under the FIP with regard to climate resilient human settlements.
 - **Programme 4:** Component 3, Landscape Conservation in the Context of Fuelwood Production and Collection, identifies a specific activity on a Sustainable Fuelwood Management Project in South-western Rwanda. This is featured in the FIP's project 2, *Sustainable Forest and Landscape Management*, which includes group and community woodlots at various scales.
125. Components and standalone projects with a link to the FIP have been clearly identified as such in the descriptive text within each of the investment programmes (in Section 8).

7.3 MONITORING AND EVALUATION ARRANGEMENTS

126. In line with the spirit of the PPCR, each of the four investment programmes have been designed to build climate resilience in Rwanda, mainstream climate change across sectors, and achieve maximum transformational impact. In order to evaluate this progress, a comprehensive Results Framework has been provided in Appendix B, with programme specific information in Section 8. Each PMU will play a leading role in refining the programmatic Monitoring and Evaluation (M&E) Framework based on the SPCR results framework, and assign specific responsibilities for monitoring programme indicators.
127. FONERWA, as the lead of the Strategic Coordination Unit, will be responsible for collating all M&E information, and ensuring the reporting happens on a national and international level.
128. In addition to adhering to the PPCR M&E standards, the SPCR will also need to align with the national M&E reporting process. Greater alignment will not only ensure that programmes reflect national priorities, but also that they receive the necessary institutional support for success. Furthermore, alignment with national M&E reporting processes is critical for enabling national ownership of the SPCR, and the ability to access and utilize accurate data related to the pre-SPCR baseline.
129. To assist with M&E and programme coordination, each PMU will perform the following roles:
- Ensure that the SPCR is fully harmonized with the NST and sector strategies;
 - Provide coordinated support to each of the investment programme, ensuring that there is adequate financing for programmatic operations;
 - Convene technical teams to support regular operations and wide representation;
 - Monitor and report progress across the SPCR; and
 - Provide a central government-led channel to support future climate change activities in Rwanda and continued investment in climate change mainstreaming.
130. The impact of the SPCR on vulnerable social groups – include women, children, elderly, youth, people with disabilities, incapacitated, conflict and post-conflict affected groups, ethnic minorities, and people living with HIV/AIDS – would be monitored through specific targets and indicators (see Appendix B). This is also true for the number and percentage of socially vulnerable group members benefiting directly from each programme (women, elderly, incapacitated, youth); and percentage of funds from each programme directly benefiting socially vulnerable groups.
131. The SPCR is designed for a ten-year horizon and therefore will require an intense amount of energy and dexterity to implement. The proposed projects and monitoring indicators may need to evolve as programmes are refined and projects further developed, while keeping mind the need to adhere to national M&E frameworks.

8 INVESTMENT PROGRAMMES

132. In line with the priorities of the *GCCRS*; the *National Strategy for Transformation, Vision 2050*, Intended Nationally Determined Contribution (INDC), and the Sustainable Development Goals (SDGs), Rwandan stakeholders have proposed four strategic investment programmes for the SPCR. Each of these strategic investment programmes has corresponding components and projects that are aligned with Rwandan priorities. At the beginning of each programme, a summary of the components and projects is provided.

133. The programmatic approach below represents the Rwandan government's move to developing programmes of action, rather than single projects. As reinforced by GEF, a programmatic approach enables countries to achieve meaningful impacts by: (1) Strengthening country ownership, (2) Promoting horizontal and vertical integration of global environmental concerns into decision making; and (3) Increasing opportunities for co-financing from a variety of other sources.⁹² Under each programme, several components, or rather thematic subgroupings are proposed. These components then have specific projects to help achieve the development objectives outlined for each programme.

134. The investment programmes are illustrated below:

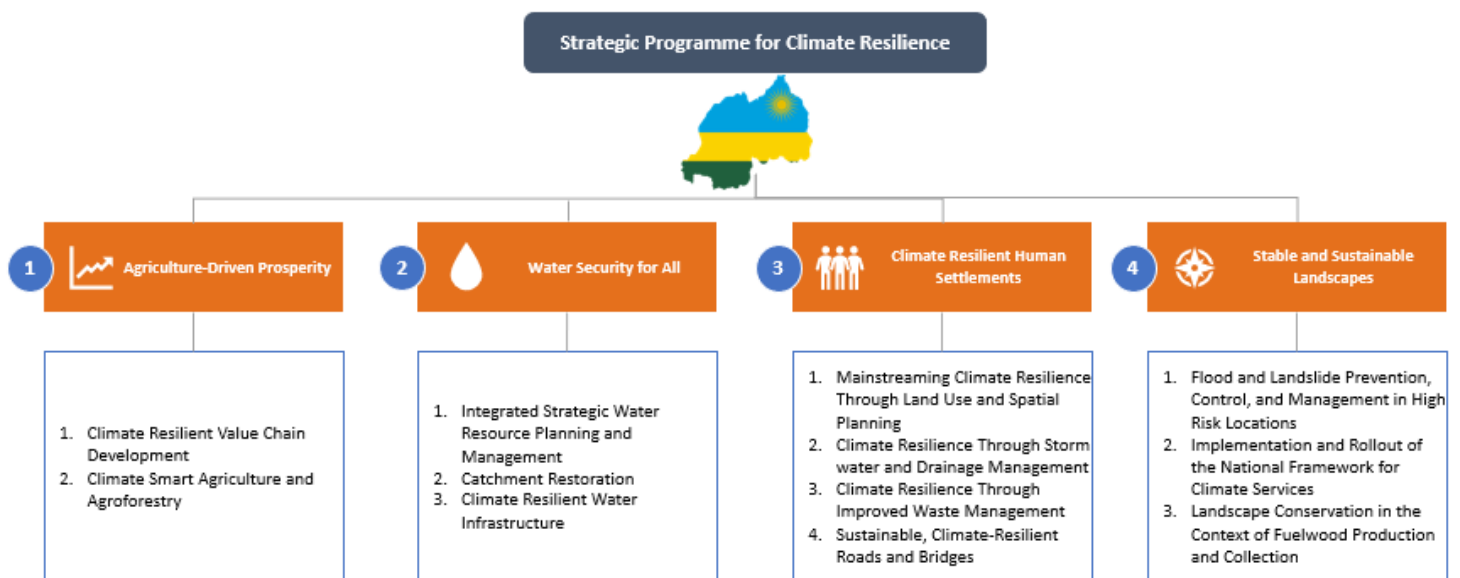


Figure 10: SPCR Programmes and Components

8.1 INVESTMENT PROGRAMME 1: AGRICULTURE-DRIVEN PROSPERITY

Ubukire Bushingiye Ku Buhinzi

(Kinyarwanda Translation of the Programme Title)

Climate Resilience Focus: To improve Rwanda's agriculture adaptive capacity against climate risks and hazards by improving the productivity of agriculture and subsistence farming. To build inclusive (gender inclusion, vulnerable groups and youth) resilience in selected value chains.

Priority SPCR Cross-Cutting Components: Climate Services and Disaster Risk Reduction / Disaster Management; Integrated Land Use and Spatial Planning; Institutional Strengthening and Coordination

Cross-Sectoral Elements: Hydro-meteorology; Agriculture and land use; Infrastructure planning and development; Forestry; and Ecosystems and Biodiversity.

Lead MDB: African Development Bank

Estimated Amount: \$ 44 365 200

Programme: Agriculture Driven Prosperity			
No.	Component	Project	Estimated Cost (USD)
1	Climate Resilient Value Chain Development	1. Providing Investment to New Climate Resilient Value Chains; 2. Unlocking Barriers to Investment in Agriculture; and 3. Building Climate Resilient Post-Harvest Facilities and Infrastructure.	\$ 34 289 200
2	Climate Smart Agriculture and Agroforestry	Component 2a 1. Climate Smart Insurance; and 2. Linking Climate Smart Agriculture Research to Projects. Component 2b 1. See Forestry Investment Plan	\$ 10 076 000
Total Programme Cost			\$ 44 365 200

Institutions Involved: MINAGRI; MoE; MINILAF; MINICOM; MINALOC; RWFA; Meteo Rwanda, NAEB; RAB; MIGEPROF; District Governments.

Implementation Arrangement: The Project Management Unit will be chaired by MINAGRI, supported by the following institutions: MoE; MINILAF; MINICOM; MINALOC; RWFA; Meteo Rwanda, NAEB; RAB; MIGEPROF; District Governments.

8.1.1 BACKGROUND AND RATIONALE

135. Agriculture is critical to Rwanda's growth and transformation from poverty to prosperity. The small country of just 2.6 million hectares dedicates more than 76% of the land to agriculture. While statistics vary, the Rwandan agricultural sector is the main employer, a key contributor to GDP and wholly responsible for the food security of the country.
136. As Rwanda walks its transformational path from a low-income to a middle-income country, the structural shift, as supported by Vision 2020 transiting to Vision 2050, will support the move from subsistence agriculture to non-farm sectors. As evidence to this, the agricultural share of the economy has decreased from 36% in 2000 to 30% by 2016, with employment as a strong driver for the structural change.
137. Yet despite the economic growth, food security and nutrition at a household-level remain a significant concern. According to at 2014 USAID Nutrition Profile for Rwanda, 460,000 households (21%) have unacceptable food consumption and may be considered food insecure. The northern and western areas bordering Lake Kivu and along the Congo Nile Crest suffer from the highest food insecurity. Although efforts under the National Multi-Sectoral Strategy to Eliminate Malnutrition has helped increase the nutritional status of children under 5 and women, as well as rates of stunting, anaemia, chronic malnutrition is still high, with 47% of rural children stunted, as compared to 27% of urban children.⁹³
138. Although food security rates have improved, much of the population remains dependent on rain-fed agriculture and auto-consumption. The vulnerability of this sector to climate and weather-related risks is intense. The prolonged droughts in the eastern and southern regions and unpredictable rains and floods in the northern and western regions have had a devastating impact on agricultural production. This variability does not allow farmers to plan for farming cycles, which affect their livelihoods. The situation is worsened by the soil erosion due to the country topography.
139. From a temperature standpoint, rising temperatures influence crop and livestock productivity through crop failure and increased diseases and pests. In much of Rwanda's highland agriculture, rising temperatures make way for new pests that were previously unable to survive at the higher altitude. This temperature rise can, for example, mean that the hospitable climate for growing tea must increase in altitude, which then reduces the potential land available for production.
140. Understanding the prominence of the agricultural sector in Rwanda is hearing the heartbeat of Rwanda. Providing the sector with opportunities to move from business-as-usual to climate-smart, integrated agricultural practices is critical to economic development and improvement of both urban and rural livelihoods. Better farm productivity implies higher incomes for agricultural households, and the ability to pay school fees and educate children. It also means more disposable income to invest in household

health and nutrition. Greater household investment in education and nutrition supports the development of a robust, well-informed, and more resilient workforce. Better agricultural productivity ensures a stronger and more reliable supply-chain for agro-based industries, supporting value-addition and a transition into a more manufacturing-based economy.

141. Current land use systems in Rwanda are predominantly based on small, individual land holdings. On these, farmers may have a mix of agriculture, agroforestry and perhaps small woodlot, boundary or homestead trees. The pattern of specific land use is therefore extremely fine-scale. Land use planning, and thus harmonizing the planning of agriculture and agroforestry, will need to accommodate the land ownership pattern, as well as the need for different land, uses to be allocated depending on erosion risk, fertility and the potential for sustainable activities.
142. A detailed gender analysis will be conducted during project preparation and project implementation part for targeted geographical areas. Following detailed analysis, the design of gender-responsive interventions will address the identified gender gaps for each of the interventions. In collaboration with the Ministry of Gender and Family Protections, and other key stakeholders (NGOs, CSO, private sectors, key gender working groups), technical backstopping will be provided throughout the project cycle. MDB E&S Safeguards and project-specific ESIA will be undertaken in accordance with Rwanda's environmental legislation.
143. Given the strong element of this programme that links the role of science and research to investment, it is especially important to involve academia in stakeholder consultations so that local research skills can be championed and showcased as best practices for other countries.
144. In support of this development, this investment programme is focused on agriculture and agroforestry and is designed with two components: (1) Climate Resilient Value Chain Development; and (2) Climate Smart Agriculture and Agroforestry. Although not explicitly mentioned, adequate attention should be paid to the critical issue of livestock and fisheries, which is part and parcel of agriculture, in the programmatic design.

8.1.2 DEVELOPMENT OBJECTIVES

145. **Programme development objective:** To improve Rwanda's agriculture adaptive capacity against climate risks and hazards by improving the productivity of agriculture and subsistence farming. To build inclusive (gender inclusion, vulnerable groups and youth) resilience in selected value chains.

146. Moreover, this programme's work contributes to the four draft objectives identified in the *Draft Strategic Plan for Agricultural Transformation 2018-24*.¹ Agricultural outcomes, specifically increased financing and infrastructure for agriculture, and increased climate resilience for agriculture, are mentioned to help achieve Pillar 1: Economic Transformation Pillar of the NST. The suggested key strategic intervention suggested supports the growth of agricultural exports, which is complemented by increasing the volume of traditional agriculture export crops and products.
147. This programme also contributes to Rwanda's Vision 2050, which seeks to transition Rwanda to a high-income economy by, among other contributing factors, promoting climate resilience across productive sectors, namely agriculture and energy.⁹⁴ Furthermore, the investment programme also encapsulates multiple programmes of action identified by Rwanda's national GGCRS, such as Sustainable intensification of small-scale farming and agricultural diversity for local and export markets.⁹⁵
148. It contributes to the two transformational impacts of the SPCR framework: (1) increased resilience of households, communities, businesses, sectors and society to climate variability and climate change; and (2) strengthened climate responsive development planning. It also contributes to the five programme outcomes: B1. Strengthened adaptive capacities; B2. Improved institutional framework in place; B3. Use of climate information in decision making routinely applied; B4. Strengthened climate responsive development planning; and B5. Climate responsive investment approaches identified and implemented.
149. Lastly, this programme is designed in line with the four prioritization criteria that guided Rwanda's SPCR: (1) paradigm shift potential, as demonstrated through elements like the scaling up of insurance schemes and the systematic change in the research projects that contribute to a low-carbon and climate-resilient development pathway; (2) national ownership, as evidenced by the ample links the *Draft Strategic Plan For Agricultural Transformation 2018-24 (PSTA 4)* and other national planning documents; (3) economic efficiency, as demonstrated through several of the climate-smart agriculture activities as well as the climate resilient value chains; and (4) gender and vulnerable peoples impact, in the systematic way that beneficiaries are included in the programme design, implementation and monitoring of this programme.

¹ These objectives are: Priority Area 1: Deliver effective and efficient public and private sector services in agriculture sector to support the results achievement foreseen in the other priority areas, an increased private sector led sustainable agricultural growth. Priority Area 2: Improve the productivity and inclusiveness of agricultural market systems and increase the value addition and competitiveness of diversified agricultural commodities, for domestic, regional, and international markets. Priority Area 3: Sustainably increase the productivity and profitability of smallholder, commercial and agri-businesses production systems, and enhance nutrition and resilience through more diversified and integrated management of crops, livestock fish and forest resources sub-sectors. Priority Area 4: Support knowledgeable farmers who have access to the right inputs and technologies making and implementing informed decisions; and capacitated rural value chain actors who are empowered to profitably engage in non-farm and off farm activities.

8.1.3 COMPONENTS AND PROJECTS

150. Components and projects will be identified during detailed project design, with framework suggestions provided in this section. Indicatively, investment programme one's components and projects are described below. A detailed representation of each component and project is located in Appendix G. Additionally, FONERWA is developing an agriculture decision support tool, which may be a good guide in the development of this investment programme.²
151. It will be critical to look at ways to improve knowledge and lessons learned through the generation and dissemination of knowledge products during design and implementation of each project. There are ample opportunities to showcase some of the learnings in this programme, including: best practice sharing around climate-smart insurance, webinars on how to integrate climate information into building climate resilient value chains, showcasing post-harvest storage facility designs as a model for East Africa, plenty of opportunities to link university students throughout the continent to the research projects that are linked to investment, and local best practice workshops to ensure that knowledge does not stay at a national or regional level, but is rather disseminated to the village level. The detailed scoping and design stage will provide an opportunity for ideas such as these, and many more, to be appropriately integrate into each project's future.

COMPONENT 1: CLIMATE RESILIENT VALUE CHAIN DEVELOPMENT

152. This component's objective is linked to the NST's Economic Transformation Pillar, and objective to "Establish Rwanda as a Globally Competitive Knowledge-based Economy," and "Promote industrialization and attain a structural shift in the export base to high-value goods and services with the aim of growing exports by 17% annually."
153. This component's objectives are also aligned with Priority Area 2 from the Draft PSTA, Productive, Inclusive Markets and Value Addition, specifically Output 2.1: Strengthened partnership in the commercialisation of agricultural sector value chains products, as well as Outcome 2: Increased competitiveness, value addition and private sector involvement of diversified agricultural commodities for domestic, regional, and international markets.
154. This component supports the development of Rwanda's work in value chain development. Critical to this component, however, is the emphasis on *climate resilient* value chain development. Thus, as this component builds its projects, it will be crucial to make the link to climate change adaptation, gender

² For more information on this tool, please visit: <http://www.futureclimateafrica.org/news/blog-integrating-climate-information-into-green-growth-finance-in-rwanda/>

integration, and private sector engagement that improves opportunities for rural communities to increase their ability to manage risks and improve livelihoods through better access to the markets.

155. As Rwanda seeks to invest in the development of new crops, integral to their development of higher value market cash crops is the consideration of climate on these crops. Projects like MINAGRI's Climate Mainstreaming Pilot for the Coffee and Tea Sectors have made the critical link between climate futures and cash crop development.³ Many export crops, in particular coffee and tea, have been affected by high climate sensitivity, changing climatic zones, rainfall variability, and changes in pests and diseases.⁹⁶ This component will focus on the climate-smart development of new climate resilient value chain crops.
156. Value chain development allows for improved competitiveness and income distribution, and more specifically, supports the desired outcomes of higher income earnings for poor and vulnerable groups, as well as the active participation of women and youth. Suggested principles for value chain development to achieve sustainable and pro-poor growth include: sustainability, equitability, do-no-harm, and valuing traditional knowledge.⁹⁷

COMPONENT 2: CLIMATE SMART AGRICULTURE AND AGROFORESTRY

COMPONENT 2A: CLIMATE SMART AGRICULTURE

157. Climate-smart agriculture is fundamental to increasing productivity, addressing current climate variability and future climate risks and reducing greenhouse gas emissions. Integrated ways of improving soil fertility and increasing farm profitability are best supported by a range of services, such as climate information systems, financial services like improved access to credit and insurance, and capacity building training to link researchers and practitioners.
158. Women and youth have an increased vulnerability to men, based on their greater dependence on natural resources for livelihoods, responsibility for food production, water and fuel for their households, more limited assets, and social, cultural, and political barriers, among other factors. With regard to increasing agricultural productivity, the Green Climate Fund recommends that the following efforts are undertaken to address gender: systematic gender analysis to identify where there may be differences in men's and women's productivity; resolution of the challenges women experience in accessing, using, and supervising farm labour; improvement in women's access to productive inputs and resources such as extension and technologies; improvement in women's use of agricultural inputs; and improving their

³ For more information on this project, please consult the full project document: Climate Mainstreaming Pilot for the Coffee and Tea Sectors (MINAGRI).

tenure of natural resources, as women's lack of access to secure land tenure is a major constraint. During the design of the projects, it is recommended to use this framework as a guideline.⁹⁸

159. The priority areas for the country in Phase 1 are the Eastern Province, given its vulnerability to drought, and the North-western region, given its vulnerability to flooding. In Phase 2 of the project, it may be rolled out on a national level.

COMPONENT 2B: CLIMATE SMART AGROFORESTRY

160. The effects of a changing climate have put agriculture and agroforestry in Rwanda at serious risk. Exposure of crops to warmer and drier environments means an increase in drought susceptibility and a decrease in productivity, in both the already drought-prone areas like the East, but also in more tropical regions with increased seasonal dry periods. There is still significant scope for increasing the use of agroforestry in both research and in practice to improve Rwanda's production systems. While this project sits inside the FIP, its framing and link to this investment programme is critical.
161. Agroforestry has been a reliable tool in improving soil fertility and increasing farm household resilience through the provision of additional resources. While the understanding of these benefits is not new, in light of growing food insecurity and shortages and rising prices of fossil fuel based agricultural inputs, the imperative for Rwanda to look at agroforestry as a necessary and cost-effective tool is even greater.
162. Within the framework of wider landscapes, as a result of increasing population and rising expectations, agriculture has been extended onto non-sustainable locations. Soil conservation measures have not kept pace with the rate of expansion leading to floods, soil loss and landslides. Extension services are insufficient to support the widespread application of high quality tree planting and agroforestry and both require a greater range of new options to enhance resilience to climate change. Active research, diversification of the species base for forestry and agroforestry, an improved supply of reproductive material and skills building on field techniques will all be necessary for improved practices.
163. The Rwanda Readiness Preparation Proposal (R-PP) identifies three Strategic Options to be employed in countering and reversing the causes of deforestation and forest degradation. Most relevant to the agroforestry component of this Investment Programme is the modernisation of agriculture and soil protection, which aims to improve food security while also employing agroforestry to control soil erosion and improve fertility. In order to provide sustainable landscapes that will control current problems and deliver increased levels of products and services for more efficient value chains, improved agriculture, forestry and agroforestry will need to be developed in close concert through fine-scale land use planning.

164. In terms of climate change, restoring and improving forest cover will provide mitigation of GHG emissions and increase substantially carbon sequestration and storage. Improved site-user-species matching based on a widened and diversified base of forestry and agroforestry species and high-quality germplasm, combined with greater application of best practices, will adapt current interventions to give greater resilience to the direct effects of climate change and the indirect effects, such as pests and diseases.

8.1.4 INSTITUTIONAL ARRANGEMENTS

165. The Project Management Unit will be chaired by MINAGRI, supported by the following institutions: MoE; MINILAF; MINICOM; MINALOC; RWFA; Meteo Rwanda, NAEB; RAB; MIGEPROF; District Governments.
166. Organizational and institutional support to women's groups will also be required if rural and disadvantaged women are to access resources, credit, technical and entrepreneurial training, and guidance. When the projects are in their design phase, having women employed as frontline extension staff, project managers, policy makers, and agribusiness enterprise employees and managers is critical to the success of this work.
167. Once the projects have gone through project preparation, it will be important to determine appropriate institutional arrangements that are consistent with the Rwandan government and best serve the project.

8.1.5 GENDER ISSUES

168. Involving women in development is a critical factor in achieving the eradication of poverty and improving overall socio-economic development. According to the UN Food and Agriculture Organization, if women had the same access as men to agricultural resources, production would increase by 20-30%, with the possibility of reducing the number of food insecure people in the world by 12-17%. At the same time, according to the International Planned Parenthood Foundation, education and economic empowerment of women has significant impact on reducing poverty: educated mothers are more than twice as likely to send their children to school as mothers with no education; women reinvest up to 90% of their incomes back into their households, compared to 30-40% by men.
169. While Rwanda's commitment to gender equity and equality is demonstrated through its planning documents, the agricultural sector has room for improvement with regard to gender. The agriculture sector is the primary arena for women's income-earning and employment opportunities, with 82% of women working in agricultural occupations compared with 61% of men. In female adult only households, 90% work in agriculture, compared with 62% of male and female adult households. Moreover, the number of female small-scale farm workers, two million, is nearly double that of men, 1.1

million. Lastly, since 2005, the number of men working in agriculture has declined while the number of women has risen.

170. Women's role in subsistence agriculture has meant that they receive low prices for their products due to lack of market intelligence, lack of capacity to participate in agri-business and poorly paid positions in secondary agriculture. Moreover, as 30% of the country's households are female-headed, their participation in agriculture is particularly vulnerable to any type of shock events, as women rarely have asset stocks nor financial savings because of their foundation of being illiterate, poor and stereotyped to be subordinate to male counterparts be it at household, community and governance structure levels."
171. Gender differences persist in agricultural productivity, mostly due to differences in access to and use of agricultural inputs, including improved technologies; land tenure security and investments related to land; access to finance and credit is lacking for women; and informal institutional constraints affecting farm/plots management and the marketing of agricultural products – enabling female farmers to shift into high-value commercial agriculture. In this project, women can take a greater role in cultivating export crops, and policies that leverage these kinds of advantages can therefore enhance gender equality and boost agricultural growth.
172. Women farmers in Rwanda are an integral part of agroforestry systems as they are often responsible for managing trees especially at early stages. Agroforestry has a great potential to contribute food security, however, women face several constraints. In general, women have less access to men to opportunities such as land, financial services and technology. In the context of tree tenure, women often are confined to by-products that have less economic value (i.e. branches, fodder, indigenous fruits) whereas men control ones that generate higher revenues. Some constraints for women include limited access to processing technologies, market access and information. Some interventions include women training women in business skills, training more women as extension officers, linkages to markets by targeting women's enterprises to facilitate their engagement in collective action which will lead to increased income, food security and nutrition for women and their families.
173. Traditionally, women's work is often classified as reproductive roles/unpaid care work or fulfilling reproductive roles, rather than their paid, productive male counterparts. Thus, less attention is paid to women with regard to accessing and having control over productive resources such as credit, agricultural extension services. Projects like the Twigire Muhinzi extension model help to ensure that all farmers in Rwanda
174. Studies have shown that even though women may dominate in an area where a low level of technology is being used, when there are shifts either in the technology or the economic status of that area, there is often a shift in power to men. These unintended consequences are often overlooked in planning and

decision-making processes, due to the lack of engagement with women. Whilst the advancement of technology is an improvement in the lives of men and women, it sometimes drives the gender rift even further apart. Some questions for consideration in the planning phase of this programme include:

- Is the introduction of the technology likely to move control of assets from women to men, and if so, how can this be avoided, and how this be shared more equitably?
- Is the promoted technology appropriate for use by both women and men?
- Are there training programmes made available for the use of the new technology?
- What are the different needs of women and men for technology/equipment?
- Do both women and men have equal access to finances for buying new equipment and for maintaining it effectively?

175. In training sessions associated with this programme, building capacity for sensitisation to and implementation of gender-equality principles, women's awareness of their rights and the barriers to exercising those rights should be strengthened to increase not only the awareness, but the accountability when it comes to gender integration. During the training session, the needs of both men and women need to be considered, and an open learning environment should be created.

8.1.6 EXPECTED RESULTS

176. In each of the results, where possible, it is critical to provide gender disaggregated data that will allow an analysis of the change and increase in benefits to women. Expected results from the program include:

- Improved climate resilient value chains identified;
- Investment leveraged from the private sector to support climate-resilient adaptation in selected agricultural and agroforestry areas;
- Increased cross-sectoral collaboration for mainstreaming climate resilience in national and local planning documents and projects; and
- Increased agricultural production and added value from agroforestry resources to increase climate resilience.⁴

⁴ Agricultural production interventions that target and empower women can influence nutrition and improve women's time use. During the design of these activities, it could be useful to look into training from a farmer's cooperative on farming techniques that can increase crop production to transform her and her family's lives.

8.1.7 INDICATORS AND BASELINE

Indicator	Baseline
Numbers of people supported by the PPCR to cope with effects of climate change	<i>To be determined based on project design.</i>
Change in damage/losses (\$) from extreme climate events in areas at risks that are the geographical focus of intervention	<i>To be determined based on project design.</i>
Degree of integration of climate change in national planning	<i>To be determined based on project design.</i>
Extent to which vulnerable households, communities, businesses and public-sector services use improved PPCR supported tools, instruments, strategies, activities to respond to Climate Variability and Climate Change	<i>To be determined based on project design.</i>
Evidence of strengthened government capacity and coordination mechanism to mainstream climate resilience	<i>To be determined based on project design.</i>
Suggested gender indicators (though not programmatically required): <ul style="list-style-type: none"> No. and % of people (disaggregated by sex and perhaps socioeconomic groups) that are involved in the project design and implementation No and % of people (disaggregated by sex) trained/receiving extension services in sustainable landscape management No. and % of people (disaggregated by sex) who adopted an improved agroforestry technology No. and % of household (disaggregated by sex) that are food/nutrition secure No and % of households (disaggregated by sex) with improve annual income from adopting climate smart agricultural production practices" No. of micro-enterprises created and functional in the community (disaggregated by sex) Number of beneficiaries that feel this project investment reflects their needs (disaggregated by sex) 	<i>To be determined based on project design.</i>

8.1.8 RISKS AND SAFEGUARDS

Risk	Estimated Level of Risk	Mitigation (Safeguards)
Weak coordination between institutions	Moderate	Institutional arrangements for programme governance have been structured to ensure higher levels of inter-ministerial coordination.
Weak project management within institutions	Moderate	External project management has been explicitly built into one project, and can be built into other projects as needed.
Constrained participation by government officials in project delivery and trainings, due to workload and competing tasks	Moderate	Incentive pay has been explicitly built into one project, and can be built into other projects as needed.
Continuation of business-as-usual agriculture with a transformation to climate smart systems.	Medium	Projects have been designed to include transformative elements that explicitly allow for climate smart systems; substantial training of both government staff and citizens will need to be done to ensure the switch.
Project timeframes are too compressed for significant gains in climate change resilience	Low	Projects have been designed to deliver results in a 3-5-year timeframe. Given Rwanda's annual heavy rains during the wet season, a five-year period would allow for project impact to be observed and assessed.

8.1.9 INDICATIVE COSTING

177. Below is a brief representation of the costs associated with each component and project. A detailed representation of the costs associated with each component and project can be found in Appendix G.

For the FIP's project, *Development of Agroforestry and Sustainable Agriculture*, the total funding estimated is approximately US\$ 61 million.

Component	Project	Lead Ministry	Sub-Total	Contingency (10%)	Total Cost (US \$)	Cost (US \$)
Climate Resilient Value Chain Development	Providing Investment to New Climate Resilient Value Chains	MINAGRI	\$ 24 676 000	\$ 2 467 600	\$ 27 143 600	\$ 34 289 200
	Unlocking Barriers to Investment in Agriculture		\$ 2 000 000	\$ 200 000	\$ 2 200 000	
	Building Storage Facilities and Drying Grounds		\$ 4 496 000	\$ 449 600	\$ 4 945 600	
Climate Smart Agriculture and Agroforestry	Climate Smart Insurance		\$ 2 300 000	\$ 230 000	\$ 2 530 000	\$ 10 076 000
	Linking Climate Smart Agriculture Research to Projects		\$ 6 860 000	\$ 686 000	\$ 7 546 000	
	2b: See Forestry Investment Plan (FIP)		\$ -	\$ -	\$ -	
PROGRAMME TOTAL			\$ 40 332 000	\$ 4 033 200	\$ 44 365 200	\$ 44 365 200

8.2 INVESTMENT PROGRAMME 2: WATER SECURITY FOR ALL - STRENGTHENING RESILIENCE IN THE WATER SECTOR

Amazi Ahagije Kuri Bose

(Kinyarwanda Translation of the Programme Title)

Climate Resilience Focus: To promote water security for all in Rwanda in the face of socio-economic development and climate change, through improved and integrated water resource management, effective institutions and resilient infrastructure. To promote water security for all (especially of women and other vulnerable social groups) in the implementation and use of resilient infrastructure.

Priority SPCR Cross-Cutting Components: Climate Services and Disaster Risk Reduction / Disaster Management; Integrated Land Use and Spatial Planning; Institutional Strengthening and Coordination

Cross-Sectoral Elements: Hydro-meteorology; Disaster Risk Reduction (DRR) and Disaster Risk Management; forestry; ecosystems and biodiversity; energy; and infrastructure planning and development

Lead MDB: World Bank

Estimated Amount: \$310 475 000

Programme: Water Security for All - Strengthening Resilience in the Water Sector			
No.	Component	Project	Estimated Cost (USD)
1	Integrated Water Resource Planning and Management	1. Strategic catchment planning for all level one catchments 2. Groundwater Study and Mapping Exercise 3. Complete and automated hydrological network	\$ 19 635 000
2	Catchment Restoration	1. Catchment Rehabilitation through Agriculture 2. Implementing the Water-Energy-Food Nexus through Hydropower	\$ 38 280 000
3	Climate Resilient Water Infrastructure Planning and Development	1. Large-scale resilient water storage 2. Small-scale water infrastructure 3. Rainwater Harvesting	\$ 252 560 000
Total Programme Cost			\$310 475 000

Institutions Involved in Implementation: MoE; MINILAF; RWFA, MININFRA; REMA; MINAGRI; MIDIMAR; EWSA; MINECOFIN; MINALOC; MIGEPROF; District governments

Implementation Arrangement: The Project Management Unit will be chaired by MoE, supported by the following institutions: MINILAF; RWFA; MINEACOM; MININFRA; MINALOC; Meteo Rwanda, NAEB; RAB; MIGEPROF; District Governments.

8.2.1 BACKGROUND AND RATIONALE

178. Water is an abundant resource in Rwanda with vast potential for development. The water resources constitute 101 lakes, hundreds of rivers, marshlands and groundwater. Due to its relief and its location in the African Great Lakes region, Rwanda has a very dense river network.⁹⁹ The country's area (26 338km²) is divided between the Congo River Basin in the west, and the Nile River Basin in the east. The Upper Nile Basin drains 90% of the surface waters through the Nyabarongo and Akagera Rivers, the main tributaries of Lake Victoria.¹⁰⁰ In the north and west, Lakes Buhera Ruhondo and Kivu are deeper than 50m. Other lakes (Mugesera, Sake, Bilira, Cyohoha, Rweru and Ihema) are shallower, with depths not exceeding 10m.¹⁰¹ Nearly all (95%) of Rwanda's water resources originate from within the country and only about 5% from outside its territory, essentially Burundi.
179. Although Rwanda is endowed with substantial freshwater resources, it is highly vulnerable to current climatic variability through flood and drought episodes. Rwanda has increasingly been experiencing long periods of drought which tend to be cyclical and persistent interspersed with periods of heavy flooding. These changes could be attributable to the anthropogenic activities and global warming phenomena which have imposed many uncertainties on weather patterns causing vulnerabilities of the people.¹⁰²
180. Over the last 3 decades, the water resources have been severely degraded, as evidenced by heavy sediments in rivers; pollution from agricultural chemicals and fertilisers, industrial effluents and municipal waste; reduced water levels and flow volumes, resulting in shortages. The challenges of rapid population growth, increased urbanisation and industry, environmental degradation and pollution are leading to accelerated depletion and degradation of the available water resources. Critical catchments have been converted into agricultural lands, resulting in destruction and drying up of many streams, and decline of groundwater reserves.
181. Rwanda's hydrological system is being challenged to provide for the growing water needs of its recent development¹⁰³ and growing population. Water touches upon every aspect of Rwanda's development: from agriculture, hydropower, tourism, and industries. The shared river systems connect all Districts and development sectors within each catchment. Water is also at the centre of climate change adaptation.¹⁰⁴ Therefore, increasing extreme events like prolonged drought have raised concerns for water access, even in areas hitherto known to be water secure. With reduced and increasingly unreliable rainfall, agriculture is expected to rely on irrigation. This will, undoubtedly increase the pressure on water resources.¹⁰⁵
182. How Rwanda's energy, water supply, and treatment infrastructure is planned now will dictate the success and resilience of future communities. Given these demands, preserving environmental flows

and protecting biodiversity will become increasingly difficult.¹⁰⁶ Any significant increase in Rwanda's water demand will impact downstream nations, primarily the beneficiaries of the Kagera Basin and riparian states of the Nile. In addition, transforming the national reliance on rainfall, particularly rain-fed agriculture must be a priority reflected in sectoral development planning and public infrastructure spending.¹⁰⁷

183. In the near future, Rwanda's main water resource management challenge will be meeting the increasing multiple water demand for internal use and transboundary needs, with limited capacity and in the face of declining water availability due to ecosystems degradation, pollution, and climate change. The country's capacity is limited in terms of human resources, institutional systems, and infrastructure. Coordinated internal use and enhancing trans-boundary water cooperation are some of the critical and immediate priorities for the GoR.¹⁰⁸
184. A detailed gender analysis will be conducted during project preparation and project implementation part for targeted geographical areas. Following detailed analysis, the design of gender responsive interventions will address the identified gender gaps for each of the interventions. In collaboration with the Ministry of Gender and Family Protections, and other key stakeholders (NGOs, CSO, private sectors, key gender working groups), technical backstopping will be provided throughout the project cycle. MDB E&S Safeguards and project-specific ESIA will be undertaken in accordance with the Rwanda's environmental legislation
185. Understanding how men and women access and use water resources differently can promote better targeting of interventions and improve project development outcomes. Therefore, in support of more effective and efficient water resource management that promotes water security for all in the face of socio-economic development and climate change, this investment programme focuses on (1) integrated strategic water resource planning and management; (2) catchment restoration; and (3) climate resilient water infrastructure.

8.2.2 DEVELOPMENT OBJECTIVES

186. **Programme development objective:** To promote water security for all in Rwanda in the face of socio-economic development and climate change, through improved and integrated water resource management, effective institutions and resilient infrastructure. To promote water security for all (especially of women and other vulnerable social groups) in the implementation and use of resilient infrastructure.
187. This programme is aligned with and would contribute to the realization of Rwanda's Vision 2020, which states that Rwanda will continue to invest in protection and efficient management of water resources,

as well as water infrastructure development to ensure that by 2020 all Rwandans have access to clean water. The programme also supports the achievement of Rwanda's NST, whose overarching goal for the Environment, Natural Resources, and Climate Change sector is to optimize and scale-up sustainable and climate-resilient management of natural capital resources, to anchor and accelerate achievement of Rwandan prosperity.¹⁰⁹ Furthermore, the investment programme also encapsulates multiple programmes of action identified by Rwanda's national GGCRS, such as (a) integrated water resource management and planning; (b) sustainable land use management; (c) disaster management and disease prevention; (d) climate data and projections; and (e) sustainable intensification of small-scale farming.

188. In addition to national development objectives, this investment programme contributes to the two transformational impacts of the PPCR framework: (1) increased resilience of households, communities, businesses, sectors and society to climate variability and climate change; and (2) strengthened climate responsive development planning. It also supports the PPCR's five core programme outcomes: B1. Strengthened adaptive capacities; B2. Improved institutional framework in place; B3. Use of climate information in decision making routinely applied; B4. Strengthened climate responsive development planning; and B5. Climate responsive investment approaches identified and implemented.
189. Lastly, this programme is designed in line with the four prioritization criteria that guided Rwanda's SPCR: (1) paradigm shift potential, as each of the interventions can be scaled-up and replicated across Rwanda; (2) national ownership, as evidenced by the ample linkages with the NST and the GGCRS, amongst others; (3) economic efficiency, as the broad basket of initiatives represent the different elements required for IWRM, and each of the interventions support or enhance the country's ability to manage water resources effectively, while also ensuring sustainable supply; and (4) gender and vulnerable peoples impact, the interventions aim to assist vulnerable people including women by improve living standards and service delivery, in the systematic way that beneficiaries are included in project cycle (i.e. the programme design, implementation and monitoring).

8.2.3 COMPONENTS AND PROJECTS

190. Components and projects will be identified during detailed project design, with framework suggestions provided in this section. Indicatively, investments for Programme 2's components and projects are described below. A detailed representation of each component and project is located in Appendix G.
191. It is recommended that during the design stage of each activity, a comprehensive planning process be conducted that finds ways to include gender, youth and other vulnerable groups in the entire project lifecycle. Added to this, ways to improve knowledge and lessons learned should be explored. These can include: capacity building and knowledge sharing with local communities, particularly women and

children; knowledge products, conferences, and/or webinars on lessons learned in climate-resilient infrastructure, integrated and strategic water management, as well as catchment restoration; forming partnerships with the private sector, NGOs and academics on research projects and publications aimed at gaining technical expertise through the sharing of project lessons learned. The detailed scoping and design stage will provide an opportunity for ideas such as these, and many more, to be appropriately integrate into each project's future.

COMPONENT 1: INTEGRATED STRATEGIC WATER RESOURCE PLANNING AND MANAGEMENT

192. While Rwanda has made significant efforts in water resource management, the nature of its water resources renders the country extremely vulnerable. This is because the water resources in Rwanda exhibit significant variations at a spatial and seasonal scale. As climate change continues to impact Rwanda, the spatial and seasonal variations in water resources will be increased. This variability of water resources means that long-term planning is critical for not only ensuring water security, but also promoting sustainable ecological flows as well as sufficient water for the economy of Rwanda.
193. Due to the growing demands of a developing economy, it is important to promote an integrated approach to water resources management. Added to this, it is essential that coordination is promoted between the different sectors of the economy as well as major water users, which includes sectors such as energy, land-use, city planning and conservation.
194. The objective of this component is to ensure that the catchments in Rwanda are managed effectively, particularly in the context of climate variability and increasing water demand. While it is evident that a lot has been done to improve water resource management in Rwanda, there is a need to extend these initiatives to all corners of the country as well as scale up disparate pilots to consolidate results and clearly demonstrate impacts. This component will also ensure that long-term water resource planning and management does not jeopardise ecosystem integrity and healthy natural resources. Added to this, opportunities also exist for Rwanda to promote water access by implementing climate resilient and multi-purpose infrastructure.

COMPONENT 2: CATCHMENT RESTORATION

195. As the population grows, the demand for natural resources increases. Currently, in Rwanda, most catchments are poorly managed, resulting in overgrazing and soil compaction, loss of water retention capacity of soils, excessive surface water run-off, soil erosion and loss of soil fertility. Added to this, deforestation in order to get firewood, land clearing for shelter construction, and bush burning in order to get land for crop and cattle farming, is severely degrading the vegetation. It is therefore crucial that

the connectivity between the natural resources such as water, land, and energy is adequately considered.

196. This requires that land-use and catchment management is viewed in a holistic manner. More importantly, there is a need for more integrated catchment management and restoration, targeted at catchments that are already degraded. For example, promoting reforestation and terracing of hilly areas, will not only serve as an ecosystem function, but also prevents erosion and landslides. This component will also ensure that the catchments are restored to their natural state.

COMPONENT 3: CLIMATE RESILIENT WATER INFRASTRUCTURE

197. As the competition for water resources in Rwanda continues to increase, driven both by population growth and economic development, it is critical to continue providing water to all members of society. This includes not only effective planning, but also implementing engineering designs that serve multiple purposes (such as multi-purpose dams). In times of variability, sustainable water supply requires climate resilient water infrastructure. This is unfortunately currently lacking, particularly large multi-purpose storage or upland small dams, as well as wetlands.

8.2.4 INSTITUTIONAL ARRANGEMENTS

198. The Project Management Unit will be chaired by MoE, supported by the following institutions: MINILAF; RWFA; MINEACOM; MINALOC; MINIINFRA; Meteo Rwanda, NAEB; RAB; MIGEPROF; District Governments.
199. Once the projects have gone through project preparation, it will be important to determine appropriate institutional arrangements that are consistent with the Rwandan government and best serve the project.

8.2.5 GENDER ISSUES

200. Men, women, boys and girls have differing needs when it comes to water resources. It is important to understand what these needs are and look for ways to meet those needs without prejudicing one social group or another. Women and girls are often the collectors of water, users and managers of water in the household, as well as farmers of irrigated and rainfed crops. Women's specific needs for multiple use water service delivery (for example, irrigation plus domestic water use) needs to be considered, as women face specific obstacles in participating in community-organized water management project and participating in water-users' committees. Since women and girls bear the burden of fetching water, they often miss out on opportunities for education, productive activities or leisure time. This exposes women to an endless cycle of poverty, making it harder for women to secure livelihood resources and exposing

themselves to not only watershed diseases like trachoma and scabies, but also to higher risk of gender-based violence if they are walking further, particularly in the dark.¹¹⁰

201. Due to the roles identified above, women have considerable knowledge about water resources, including quality and reliability, restrictions and acceptable storage methods, and are key to the success of water resources development and irrigation policies and programmes. However, even though women play a pivotal role as providers and users of water and guardians of the living environment, it is also surprising to note that in Rwanda, there are currently no guidelines for the role of women in the provision, management and safeguarding of water resources in any policy instruments. At the community level, women are underrepresented in decision-making related to agriculture, water and sanitation. Furthermore, policymakers, managers and technical in natural resource management staff have limited knowledge on: (a) how and why different situations and interests of men and women should be taken into consideration; and (b) the identification of issues where gender 'blind' planning can have a negative impact on the implementation of development initiatives.
202. A social group that is often overlooked in the area of water resources are those people with disabilities, and in order to fully integrate gender into an Investment Framework, investors and development planners should give cognisance to the needs of people with disabilities. For example, women's access to water resources can be increased by addressing interventions (i.e. women's participation in water use association, improve access to better land management and water practices and weather information, strengthen women's participation in commodity value chains).
203. The program provides an opportunity for women and the youth to play a more integral part in water resource management. For example, women's access to water resources can be increased by addressing interventions (i.e. women's participation in water use association, improve access to better land management and water practices and weather information, strengthen women's participation in commodity value chains). Project under this programme will be designed taking several gender-related considerations into account, including (but not limited to):
 - How can the project maximize gender equity and empowerment?
 - Are women consulted in the decisions around water resources management, infrastructure, and/or climate change impact management?
 - How can stakeholder engagements be designed to be beneficial to women, and to draw more women to participate and contribute?
 - Is the introduction of the technology likely to move control of assets from women to men, and if so, how can this be avoided, and how this be shared more equitably?

- What gender-specific and gender-sensitive elements should be considered in infrastructure design and siting, to ensure that women's needs from the infrastructure in question are adequately met?
- How can the skills-building and capacity-building elements of the project take women especially into account, to ensure that knowledge-transfer empowers women to take more leadership in the integration climate change considerations into land use planning and infrastructure development?

8.2.6 EXPECTED RESULTS

204. Expected results from the program include:

- Effective and efficient water management in the face of socio-economic development and climate change
- An integrated approach to water resource management, through collaboration and systemic thinking
- A high-level understanding of the surface and groundwater resources in the country
- Systems that alert decision-makers and citizens of impending water-related climate disasters
- Rehabilitated catchments that also provide agricultural opportunities to the population
- Resilient infrastructure that is adaptable to the impacts of climate change, which also ensures that water users are more climate resilient
- Increase access to water resources and improved livelihoods for women and girls
- Improved household and community resilience due to reliable service delivery in terms of waste management

8.2.7 INDICATORS AND BASELINE

Indicator	Baseline
Numbers of people supported by the PPCR to cope with effects of climate change	<i>To be determined based on project design.</i>
Change in damage/losses (\$) from extreme climate events in areas at risks that are the geographical focus of intervention	<i>To be determined based on project design.</i>
Change in percentage of households (in areas at risk) whose livelihoods have improved (water access and food security during sensitive periods of the year)	<i>To be determined based on project design.</i>
Degree of integration of climate change in national planning	<i>To be determined based on project design.</i>
Extent to which vulnerable households, communities, businesses and public-sector services use improved PPCR supported tools, instruments, strategies, activities to respond to Climate Variability and Climate Change	<i>To be determined based on project design.</i>
Evidence of strengthened government capacity and coordination mechanism to mainstream climate resilience	<i>To be determined based on project design.</i>
Suggested gender indicators (though not programmatically required): <ul style="list-style-type: none"> • No. and % of people (disaggregated by sex and perhaps socioeconomic groups) that are involved in the project design and implementation • No and % of people (disaggregated by sex) trained/receiving extension services in sustainable livelihood options • No. and % of people (disaggregated by sex) who adopted an improved technology 	<i>To be determined.</i>

<ul style="list-style-type: none"> No. and % of people (disaggregated by gender) trained to enhance generation and delivery of climate services No. and % of household (disaggregated by sex) from intermittent water service to continuous water provision No. and % of household (disaggregated by sex) with improved provision of wastewater disposal services 	
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8.2.8 RISKS AND SAFEGUARDS

Risk	Estimated Level of Risk	Mitigation (Safeguards)
Weak coordination between institutions	High	Institutional arrangements for programme governance have been structured to ensure higher levels of inter-ministerial coordination.
Weak project management within institutions	Moderate	External project management has been explicitly built into one project, and can be built into other project as needed.
Constrained participation by government officials in project delivery and trainings, due to workload and competing tasks	Moderate	Incentive pay has been explicitly built into one project, and can be built into other projects as needed.
Constrained participation by communities in projects	Low	Once buy-in is obtained and communities are aware of the benefits provided by the projects, they are more likely to participate.
Continuation of business-as-usual in water resource planning and management	Medium	Projects have been designed to include transformative elements that explicitly allow for substantial training of both government staff and citizens. However, buy-in needs to be obtained and officials need to be empowered.
Insufficient data availability for the design and development of the programme	Medium	Rwanda is a data-rich environment, and has relatively higher levels of informational availability and access than many African countries. However, information sharing needs to be further promoted, particularly at a high-resolution
Project timeframes are too compressed for significant gains in climate change resilience	Low	Projects have been designed to deliver results in a 3-5 year timeframe. Given Rwanda's annual heavy rains during the wet season, a five-year period would allow for project impact to be observed and assessed.

8.2.9 INDICATIVE COSTING

205. Below is a brief representation of the costs associated with each component and project. A detailed representation of the costs associated with each component and project can be found in Appendix G.

Component	Project	Lead Ministry	Sub-Total	Contingency (10%)	Total Cost (US \$)	Cost (US \$)
Integrated Strategic Water Resource Planning and Management	Strategic catchment planning for all level one catchments	MoE	\$ 2 000 000	\$ 200 000	\$ 2 200 000	\$ 19 635 000
	Groundwater Study and Mapping Exercise		\$ 5 000 000	\$ 500 000	\$ 5 500 000	
	Complete and automated hydrological network		\$ 10 850 000	\$ 1 085 000	\$ 11 935 000	
Catchment Restoration	Catchment Rehabilitation : Agriculture		\$ 32 600 000	\$ 3 260 000	\$ 35 860 000	\$ 38 280 000
	Implementing the Water-Energy-Food Nexus: Hydropower		\$ 2 200 000	\$ 220 000	\$ 2 420 000	
Climate Resilient Water Infrastructure	Large-scale water Infrastructure		\$ 176 500 000	\$ 17 650 000	\$ 194 150 000	\$ 252 560 000
	Small-scale water infrastructure		\$ 43 400 000	\$ 4 340 000	\$ 47 740 000	
	Household Rainwater Harvesting		\$ 9 700 000	\$ 970 000	\$ 10 670 000	
PROGRAMME TOTAL			\$ 282 250 000	\$ 28 225 000	\$ 310 475 000	\$ 310 475 000

8.3 INVESTMENT PROGRAMME 3: CLIMATE RESILIENT HUMAN SETTLEMENTS

Imitutire Itengamaye – Inogeye Buri Wese

(Kinyarwanda Translation of the Programme Title)

Climate Resilience Focus: To improve climate resilience of the country’s built environment by designing and constructing in ways that allow infrastructure and service delivery in human settlements to be more resilient to temperature and rainfall extremes as well as extreme weather, and to enable rural and urban socio-economic growth, and thereby reinforces broad-based resilience to climate change. To increase economically viable and environmentally sustainable livelihood options with a strong focus on integrating women’s specific needs and reducing vulnerability to increased climate variability” or say special attention to gender dimensions.

Priority SPCR Cross-Cutting Components: Integrated Land Use and Spatial Planning; Institutional Strengthening and Coordination; and Climate Services and Disaster Risk Reduction / Disaster Management.

Cross-Sectoral Elements: Land use planning and management; urban development; solid waste and wastewater management; surface transport; disaster risk reduction and disaster management.

Lead MDB: African Development Bank and World Bank

Estimated Amount: \$ 150 727 500

Programme: Climate Resilient Human Settlements			
No.	Component	Project	Estimated Cost (USD)
1	Climate-sensitive Integrated Land Use Planning and Spatial Planning	1. Update of National Land Use Master Plan to integrate future climate change. 2. Development of climate-responsive city-scale Spatial Development Master Plans	\$11 467 500
2	Climate resilience through storm-water and drainage management	1. Climate-smart Storm-water Management and Drainage Initiative in secondary cities	\$ 41 580 000
3	Climate resilience through improved waste management	1. National Waste Management Flagship Project, including infrastructure development in secondary cities	\$ 49 830 000
4	Sustainable, climate-resilient roads and bridges	1. Strengthening climate resilience in Rwanda’s district road network, and integrating climate-robustness into the Nyabarongo Bridge design and construction	\$ 47 850 000
Total Programme Cost			\$ 150 727 500

Institutions Involved: MININFRA; RTDA; RHA; WASAC; MIDIMAR; MoE; MINILAF; Meteo Rwanda; MINALOC; MIGEPROF; District governments

Implementation Arrangement: The Project Management Unit will be chaired by MININFRA, supported by the following institutions: MININFRA; RTDA; RHA; WASAC; MIDIMAR; MoE; MINILAF; Meteo Rwanda; MINALOC; MIGEPROF; District governments.

8.3.1 BACKGROUND AND RATIONALE

206. Rwanda is one of the most densely populated countries in Africa¹¹¹ Most of Rwanda's population lives in rural areas. However, like much of East Africa, Rwanda is characterised by rapid urban growth. Rwanda's government proactively encourages the transition of towns and small population centres into secondary cities, intently aware that almost no country has graduated from low-middle income status without attaining 50% urbanization.¹¹² Rwanda's urban population stood at approximately 16.5% in 2012¹¹³ but the country's near-term vision statement sets an ambitious target of having over 35% of citizens in urban areas by 2020.¹¹⁴

207. Rwanda's second Economic Development and Poverty Reduction Strategy (EDPRS II) emphasized three main objectives for the urban and rural settlements sector: integrated development planning and management; development of secondary cities as poles of growth; and establishment of financing and supply options for affordable housing.¹¹⁵

208. In furtherance of EDPRS II, and with the intention of implementing projects and programmes that would support the goals of EDPRS II, Rwanda identified six secondary cities as hubs for sustainable, green, inclusive growth: Huye, Muhanga, Musanze, Nyagatare, Rubavu, and Rusizi.¹¹⁶

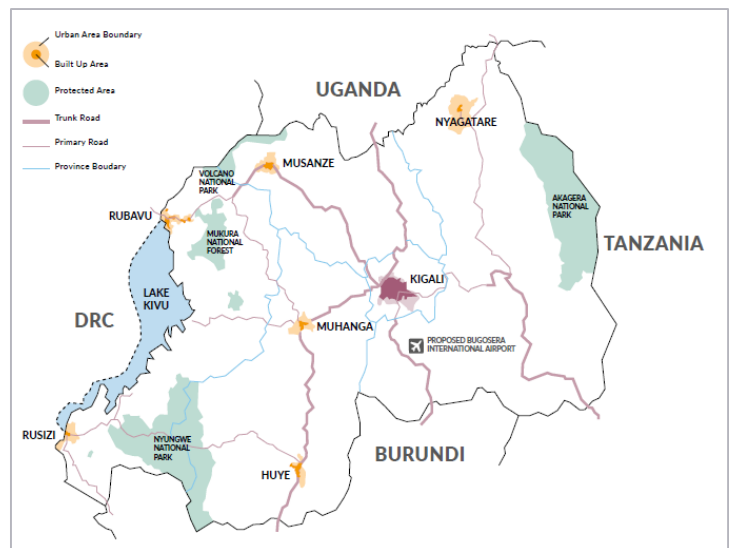


Figure 11: Rwanda's National Capital Kigali and Six Secondary Cities (GGGI, 2015)¹¹⁷

209. As Rwanda's cities and urban nodes grow, it is imperative that this growth be managed and directed so that expanding human settlements – and the concomitant development of infrastructure and service provision – can contribute to broad-based climate change resilience of Rwanda's population and environment, rather than diminish it.

210. At this time, Rwanda's human settlements – rural and urban – are poorly prepared for climate change. Climate change considerations such as future temperature and rainfall projections have yet to be integrated into land use planning or into infrastructure design and development in settlements.

211. In Rwanda, principal impacts of climate change with implications for human settlements and the built environment are temperature rise and change in precipitation patterns. These are expected to result in additional impacts such as increased humidity in some regions and certain parts of the year, increased

dryness and aridity in some regions and certain times of the year, plus an expected increase in frequency and magnitude of extreme events such as wildfires, floods, and landslides.¹¹⁸ The already arid Eastern part of the country is expected to experience more prolonged and more intense drought conditions, while the Northern and Western part of the country will likely witness more flooding and damage from intense rainfall events.¹¹⁹ Rwandan human settlements – in urban and rural areas -- must adapt these to anticipated threats.

212. A few key areas offer high potential for the integration of climate change resilience into Rwanda's human settlements. These include land use planning (particularly spatial planning that incorporates future climate risks), drainage and storm-water management, solid waste and wastewater management, and surface transport (especially the roads and bridges sector).
213. A detailed gender analysis will be conducted during project preparation and project implementation part for targeted geographical areas. Following detailed analysis, the design of gender responsive interventions will address the identified gender gaps for each of the interventions. In collaboration with the Ministry of Gender and Family Protections, and other key stakeholders (NGOs, CSO, private sectors, key gender working groups), technical backstopping will be provided throughout the project cycle. MDB E&S Safeguards and project-specific ESIA will be undertaken in accordance with the Rwanda's environmental legislation
214. Therefore, in support of more adaptive and resilient human settlements in Rwanda, diminished vulnerability to climate change related extreme events, and to better equip growing Rwandan cities to cope with shifting temperature and rainfall trends, this investment programme focuses on (1) climate-conscious integrated land use planning and spatial planning (2) storm-water and drainage management; (3) urban waste management; and (4) climate-robust road transport infrastructure.

8.3.2 DEVELOPMENT OBJECTIVES

215. **Programme development objective:** To improve climate resilience of the country's built environment by designing and constructing in ways that allow infrastructure and service delivery in human settlements to be more resilient to temperature and rainfall extremes as well as extreme weather, and to enable rural and urban socio-economic growth, and thereby reinforces broad-based resilience to climate change. To increase economically viable and environmentally sustainable livelihood options with a strong focus on integrating women's specific needs and reducing vulnerability to increased climate variability" or say special attention to gender dimensions.
216. This programme is compatible with Rwanda's Vision 2050, which articulates Rwanda's commitment to "modern infrastructure and livelihoods." Vision 2050 emphasizes high-income economy, high quality

of life and standards of living, which are predicated on effective and high-performing infrastructure, and reliable service delivery. Furthermore, Vision 2050 targets modern sanitation, environmentally friendly and climate resilient surroundings, modern cities with optimal space utilization, and modern transport facilities and services.¹²⁰

217. Additionally, the programme also supports the achievement of the NST's outcome on increasing sustainability of land use systems, as well as increasing availability of affordable housing, through increasing basic infrastructure through the construction of urban roads.
218. Moreover, this investment programme also encapsulates multiple programmes of action identified by Rwanda's national GGCRS, such as (i) low carbon urban systems; (ii) resilient transport systems; (iii) sustainable land use management; and (iii) disaster management and disease prevention.¹²¹
219. In addition to national development objectives, this investment programme contributes to the two transformational impacts of the PPCR framework: (1) increased resilience of households, communities, businesses, sectors and society to climate variability and climate change; and (2) strengthened climate responsive development planning. It also supports the PPCR's five core programme outcomes: B1. Strengthened adaptive capacities; B2. Improved institutional framework in place; B3. Use of climate information in decision making routinely applied; B4. Strengthened climate responsive development planning; and B5. Climate responsive investment approaches identified and implemented.
220. Furthermore, this programme is designed taking into account the four prioritization criteria that guided Rwanda's SPCR. These criteria helped determine which projects – from within the extremely large number of initial candidate projects that were analyzed and evaluated -- remained within the programme, and how each of the projects were molded. The programme has paradigm shift potential, given that each of the interventions can be scaled-up and replicated in other urban and rural human settlements. The programme is well suited to generating knowledge and learning about climate change resilience in the built environment. There is strong national ownership of the programme, especially in terms of MININFRA's direct contributions to shaping the storm-water and drainage project and the transport sector project. The investment programme is the second most expensive in the SPCR, yet reflects economic efficiency since each of the interventions support or enhance productive activity in human settlements and have a wide spectrum of non-climate co-benefits as well. In terms of the ability to assist vulnerable people including women, all projects under this programme have been designed to improve living standards and service delivery, with benefits accruing to vulnerable populations in human settlements as well.

8.3.3 COMPONENTS AND PROJECTS

221. Components and projects will be identified and scoped during a detailed project design phase, with the frameworks provided in this section. Indicatively, investment programme three's components and projects are described below. A detailed representation of each component and project is located in Appendix G.
222. It will be critical to look at ways to improve knowledge and lessons learned through the generation and dissemination of knowledge products during design and implementation of each project. There are ample opportunities to showcase some of the learnings in this programme, including: sharing either through webinars or conferences with national and regional practitioners on how to incorporate climate-sensitive integrated land use planning into decision making; a knowledge product on lessons learned in building stormwater and drainage management systems, using global best practices to inform waste management; looking at ways to showcase the work in this component to the private sector to help attract future financing; and sufficient opportunities to use case studies around climate resilient infrastructure (roads and bridges) and the role that those lessons may play in the compliance around EIAs. The detailed scoping and design stage will provide an opportunity for ideas such as these, and many more, to be appropriately integrated into each project's future.

COMPONENT 1: CLIMATE-SENSITIVE INTEGRATED LAND USE PLANNING AND SPATIAL PLANNING

223. This component's objective is to build climate change resilience in Rwanda by ensuring that future climate change considerations are mainstreamed into Rwanda's land use planning process, so that integrated land use planning and spatial planning can shape Rwanda's development in more climate-compatible ways and can embed climate change resilience into the country's evolving built environment.
224. Throughout the course of the SPCR development process, stakeholders from different sectors and institutional affiliations stressed the need for more advanced land use planning approaches in Rwanda, especially the need for comprehensive spatial planning for Rwanda's growing urban centres. It was noted repeatedly that while Rwanda does have a land use master plan, it needs to be revised with plausible climate change futures in mind. Similarly, while Rwanda does have a host of strategies and plans focused on urban development (Urbanization Sector Strategic Plan for EDPRS II; National Urban Housing Policy; National Urbanization Policy; National Informal Settlement Upgrading Strategy, amongst others), none of them meaningfully integrate climate change. This leaves these plans unable to support medium to long-term climate change resilience in Rwanda.

225. Some (but not all) of Rwanda's population centres have Local Land Development Plans. These too are not currently responsive to climate change projections, and have not relied on advanced spatial planning methods. Recognizing the need for a comprehensive approach to urban planning, in 2016 Rwanda launched an effort to develop or revise (i) Conceptual Urban Master Plans; (ii) Local Land Development Plans; and (iii) Land Subdivision Plans (detailed physical plans) for its six secondary cities.¹²² However, this effort did not actively seek to integrate climate change factors into the planning process.
226. Land use planning is gaining recognition globally as one of the most fundamental and most impactful opportunities to build climate change resilience, especially over a longer time horizon.¹²³ In Rwanda, a revision of the National Land Use Master Plan, and the recently initiated development (and revision) of Urban Master Plans and Local Land Development Plans, represent two distinct and important opportunities to mainstream climate change resilience into the built environment, especially human settlements.

COMPONENT 2: CLIMATE RESILIENCE THROUGH STORM-WATER AND DRAINAGE MANAGEMENT

227. This component's objective is to build climate change resilience in Rwanda by strengthening adaptive capacity in human settlements in terms of better preparedness for large volumes of rainfall, enhanced drainage and absorptive systems to channel heavy rainfall and avoid accumulation, and reduced flooding through improved storm-water management.
228. Floods are already a common occurrence in Rwanda, and are expected to increase with climate change. Studies indicate that over the last two decades in Rwanda, the most commonly observed natural disasters were the result of heavy precipitation in single, intense events.¹²⁴ Climate change projections strongly suggest that such heavy rainfall events are likely to become more frequent, with higher rainfall volumes expected in each such event. Relative to a 1970 baseline, rainfall variability is also likely to increase by 5-10%, making it harder to predict and prepare for immense volumes of rainfall during specific times of the year.¹²⁵
229. Flooding and waterlogging in human settlements not only pose a threat to life and property, they impair businesses and trade. For instance, the Nyabugogo business district in Kigali experiences flooding and standing water every year during the rainy season. Small businesses and entrepreneurs in Nyabugogo recently surveyed estimated that such flooding costs them approximately 178 million Rwandan Francs annually. This represents over 23% of their yearly profit.¹²⁶ The flooding also costs the Rwandan exchequer dearly; the government already developed a small drainage channel in the

area but waterlogging continues.¹²⁷ This left Rwanda with few options but to take a large loan of \$ 74 million USD from China's Export Import Bank to redevelop the area and build new road networks that will lead to less flooding.¹²⁸

230. Water runoff from heavy rainfall in the volcanoes during rainy seasons cause a lot of damages and losses to the people living in the downstream mainly because of the quantity of water flow and its velocity. These in most instances cause the death of people, destruction of bridges, roads, crops and other damages to property. The water runoff from the rainy season is usually so extreme that it often destroys and washes away most of the structural flood defenses (gabions and check dams) that under normal situations protect streams draining in the volcanic area. In order to ensure effective measures for the protection of the infrastructure in the region, consideration of climate variability and climate change is imperative.
231. The volcanic area and Kigali's flooding challenges have received attention from the Rwandan government, but as secondary cities grow around the country similar challenges will be encountered in other human settlements unless adequate storm-water management and drainage measures are introduced now.

COMPONENT 3: CLIMATE RESILIENCE THROUGH IMPROVED WASTE MANAGEMENT

232. This component's objective is to build climate change resilience in Rwanda by enhancing human settlements' ability to reduce, reuse, and treat waste (solid waste as well as wastewater) -- thereby improving overall resource-efficiency (making settlements more adaptable in the medium-to-long term) -- and diminishing the levels of contaminants spread by runoff or waterlogging during heavy rainfall events.
233. Rwanda's waste-related national policy and regulatory architecture display critical gaps. Somewhat curiously, even though Rwanda does not have an overarching national integrated waste management framework (nor policy, strategy, or guidelines), it has started addressing waste in more sophisticated (albeit piece meal) ways: it has developed a National e-Waste Management Policy,¹²⁹ is funding (through FONERWA) the development of a National e-Waste Strategy and the establishment of sustainable recycling industries,¹³⁰ has adopted national guidelines on healthcare waste management,¹³¹ has evolved a plan to address the transboundary movement of hazardous wastes and their disposal,¹³² and formulated guidelines on the management of waste disposal in landfills.¹³³
234. Yet, even in the face of these multifarious efforts, Rwanda is grappling with underdeveloped waste management capacity, at the policy level as well as infrastructure and operational level. Solid waste

management remains a problem in rural and urban settlements.¹³⁴ Recognizing this gap, a National Task Force on solid waste management has been conceptualized and charged with devising an integrated approach to waste, but the task force's progress is indeterminate.¹³⁵

235. While one notable effort on consolidated waste management that focused on improved landfills (funded by UNDP) has had a beneficial outcome,¹³⁶ other sporadic attempts have fallen short, such as the City of Kigali's efforts to develop a waste to energy project, a composting facility at Nduba, and a new sanitary landfill – documented in a highly critical and telling report by Rwanda's Auditor General.¹³⁷
236. AfDB has recently launched an effort to build landfills and faecal sludge treatment plants in four cities in Rwanda – Rusizi, Karongi, Rubavu, and Musanze.¹³⁸ This, however, still leaves waste management needs in the secondary cities of Huye, Muhanga, and Nyagatare unaddressed and also does not extend to rural settlements where sanitation and waste management are growing priorities.
237. Overall, waste management is an area where Rwanda is falling short. Without adequate systems and infrastructure and trained personnel to address waste management, Rwanda's human settlements are unlikely to provide households and businesses the level of service delivery and municipal support needed for broad-based socio-economic resilience.

COMPONENT 4: SUSTAINABLE, CLIMATE-RESILIENT ROADS AND BRIDGES

238. This component's objective is to build climate change resilience in Rwanda by strengthening climate-robustness of Rwanda's district road network, designing and constructing roads – and one critical bridge -- so that they are better able to reduce the risk of floods and landslides, thereby reducing climate change vulnerability of communities and businesses that depend on road transportation. The component also offers an opportunity to explore the other side of the equation, i.e. to investigate how district roads in Rwanda could be constructed and maintained in ways that minimize damage to and destabilization of the surrounding environment.
239. The transport sector is fundamental to Rwanda's development, and is an engine of growth for the country's economy.¹³⁹ Reliable, accessible, and affordable transportation options are essential for trade in goods and services, and for the mobility of Rwanda's people in pursuit of better opportunities. Not only is transport critical for value addition in Rwanda's agriculture sector and to improve access to markets for agricultural produce, it is pivotal to the country's intended transition from an agrarian economy to a middle income, knowledge-based economy.¹⁴⁰
240. Road transport is the dominant mode of transport in Rwanda, with the vast majority of movement of people, goods, and services taking place by light and heavy motor vehicles and two-wheeled transport.

Largely as a result of its mountainous terrain that requires lengthy, weaving roads, Rwanda has a high road density of 0.53 km of road / km², which is close to Africa's weighted average of 0.57 km / km².¹⁴¹ The table below indicates varying lengths of different classes of roads in Rwanda (from 2012).

Table 5: Total Length of Roads in Rwanda (MININFRA, 2012)¹⁴²

Type of Roads	Length (km)	
Classified		4 698
<i>Paved National Roads</i>	1 075	
<i>Unpaved National</i>	1 785	
<i>Unpaved District Roads</i>	1 838	
City of Kigali Roads		1 017
<i>Paved Roads</i>	153	
<i>Unpaved Roads</i>	864	
Unpaved Roads		8 285
Grand Total Road Length in Rwanda		14 00

241. This component seeks to build on and expand key elements from a successful African Development Bank (AfDB) and Nordic Development Fund (NDF) driven project in Rwanda currently underway: Developing capacity for climate resilient road transport infrastructure. That project is the first of its kind in Rwanda, with an explicit focus on climate change resilience in the roads and bridges sector, with three primary objectives: (i) increased multi-stakeholder knowledge and supporting tools required to integrate climate change adaptation and disaster risk management into the transport sector; (ii) enhanced infrastructure protection in right-of-way areas vulnerable to landslides, erosion, intense precipitation and high temperatures; and (iii) increased capacity by transport sector experts for disaster risk management.¹⁴³ The specific focus of the AfDB-NDF project, however, is the upgrading of a 125 km stretch of Rwanda's Base-Gicumbi-Rukomo-Nyagatare national highway road section (with the upgrading effort being used as an opportunity for broader capacity building, knowledge-sharing, the introduction of tools to integrate climate change considerations etc.).
242. The SPCR seeks to complement the AfDB-NDF effort through a combination of activities that will move the road transport sector even farther in terms of the ability to mainstream climate change into sector planning and operations. In contrast to the aforementioned project, this project will focus not on a national road but rather on district roads, which are more vulnerable to climatic impacts.
243. Additionally, this component will also demonstrate – through a high-profile bridge project currently in development in Rwanda – how climate change robustness can be integrated into the engineering and operations and maintenance aspects of a transport infrastructure project. Plans and technical studies for the Nyabarongo bridge (between Nyarugenge and Kamonyi districts) already exist, but which do not factor in climate change. Even the socio-environmental study for the bridge project does not take climate change into account.¹⁴⁴ In light of the fact that the intended location for the bridge is in an area

identified by MIDIMAR as being at high risk of floods and landslides, the bridge represents a pivotal opportunity to showcase in Rwanda approaches gaining traction the world over to integrate future climate change considerations into the design, construction, and operation of an infrastructure project to ensure that the asset maintains performance and value even in the face of climate change, and that it actively contributes to climate change resilience of the communities it serves. In the case of the bridge, it would be important to factor in changing flood levels in the future in Rwanda, and to ensure that even as return periods for 50-year floods and 100-year floods shorten considerably, the bridge will still be functional and won't get overtopped.

8.3.4 INSTITUTIONAL ARRANGEMENTS

244. The Project Management Unit will be chaired by MININFRA, supported by the following institutions: MININFRA; RTDA; RHA; WASAC; MIDIMAR; MoE; Meteo Rwanda; MINALOC; MIGEPROF; District governments.
245. Once the projects have gone through project preparation, it will be important to determine appropriate institutional arrangements that are consistent with the Rwandan government and best serve the project.

8.3.5 GENDER ISSUES

246. An estimated 70% of people living below the poverty line around the world are women.¹⁴⁵ This makes them doubly susceptible to the impacts of climate change, due both to their vulnerability from poverty, and vulnerability because of gender. Restricted access to information and resources as well as limited involvement in decision-making procedures results in women being one of the most at-risk groups to climate change impacts.¹⁴⁶
247. Climate change is not gender-neutral. Women, especially from developing countries, are disproportionately hurt by climate change. Men and women have different access to climate information, and use and benefits from accessing climate services. Building climate resilience depends heavily on availability and access to adequate climate data. In general, women have less access and control of information and communication technology (ICT) such as radio, television, cell phones due to limited access to capital to secure ICT or barriers arising from higher levels of technological language illiteracy among women. For example, women's information networks are often smaller in comparison to male counterparts which can lead to fewer opportunities to learn about new productive technologies.
248. This discrepancy arises from a number of factors:
- Gender-based differences in time use, access to assets and credit, and treatment by markets and formal institutions (including legal and regulatory frameworks) constrain women's opportunities.

As a result, there is a global gender gap in earnings and productivity – around the world, women make between 30-80% of what men earn annually.¹⁴⁷

- The literacy rate and therefore access to information is lower amongst women than in men. For instance, in Rwanda, where average population literacy is 68%, 72% of men were literate and 65% of women were literate in 2012.¹⁴⁸
- Women have less access than men to policy and decision-making processes.
- Socio-cultural norms can limit women from acquiring skills necessary to escape or avoid hazards, and from enjoying the same mobility as men may during natural disasters.
- Because of women's primary roles in both natural resources management and in family care – women respond to shocks differently than men.

249. At the same time, women can be extremely influential drivers of climate change resilience. A number of studies have demonstrated that women's greater participation in co-creating climate change solutions is likely to enhance the sustainability of such efforts, and that drawing on women's experiences, knowledge and skills and supporting their empowerment makes climate change responses more effective.¹⁴⁹

250. SPCR's Programme Three – Climate Resilient Human Settlements – brings with it real opportunities to strengthen climate change resilience of Rwandan women, as well as to involve them in developing climate change solutions. Women tend to be decisionmakers at the household level, placing them in ideal positions to grapple with issues related to waste management and drainage. Women's reliance on land and natural resources to support their livelihoods, as well as their deeper understanding of community ties and networks also makes their input key for integrated spatial planning and land use planning. Gender-sensitive strategies can thus be well integrated into each of the programme's four components and project.

251. Projects under Programme Three will be designed taking several gender-related considerations into account, including (but not limited to):

- How can the project maximize gender equity and empowerment?
- How can the project minimize gender inequity and disproportionate vulnerability of women?
- How can stakeholder engagements be designed to be beneficial to women, and to draw more women to participate and contribute?
- What gender-specific and gender-sensitive elements should be considered in infrastructure design and siting, to ensure that women's needs from the infrastructure in question are adequately met?

- How can the skills-building and capacity-building elements of the project take women especially into account, to ensure that knowledge-transfer empowers women to take more leadership in the integration climate change considerations into land use planning and infrastructure development?

252. SPCR's Programme Three will reflect the stance taken by Rwanda's leadership on the role of women in shaping the country. As President Paul Kagame himself notes, "Fighting against inequality and poverty and working for development will only succeed if it involves men and women equally. It is the responsibility of each of us. We cannot claim to be on a sustainable path to transform Rwanda if we exclude women who are more than half of the population."¹⁵⁰

8.3.6 EXPECTED RESULTS

253. Expected results from the program include:

- Reduced risk of damage to human settlements from future climate change impacts including rising temperatures, heavy rainfall, flooding, wildfires etc. (with a focus on reduced risk of women and vulnerable groups);
- Improved preparedness for and response to large volumes of water from heavy precipitation, through better drainage and storm-water management, in targeted secondary cities and associated communities (especially amongst women and vulnerable groups in such communities);
- Improved household and community resilience due to reliable service delivery in terms of waste management, as well as improved resource-efficiency (from re-use and recycling) that will strengthen longer-term economic resilience in the face of resource constraints sparked by climate change;
- Enhanced robustness of district roads and of the Nyabarongo bridge to face the impacts of climate change, and reduced risk of depreciation of asset value from climatic stresses.
- Increased cross-sectoral collaboration to develop and strengthen climate change resilience in human settlements, at the national level, in secondary cities, as well as district level (in the districts involved).

8.3.7 INDICATORS AND BASELINE

254. Note: baseline values will be determined during project design and scoping, as precise project location is salient for determination of baseline.

PPCR Results Framework Indicator	Baseline
Numbers of people supported by the PPCR to cope with effects of climate change	<i>To be determined based on project design and final location.</i>
Change in damage/losses (\$) from extreme climate events in areas at risks that are the geographical focus of intervention	Pre- PPCR investment period extreme climatic events (floods and waterlogging in areas where storm-water / drainage project will occur). <i>To be determined based on project design and final location.</i>
Degree of integration of climate change in national planning	<i>To be determined based on project design and final location.</i>
Extent to which vulnerable households, communities, businesses and public-sector services use improved PPCR supported tools, instruments, strategies, activities to respond to Climate Variability and Climate Change	<i>To be determined based on project design and final location.</i>
Evidence of strengthened government capacity and coordination mechanism to mainstream climate resilience	<i>To be determined based on project design and final location.</i>
Suggested gender indicators (though not programmatically required and not prescribed by the PPCR results framework): <ul style="list-style-type: none"> No. and % of people (disaggregated by gender and perhaps socioeconomic groups) that are involved in project design and implementation; No. and % of people (disaggregated by gender) benefiting from resilient storm-water and drainage interventions, and resilient waste-management interventions; No. and % of people (disaggregated by gender) who increase adaptive capacity through reliance on more climate-resilient district roads they access; No. and % of households (disaggregated by sex) targeted in landscape reporting satisfaction with service delivery or benefits received under the project No. and % of households (disaggregated by sex) trained in rural environmental cadaster database system to analyse and validate data; No. and % of people (disaggregated by gender) trained to integrate climate change considerations into land-use and spatial planning. 	<i>To be determined based on project design and final location.</i>

8.3.8 RISKS AND SAFEGUARDS

Risk	Estimated Level of Risk	Mitigation (Safeguards)
Weak coordination between institutions	Moderate	Institutional arrangements for programme governance have been structured to ensure higher levels of inter-ministerial coordination.
Weak project management within institutions	Low	Relative to some other ministries, MININFRA has stronger project management capacity, and is a key factor in all four projects. Moreover, the project budgets have been estimated to accommodate supplementary external project management if needed.
Constrained participation by government officials in project delivery and trainings, due to workload and competing tasks	Low	All project projects designed are integral to Ministries' existing mandates and correlate to existing roles and responsibilities of Ministry staff, therefore these projects would be subsumed within their normal day-to-day tasks.

Weak interest by local governments to adopt or participate in development of climate-conscious land use and spatial planning, or infrastructure for waste, storm-water, and transport.	Low	Local governments are naturally invested in the resilience of their jurisdictions, and will appreciate the disaster risk reduction and climate change resilience aspects of the programme.
Project timeframes are too compressed for significant gains in climate change resilience	Moderate	Infrastructure projects such as those identified in this programme have a lengthy development cycle. It is possible that some projects may (especially if they face administrative delays) reach completion and operationalization only towards the end of the five-year period. However, their climate resilience potential would be modelled during design stages, and when fully operational they can be evaluated against annual climate variability (e.g. heavy rains and flooding), which could be a useful proxy for future climate change impacts.
Insufficient data availability for the design and development of the programme	Low	Rwanda is a data-rich environment, and has relatively higher levels of information availability and access than many African countries.

8.3.9 INDICATIVE COSTING

255. Below is a brief representation of the costs associated with each component and project. A detailed representation of the costs associated with each component and project can be found in Appendix G.

Component	Project	Lead Ministry	Sub-Total	Contingency (10%)	Total Cost (US \$)	Cost (US \$)
Mainstreaming Climate Resilience Through Land Use and Spatial Planning	Update of National Land Use Master Plan to integrate future climate change	MININFRA	\$ 4 675 000	\$ 467 500	\$ 5 142 500	\$ 11 467 500
	Climate-conscious city scale master plans		\$ 5 750 000	\$ 575 000	\$ 6 325 000	
Climate Resilience Through Storm water and Drainage Management	Climate-smart storm-water management and drainage initiative in secondary cities		\$ 37 800 000	\$ 3 780 000	\$ 41 580 000	\$ 41 580 000
Climate Resilience Through Improved Waste Management	Solid waste and wastewater guidelines and interventions in cities and rural settlements		\$ 45 300 000	\$ 4 530 000	\$ 49 830 000	\$ 49 830 000
Sustainable, Climate-Resilient Roads and Bridges	Strengthening climate resilience in Rwanda's district road network, and integrating climate-robustness into the Nyabarongo Bridge design and construction		\$ 43 500 000	\$ 4 350 000	\$ 47 850 000	\$ 47 850 000
PROGRAMME TOTAL			\$ 137 025 000	\$ 13 702 500	\$ 150 727 500	\$ 150 727 500

8.4 INVESTMENT PROGRAMME 4: STABLE AND SUSTAINABLE LANDSCAPES

Kubungabunga Umutungo Kamere N'Ibidukikije K'Uburyo Burambye

(Kinyarwanda Translation of the Programme Title)

Climate Resilience Focus: To enhance Rwanda's adaptive capacity against climatic risks and hazards by strengthening landscape based resilience, building technical and managerial capacity for the complete value-chain of climate services, and supporting communities in efforts to reduce landscape degradation and instability, thereby reducing overall disaster risk and vulnerability. To build inclusive (gender inclusion, vulnerable groups and youth) stable and sustainable landscapes.

Priority SPCR Cross-Cutting Components: Climate Services and Disaster Risk Reduction / Disaster Management; Integrated Land Use and Spatial Planning; Institutional Strengthening and Coordination

Cross-Sectoral Elements: Disaster Risk Reduction (DRR) and Disaster Risk Management; Hydro-meteorology; agriculture and land use; infrastructure planning and development; forestry; and ecosystems and biodiversity.

Lead MDB: World Bank

Estimated Amount: \$ 28 749 050

Programme: Stable and Sustainable Landscapes			
No.	Component	Project	Estimated Cost (USD)
1	Flood and landslide prevention, control, and management in high flood risk locations	1. Integrated Flood Risk Management Project in North-western Rwanda 2. Land stabilization and landscape restoration in areas affected by mining	\$20 377 500
2	Implementation and rollout of the National Framework for Climate Services	1. Technical and management capacity development for institutional transition to a climate services delivery agency and trainings to facilitate end-user orientation	\$ 8 371 550
3	Landscape conservation in the context of fuelwood production and collection for biomass use	See Forestry Investment Plan (FIP)	--
Total Programme Cost			\$28 749 050

The programme will leverage ongoing funding from the World Bank (US\$ 9.5 million) for an existing project, namely the Landscape Approach for Forest Restoration and Conservation (LAFREC) project. This will mainly be used for building on the lessons learnt, institutional capacities developed for the said project, and even detailed design of Project One under this programme (integrated flood risk management), which can draw on relevant aspects of LAFREC's flood forecasting and preparedness component.

Institutions Involved: MINILAF; MoE; REMA; RWFA; MIDIMAR; METEO RWANDA; MININFRA; MINAGRI; MINALOC; MIGEPROF; District Governments.

Implementation Arrangement: The Project Management Unit will be chaired by **MINILAF**, supported by the following institutions: MoE; REMA; RWFA; MIDIMAR; Meteo RWANDA; MININFRA; MINAGRI; MINALOC; MIGEPROF; District Governments.

8.4.1 BACKGROUND AND RATIONALE

256. Rwanda has historically been extremely vulnerable to climate-related disasters such as floods and landslides. Its hilly topography makes it particularly prone to flash floods and landslides after episodes of heavy rainfall. Given that climate change projections suggest a future with more heavy and intense rainfall events, the risk of these disasters is expected to increase in Rwanda in the years to come. Rwanda needs to build resilience to such expected impacts, both by ensuring that its landscapes remain stable in the face of climatic shocks and stresses, and by developing its capacity to better understand, interpret, and disseminate actionable climate and weather-related information across the country.
257. Flooding and landslides are Rwanda's most prevalent and most damaging disasters, occurring almost annually during the wet season. In April 2015, flooding and landslides resulting from heavy rainfall displaced thousands of people in Nyamasheke and Rubavu districts. An estimated 3425 people from 685 households had to be accommodated in villages in neighbouring regions after their homes were damaged. Over 200 hectares of crops were also lost to the floods.¹⁵¹ In May 2016, a period of heavy rainfall caused floods and landslides in Gakenke, Muhanga, Rubavu, and Ngororero districts that killed 49 people, destroyed an estimated 500 homes, and left thousands of Rwandans homeless. Gakenke was the hardest hit.¹⁵² Moreover, the Ministry of Disaster Management and Refugee Affairs highlighted that from January to May 9, at least 81 people died, 74 were injured, some 1,398 houses destroyed while over 1,500 hectares of crops were damaged as a result of disasters.
258. Across the country, an estimated 19% of all slopes have been identified as very highly or highly susceptible to landslides by Rwanda's National Risk Atlas, and another 23% of slopes have been classified as moderately susceptible.¹⁵³ While the lack of adequate hydrometric coverage constrained the Atlas in its assessment of high flood risk areas, historic records detailed in the Atlas underscore the susceptibility of several districts in Rwanda to flooding with a 25-year return period, including Bugesera, Kamonyi, Kicukiro, Nyarugenge, Rwamagana, and Gakenke.¹⁵⁴
259. Frequent floods and landslides represent a significant economic burden for Rwanda, and an impediment to socio-economic climate resilience. The National Risk Atlas estimates that if Rwanda suffers multiple classes of disasters in any one given year, the cumulative economic losses from all disasters could amount to as much as 100 billion Rwandan Francs (USD 132 million).¹⁵⁵¹⁵⁶ The figure does not take into account flooding, droughts and windstorms, but rather only focuses landslides and earthquake. Furthermore, these assessments do not include future risk of more frequent or damaging disasters due to the impact of climate change.

260. Human activity and unsustainable land use practices exacerbate risks arising from natural climate variability and anthropogenic climate change.¹⁵⁷ Thus, an important component of climate resilience against floods and landslides is enabling and empowering local communities to adopt more sustainable practices. In Rwanda, heavy reliance on fuelwood for bio-energy (domestic cooking and heating) contributes to slope destabilization and erosion in many areas. Firewood is the main source of energy for an estimated 98% of rural households, representing over 90% of the population.¹⁵⁸ Even as efforts need to be made to provide reliable access to more sustainable, low-carbon fuels, it is imperative that the production and harvesting of fuelwood – which will not sharply decline overnight – be made more sustainable so that landscapes are less unstable.
261. Ecosystem-based approaches to climate change resilience, in particular disaster risk reduction and disaster risk management, require a strong foundation of weather and climate information to act on. Rwanda's capacity to collect and analyse hydro-meteorological data has steadily improved over the last decade through national government and external support, but there remain critical gaps in terms of both data collection infrastructure as well as service delivery. More modern observational systems and analytical software can help contribute to landscape and human security and help Rwanda be better prepared for disasters that do occur. At the same time, as the FCFA Rwanda pilot project suggests,¹⁵⁹ improved data availability and access do not automatically translate into climate-resilient outcomes for end users unless information is adequately tailored for specific needs.¹⁶⁰ This calls for a paradigm shift from the generation of technical data and analysis towards a professionalised, client-facing, climate services approach and the provision of decision-ready climate products and services,¹⁶¹ in line with international approaches endorsed by the Global Framework for Climate Services.
262. A detailed gender analysis will be conducted during project preparation and project implementation part for targeted geographical areas. Following detailed analysis, design of gender responsive interventions will address the identified gender gaps for each of the interventions. In collaboration with the Ministry of Gender and Family Protections, and other key stakeholders (NGOs, CSO, private sectors, key gender working groups), technical backstopping will be provided throughout the project cycle. MDB E&S Safeguards and project-specific ESIA will be undertaken in accordance with the Rwanda's environmental legislation
263. In support of stronger, less vulnerable landscapes in Rwanda, more inbuilt adaptive capacity in natural systems, and to better equip the country to cope with increased disaster risk that accompanies climate change, this investment programme focuses on (1) flood and landslide risk reduction and management; (2) climate services; and (3) landscape restoration and conservation.

8.4.2 DEVELOPMENT OBJECTIVES

264. **Programme development objective:** To enhance Rwanda's adaptive capacity against climatic risks and hazards by strengthening landscape based resilience, building technical and managerial capacity for the complete value-chain of climate services, and supporting communities in efforts to reduce landscape degradation and instability, thereby reducing overall disaster risk and vulnerability. To build inclusive (gender inclusion, vulnerable groups and youth) stable and sustainable landscapes.
265. This programme is aligned with and would contribute to the realization of Rwanda's Vision 2050, which articulates Rwanda's commitment to "high-income economy, high quality of life and standards of living enabled by:
- Optimal natural capital (land, water, forests, environment) management.
 - Full access to high-quality, renewable, sufficient & affordable water and energy resources.
 - Phasing out of charcoal/wood as primary energy sources.
 - Climate resilience across productive sectors, namely agriculture and energy.
 - Healthy and environmentally friendly surroundings, with low pollution and high biodiversity and ecotourism, for national and international benefit."¹⁶²
266. Importantly, the programme also supports project's like the one in the NST that seeks to manage water flows from volcanoes and rivers to mitigate related disasters and improve water resource management, continuing to mainstream Disaster Risk Reduction and Management into all development sectors, and others.¹⁶³
267. Furthermore, the investment programme also encapsulates multiple programmes of action identified by Rwanda's national GGCRS, such as (i) sustainable land use management; (ii) disaster management and disease prevention; and (iii) climate data and projections.¹⁶⁴
268. Beyond national development objectives, this investment programme contributes to the two transformational impacts of the PPCR framework: (1) increased resilience of households, communities, businesses, sectors and society to climate variability and climate change; and (2) strengthened climate responsive development planning. It also supports the PPCR's five core programme outcomes: B1. Strengthened adaptive capacities; B2. Improved institutional framework in place; B3. Use of climate information in decision making routinely applied; B4. Strengthened climate responsive development planning; and B5. Climate responsive investment approaches identified and implemented.
269. Finally, this programme is designed taking into account the four prioritization criteria that guided Rwanda's SPCR. These criteria informed which projects – of all the project ideas that were initially under consideration and evaluation -- remained within the programme, and how individual projects were

structured. The programme has paradigm shift potential, given its ample potential for scale-up and replication, as well as its ability to generate knowledge and learning about landscape based climate change resilience. There is strong national ownership of the programme, especially in terms of capacity building of Meteo Rwanda. The inclusion of a project on restoration of mined land is also testament to national ownership, as it merited inclusion primarily due to the consistent demands voiced by national government stakeholders who highlighted the need for this. The investment programme reflects economic efficiency, given that the integrated flood management project can leverage lessons from and some institutional and management structures already in existing for LAFREC, and could attract private sector funds for the mining lands restoration project. In terms of the ability to reap benefits for vulnerable people including women, all projects under this programme have been designed to explore income-generating and livelihoods-supporting activities or skills-building training, which would be specially targeted at vulnerable groups.

8.4.3 COMPONENTS AND PROJECTS

270. Components and projects will be identified and scoped during a detailed project design phase, with the frameworks provided in this section. Indicatively, investment programme four's components and projects are described below. A detailed representation of each component and project can be found in Appendix G.
271. Potential for knowledge and learning opportunities in this programme include: opportunities to use the lessons learned in flood and landslide prevention, control and management to see how different decision-making pathways can influence multiple scales, different societal actors, various knowledge sources, and diverse disciplines into disaster risk research; interviews with different end-users as to how they have received climate services information and ways to improve future reception; and cross-ministerial collaboration presentations, which would allow ministries to showcase how they have benefited from each other's knowledge and discipline (the component in this programme linked to the FIP would provide a great opportunity to showcase this). The detailed scoping and design stage will provide an opportunity for ideas such as these, and many more, to be appropriately integrate into each project's future.

COMPONENT 1: FLOOD AND LANDSLIDE PREVENTION, CONTROL, AND MANAGEMENT THROUGH IMPROVED LANDSCAPE RESILIENCE

272. This component's objective is to build climate change resilience in Rwanda by reducing and managing flood and landslide risk through ecosystem-based approaches (biophysical interventions), improved

technical capacity for flood forecasting (information systems and climate services), supplementary physical structural approaches (infrastructure), coupled with community-based approaches.

273. This component seeks to draw on key elements from a successful World Bank driven project in Rwanda (funded by the Least Developed Countries Fund and the Global Environment Facility), but to integrate those elements into an explicitly climate resilience-oriented project focused on flood and landslide risk reduction and management. The prior project in question – Landscape Approach to Forest Restoration and Conservation (LAFREC), in Rwanda’s Gishwati forest region – integrated climate change as a cross-cutting issue and was one of the project’s major themes, but climate change resilience was not the primary driver of the project. Rather, it was forest conservation and natural resource management. The intention of this component is for the investment to be proactively designed with climate change adaptation benefits in mind, not merely co-benefits.
274. Moreover, LAFREC comprised of several elements, of which flood risk management was one. The SPCR intends for flood risk reduction and flood risk management to be the core feature of this component, and for a reduction in flood risk to be the principal outcome from this intervention.
275. This component also looks beyond the LAFREC approach by integrating a project that would be located in mining areas in Rwanda. As the mining and extractive sector in Rwanda expands, damaging impacts on landscapes are certain to increase, even with safeguards in place. Thus, alongside a growth in mining, Rwanda is also laying the ground for proactive landscape restoration in mining areas, to prevent and reduce the risk of erosion, landslides, and floods in such locations during heavy rainfall events.
276. Mining is already the second largest export industry in Rwanda’s economy, with tin, tantalum, and tungsten being the main exported ores. The mining sector’s contribution to GDP is expected to increase from 1.2% in 2011 to 5.27% by 2018. Similarly, the population working in this sector is projected to grow from 20,000 to triple that number, i.e. 60,000, by 2018. Investment in the sector is already skyrocketing, from USD 150 million in 2011 to an anticipated USD 500 million in 2018. This is also strongly correlated to an increase in export revenue from mining, from USD 158 million in 2011 to USD 400 million in 2018.¹⁶⁵
277. The World Bank has underscored the role that Rwanda’s mining sector can play in boosting the country’s economy, such as through a 2014 World Bank report on unleashing the potential of the mining sector. The World Bank’s analysis identifies mining as a key opportunity for income diversification and creation of off-farm jobs to help Rwanda achieve its 30% poverty reduction target, and provides guidance on how Rwanda can rapidly expand mining operations.¹⁶⁶ In light of this growth, it is also critical to support landscape resilience in areas where Rwanda is scaling up mining, to ensure that such economic development does not get eroded by loss and damage from floods and landslides.

COMPONENT 2: IMPLEMENTATION AND ROLLOUT OF THE NATIONAL FRAMEWORK FOR CLIMATE SERVICES

278. This component's objective is to build climate change resilience in Rwanda by strengthening adaptive capacity of the broader population in Rwanda and specifically of decision-making entities in Rwanda's governance architecture, in the form of access to credible, reliable, actionable climate-related information, as well as improved decision-making about weather and climate-related matters, based on tailored climate services from Meteo Rwanda.
279. This component's design and approach is informed by lessons that have emerged from recent projects that aimed at enhancing Meteo Rwanda's technical capacity, including the FONERWA-funded effort, 'Strengthening Meteo Rwanda's weather and climate services to support development,'¹⁶⁷ and the Columbia University driven Enhancing National Climate Services (ENACTS),¹⁶⁸ which included the development of online, interactive map rooms as well as institutional capacity building.¹⁶⁹
280. Insights from these pivotal efforts suggest that Meteo Rwanda is steadily improving its technical capability. For instance, in the last five years, Meteo reports that they have installed 100 automatic rainfall stations; completed 41 automatic weather stations; installed one C-band weather radar system that provides national coverage; developed over 160 manual weather stations; acquired and implemented an improved data management system (i.e. CLIMSOFIT); and introduced a modern forecasting system (i.e. PUMA).¹⁷⁰ Nevertheless, Meteo still faces critical capacity gaps that constrain its ability to deliver the client-facing climate services that Rwandan ministries and communities seek from it.
281. Consistent feedback about Meteo during the development of the SPCR indicates that there is a pressing need to support Meteo in an organizational change process, to enable and empower it to step into a customer-facing role and transition into an institution that is better equipped to meet client needs. This is especially critical at a time when Rwanda is developing a National Framework for Climate Services (NFCS), to align with and reflect the tenets of the Global Framework for Climate Services. Unless this framework is accompanied by an institution-wide shift towards service delivery, towards differentiated, user-friendly climate product development, and enhanced project management capabilities, Rwanda may not be able to translate the NFCS into tangible results. If so, it risks falling short of the multi-sectoral climate change resilience potential that can be built off the back of a strong national climate services system.

COMPONENT 3: LANDSCAPE CONSERVATION IN THE CONTEXT OF FUELWOOD PRODUCTION AND COLLECTION FOR BIOMASS USE

282. This component's objective is to build climate change resilience in Rwanda by reducing landscape fragility, especially in high-risk locations, through increased slope stability. This would make these sites less disaster prone and would enhance ecosystem-based adaptive capacity.
283. Fuelwood collection is an important driver of deforestation and forest degradation in Rwanda.¹⁷¹ A number of studies point to the reliance on fuelwood as a factor behind high rates of soil erosion, landslides, and flooding in Rwanda. Experts suggest that this has caused relocation of people and sedimentation of hydropower plants, leading to power shortages and water scarcity in parts of the country.¹⁷² While Rwanda does not have a lot of deadwood, there is overcutting of live wood, which is the main challenge.

8.4.4 INSTITUTIONAL ARRANGEMENTS

284. The Project Management Unit will be chaired by MINILAF, supported by the following institutions: MoE; REMA; RWFA; MIDIMAR; Meteo RWANDA; MININFRA; MINAGRI; MINALOC; MIGEPROF; District Governments.
285. Once the projects have gone through project preparation, it will be important to determine appropriate institutional arrangements that are consistent with the Rwandan government and best serve the project.

8.4.5 GENDER ISSUES

286. Women often face social, economic and political barriers that limit their adaptive capacity. In many settings women have unequal access to resources and to decision-making processes, as well as limited mobility. This compounds vulnerability and places women (especially women in rural areas) in situations where they are disproportionately affected by climate change.¹⁷³ For instance, Rwanda's leading English language daily, *The New Times*, reports that in Rwanda and neighbouring countries, the dry season and periods of drought witness women having to walk ever longer distances to collect fuelwood.¹⁷⁴ Moreover, women's often unfavourable situation in Rwanda in terms of land tenure security may result in their being disproportionately affected by climate change.¹⁷⁵
287. SPCR's Programme Four – Stable and Sustainable Landscapes – is especially pertinent to building adaptive capacity in women in Rwanda and reducing their susceptibility to disasters and climate-related hazards, particularly in rural settings. It offers scope for the integration of gender-sensitive strategies into each of the three components and projects. Projects under this programme should be designed bearing in mind that women are effective agents of change in climate change resilience, and can

become influential actors in the themes covered by this programme - integrated flood risk management, capacity building for climate services, and sustainable fuelwood management. The programme's heavy emphasis on ecosystems and landscapes also offers special opportunities for a gender lens in project design: women's responsibilities in households and communities, as stewards of natural and household resources, positions them particularly well to contribute to sustainable livelihoods.

288. In light of investment programme four's focus on disaster risk reduction and disaster management (both through integrated flood and landslide management as well as improved climate services), questions to consider for disaster management programmes include:

- What are the impacts on men, women, boys and girls? Are some groups affected more than others?
- Are women consulted in the decisions around adapting to and mitigating climate change?
- How do floods and landslides affect women and men differently?
- What are the key issues that make women in Rwanda particularly vulnerable to floods and droughts?
- What are the gender-dimensions of disaster prevention activities? For example:
 - *How will flood control measures affect the livelihoods of women and men?*
 - *How will women get equal access to water for productive purposes during disasters?*
 - *How will early warning systems reach both women and men effectively?*
 - *How will women be involved in decision-making in response to pending disasters such as when to evacuate?*

289. Investment programme four also delves into climate services. It does so bearing in mind that, typically, women and men have different access to climate information and communication needs, and do not benefit equally from climate services. In general, access to, ownership of and control use of ICTs (e.g. cell phone, radio, televisions, computers) remain lower for women in comparison to men. Also, women's information networks are often smaller than men's, so they offer fewer opportunities for learning about new climate services. Ensuring that women benefit equally from the investments in this programme is therefore critical to the programme's and the SPCR's overall objective of building climate change resilience.

290. Given that this programme has a strong training element, issues of gender are critical in stakeholder participation especially considering that women are often not sufficiently engaged when it comes to planning or decision-making. Such questions to consider include:

- Is the content of the training sufficiently addressing issue of gender?
- Is the training being offered to both women and men in venues and at times that are accessible?
- Are the training teams gender balanced?

291. In training sessions, building capacity for sensitization to and implementation of gender-equality principles, women's awareness of their rights and the barriers to exercising those rights should be strengthened to increase not only the awareness, but the accountability when it comes to gender integration. During the training session, the needs of both men and women need to be considered, and an open learning environment should be created.
292. The first step in tackling that challenge is to ensure that women are actively engaged and that a conducive environment is created during meetings/trainings for all to freely and openly engage. Key issues to consider in ensuring gender mainstreaming in stakeholder engagement include:
- Who is invited to participate and who is responsible for the invitations?
 - Is there are sufficient representation (at least 30%) of both genders in workshops, meetings, etc., and if not, what should be done to ensure sufficient representation?
 - Are meetings held at times and in venues that are accessible to women as well as men?
 - Are meetings structured in a way that enables women's voices to be heard, or it is necessary to have separate meetings with women to ensure that their voices are heard?
 - Are both genders represented in the teams facilitating the meetings?
 - Do the records of meetings sufficiently capture the different viewpoints of women and men?
293. Globally, climate disasters such as flood and storms kill more women than men.¹⁷⁶ (WHO 2014). Gender norms or expectations within the climate disaster content can further increase mortality rate for girls and women, particularly for women who have low socioeconomic status. Rural women, in general, have less access to resources like weather alerts, cropping pattern, financial resources, health services, institutions, etc, which has a detrimental effect on women's capacity to respond and adapt effectively to climate variability. Just as natural disasters affect women disproportionately and impact women's health and her safety, response and recovery efforts to disasters can also increase or reinforce existing gender inequalities. Access to disaster mitigation information and technologies are essential tools for managing climate-change related risks, which women often have less opportunity to access relevant resources. Women can serve as positive agents for the community preparedness which can in turn help reduce high mortality rates among women and improve women's status as leaders and decision-makers in the community.

8.4.6 EXPECTED RESULTS

294. Expected results from the program include:
- Reduced risk of erosion, landslides, floods, as well as droughts in targeted geographic locations and associated communities, including for women and vulnerable groups;

- Improved preparedness for and response to floods and landslides in targeted geographic locations and associated communities, especially amongst women and vulnerable groups;
- Adoption of more sustainable livelihoods options and income-generating activities in targeted communities, with a particular focus on women and vulnerable groups;
- Enhanced provision of tailored climate services by Meteo Rwanda to end-users, through a more client-oriented approach, and improved project management and service delivery capacity in Meteo (including through increased involvement of women in climate services in Meteo);
- Increased cross-sectoral collaboration to develop and strengthen landscape and ecosystem-based climate change resilience, at the national as well as district level (in the districts involved, including the Eastern Province).

8.4.7 INDICATORS AND BASELINE

295. Note: baseline values will be determined during project design and scoping, as precise project location is salient for determination of baseline.

PPCR Results Framework Indicator	Baseline
Numbers of people supported by the PPCR to cope with effects of climate change	<i>To be determined based on project design and final location.</i>
Change in damage/losses (\$) from extreme climate events in areas at risks that are the geographical focus of intervention	Pre-PPCR investment period extreme climatic events (floods and landslides in programme region). <i>To be determined based on project design and final location.</i>
Change in percentage of households (in areas at risk) whose livelihoods have improved (acquisition of productive assets, food security during sensitive periods of the year)	<i>To be determined based on project design and final location.</i>
Degree of integration of climate change in national planning	<i>To be determined based on project design and final location.</i>
Extent to which vulnerable households, communities, businesses and public-sector services use improved PPCR supported tools, instruments, strategies, activities to respond to Climate Variability and Climate Change	<i>To be determined based on project design and final location.</i>
Evidence of strengthened government capacity and coordination mechanism to mainstream climate resilience	<i>To be determined based on project design and final location.</i>
Suggested gender indicators (though not programmatically required and not prescribed by the PPCR results framework): <ul style="list-style-type: none"> • No. and % of people (disaggregated by gender and perhaps socioeconomic groups) that are involved in project design and implementation; • No. and % of people (disaggregated by gender) trained or supported in adopting sustainable livelihood options; • No. and % of people (disaggregated by gender) who reduce their risk from, and increase adaptive capacity to, floods, landslides, and related extreme weather events; • No. and % of people (disaggregated by gender) trained to enhance generation and delivery of climate services. 	<i>To be determined based on project design and final location.</i>

8.4.8 RISKS AND SAFEGUARDS

Risk	Estimated Level of Risk	Mitigation (Safeguards)
Weak coordination between institutions	Moderate	Institutional arrangements for programme governance have been structured to ensure higher levels of inter-ministerial coordination.
Weak project management within institutions	Moderate	External project management has been explicitly built into one project, and can be built into other projects as needed.
Constrained participation by government officials in project delivery and training, due to workload and competing tasks	Moderate	Incentive pay has been explicitly built into one project, and can be built into other projects as needed.
Weak interest by communities to participate in or adopt sustainable fuelwood production approaches or integrated flood management practices.	Low	Projects have been designed to include livelihoods-enhancing and income-generating activities, which would be an incentive for local communities to engage with the project. Additionally, local communities are naturally invested in the resilience of their surrounding environment, and will appreciate the disaster risk reduction aspects of the programme.
Project timeframes are too compressed for significant gains in climate change resilience	Low	Projects have been designed to deliver results in a 3-5 year timeframe. Given Rwanda's annual heavy rains during the wet season, a five year period would allow for project impact to be observed and assessed.
Insufficient data availability for the design and development of the programme	Low	Rwanda is a data-rich environment, and has relatively higher levels of information availability and access than many African countries.

8.4.9 INDICATIVE COSTING

296. Below is a brief representation of the costs associated with each component and project. A detailed representation of the costs associated with each component and project can be found in Appendix G. For the FIP's project, *Wood Supply Chain, Improved Efficiency and Added Value*, the total funding estimated is approximately US\$ 21.5 million.

Component	Project	Lead Ministry	Sub-Total	Contingency (10%)	Total Cost (US \$)	Cost (US \$)
Flood Prevention, Control, and Management in High Flood Risk Locations	Integrated Flood Risk Management Through Landscape Restoration	MINILAF	\$ 16 200 000	\$ 1 620 000	\$ 17 820 000	\$ 20 377 500
	Land Stabilization and Landscape Restoration in Areas Affected by Mining		\$ 2 325 000	\$ 232 500	\$ 2 557 500	
Implementation and Rollout of the National Framework for Climate Services	Technical capacity development in METEO Rwanda		\$ 7 610 500	\$ 761 050	\$ 8 371 550	\$ 8 371 550
Landscape Conservation in the Context of Fuelwood Production and Collection	See Forestry Investment Plan (FIP)		\$ -	\$ -	\$ -	\$ -
PROGRAMME TOTAL			\$ 26 135 500	\$ 2 613 550	\$ 28 749 050	\$ 28 749 050

297. This programme will leverage the \$US 9.5 million funding of LAFREC and potentially the EUR 3.7 million funding of the NDF's existing charcoal value chain project (the latter links to the sustainable fuelwood project initially proposed by the SPCR under this investment programme and which will now be addressed by the FIP). The SPCR's projects under Investment Programme 4 – stable and sustainable landscapes – demonstrate strong scale-up benefits, drawing on ongoing World Bank and NDF activities, and are thus not starting from scratch.



PART C

9 RESOURCE MOBILISATION

298. This final section of the SPCR considers the approach to funding and implementing the projects identified in Part B (which are elaborated in detail in Appendix G).

9.1 SPCR COSTING

299. The total indicative cost of developing the projects identified in the SPCR is estimated at just over US\$ 534.3 million.⁵ The costs of the four investment programmes that form the SPCR are as follows:

No.	Investment Programme	Cost in USD
1	Agriculture Driven Prosperity	\$44 365 200
2	Water Security for All	\$310 475 000
3	Climate Resilient Human Settlements	\$150 727 500
4	Stable and Sustainable Landscapes	\$28 749 050
Total SPCR Cost		\$534 316 750

300. The costing method adopted to arrive at the estimates above has been outlined in each programme's indicative costing section in Chapter 8. These costings may be revised during a project scoping exercise by interested funders, and a more granular costing may be feasible at such time based on the results of the scoping (including based on final project locations, geographic area of implementation, number of project beneficiaries and stakeholders, and latest available local costs from Rwanda for materials and labour etc.).

301. Some initial financiers have already shown interest in funding elements of the SPCR. As indicated in Section 8, the AfDB and WB are interested in supporting programmes, in particular Programme 1 for the AfDB and Programme 2 for the WB. Subject to the IDA financing, the Nordic Development Fund is potentially interested in exploring if bigger TA contracts could be identified in the strategic program suitable for NDF parallel credit financing.

302. Indicative costing for the four programmes of action subsumed within the SPCR took the following assumptions into consideration:

- Project concepts as described in Part B (Sections 8.1 through 8.4);

⁵ NOTE: This total does not include the cost of the two projects that will be covered by the Forestry Investment Plan (FIP).

- Unit costs from Rwanda wherever local prices were available;
- Unit costs from comparable locations wherever local prices were not available (for instance, unit costs from Uganda, Tanzania or other parts of East Africa);
- Reference to existing costing documents (such as funders' Project Design Documents or Grant Agreements) where project components in the SPCR closely matched projects previously funded by Development Finance Institutions (DFIs) and Multilateral Development Banks (MDBs), or national funding entities (such as FONERWA in Rwanda or NETFUND in Kenya).
- Cross-referencing of costs with similar previous projects or project sub-components implemented in Africa by experts involved in the development of the SPCR.

303. It should be noted that while many of these projects are in a range of developmental stages, most, if not all, require some element of project design and preparation. For the majority of projects, the suggested point of entry for interested funders is the pre-feasibility stage or a detailed project design stage. However, based on the due diligence involved in the development of the SPCR and the intelligence-gathering that underpinned the costing of SPCR Projects, it is believed that a minimal amount of further scoping is deemed necessary for interested funders.

304. Rwanda's SPCR reflects a firm commitment to a multi-sectoral approach, and an interest in supporting initiatives that cut across traditional economic and administrative sectoral divisions. This novel and innovative approach required the SPCR to examine potential investments through not only the climate resilience lens (i.e. was the project concept developed with climate change resilience in mind, and if so what level of impact will the project have on climate change resilience in Rwanda?) but also a multi-sectoral lens (i.e. does the project bring together different sectors in Rwanda and reflect cross-institutional collaboration across ministries and agencies whose mandates enable them to contribute to climate resilient outcomes but which seldom implement projects in tandem?). This multi-sectoral approach may require programmes to seek basket funding from multiple sources, as some donors are restricted in the sectors that they may fund.

305. The selected projects, organized by component and groups within the SPCR's four thematic investment programmes, are listed in the table below.

Table 6: Breakdown of SPCR Cost by Programme, Component and Project

Cross-Cutting			Investment Programme	Component	Project	Lead Ministry	Sub-Total	Contingency (10%)	Total Cost (US \$)	Cost (US \$)		
Technical Capacity Building and Strengthening Institutional Coordination	Integrated Land Use Planning and Spatial Planning	Climate Services and Disaster Risk Reduction / Disaster Risk Management	Agriculture-Driven Prosperity	Climate Resilient Value Chain Development	Providing Investment to New Climate Resilient Value Chains	MINAGRI	\$ 24 676 000	\$ 2 467 600	\$ 27 143 600	\$ 34 289 200		
					Unlocking Barriers to Investment in Agriculture		\$ 2 000 000	\$ 200 000	\$ 2 200 000			
					Building Climate Resilient Post-Harvest Facilities and Infrastructure		\$ 4 496 000	\$ 449 600	\$ 4 945 600			
				Climate Smart Agriculture and Agroforestry	Climate Smart Insurance		\$ 2 300 000	\$ 230 000	\$ 2 530 000	\$ 10 076 000		
					Linking Climate Smart Agriculture Research to Projects		\$ 6 860 000	\$ 686 000	\$ 7 546 000			
					2b: See Forestry Investment Plan (FIP)		\$ -	\$ -	\$ -			
				PROGRAMME TOTAL						\$ 40 332 000	\$ 4 033 200	\$ 44 365 200
			Water Security for All	Integrated Water Resource Planning and Management	Strategic catchment planning for all level one catchments	MoE	\$ 2 000 000	\$ 200 000	\$ 2 200 000	\$ 19 635 000		
					Groundwater Study and Mapping Exercise		\$ 5 000 000	\$ 500 000	\$ 5 500 000			
					Complete and automated hydrological network		\$ 10 850 000	\$ 1 085 000	\$ 11 935 000			
				Catchment Restoration	Catchment Rehabilitation : Agriculture		\$ 32 600 000	\$ 3 260 000	\$ 35 860 000	\$ 38 280 000		
					Implementing the Water-Energy-Food Nexus: Hydropower		\$ 2 200 000	\$ 220 000	\$ 2 420 000			
				Climate Resilient Water Infrastructure	Large-scale water Infrastructure		\$ 176 500 000	\$ 17 650 000	\$ 194 150 000	\$ 252 560 000		
					Small-scale water infrastructure		\$ 43 400 000	\$ 4 340 000	\$ 47 740 000			
					Household Rainwater Harvesting		\$ 9 700 000	\$ 970 000	\$ 10 670 000			
				PROGRAMME TOTAL						\$ 282 250 000	\$ 28 225 000	\$ 310 475 000
			Climate Resilient Human Settlements	Climate-sensitive Integrated Land Use Planning and Spatial Planning	Update of National Land Use Master Plan to integrate future climate change	MININFRA	\$ 4 675 000	\$ 467 500	\$ 5 142 500	\$ 11 467 500		
					Climate-conscious city scale master plans		\$ 5 750 000	\$ 575 000	\$ 6 325 000			
				Climate Resilience Through Storm water and Drainage Management	Climate-smart storm-water management and drainage initiative in secondary cities		\$ 37 800 000	\$ 3 780 000	\$ 41 580 000	\$ 41 580 000		
				Climate Resilience Through Improved Waste Management	Solid waste and wastewater guidelines and interventions in cities and rural settlements		\$ 45 300 000	\$ 4 530 000	\$ 49 830 000	\$ 49 830 000		
				Sustainable, Climate-Resilient Roads and Bridges	Strengthening climate resilience in Rwanda's district road network, and integrating climate-robustness into the Nyabarongo Bridge design and construction		\$ 43 500 000	\$ 4 350 000	\$ 47 850 000	\$ 47 850 000		
				PROGRAMME TOTAL						\$ 137 025 000	\$ 13 702 500	\$ 150 727 500
			Stable and Sustainable Landscapes	Flood Prevention, Control, and Management in High Flood Risk Locations	Integrated Flood Risk Management Through Landscape Restoration	MINILAF	\$ 16 200 000	\$ 1 620 000	\$ 17 820 000	\$ 20 377 500		
					Land Stabilization and Landscape Restoration in Areas Affected by Mining		\$ 2 325 000	\$ 232 500	\$ 2 557 500			
				Implementation and Rollout of the National Framework for Climate Services	Technical capacity development in METEO Rwanda		\$ 7 610 500	\$ 761 050	\$ 8 371 550	\$ 8 371 550		
				Landscape Conservation in the Context of Fuelwood Production and Collection	See Forestry Investment Plan (FIP)		\$ -	\$ -	\$ -	\$ -		
				PROGRAMME TOTAL						\$ 26 135 500	\$ 2 613 550	\$ 28 749 050
TOTAL COST OF RWANDA'S STRATEGIC PROGRAMME FOR CLIMATE RESILIENCE (SPCR) INITIATIVES									\$ 534 316 750	\$ 534 316 750		

9.2 DEVELOPING A COMPREHENSIVE FUNDING AND FUNDRAISING STRATEGY

306. The proposed project development phasing and suggested financing sources outlined below are the first steps in developing a full funding and capital raising strategy for the SPCR. While it is still very early in the development cycle for many of the identified projects, engagements with prospective funders and financiers should commence as early as possible. These early engagements are used to assess appetite and wherewithal, which can assist in financially positioning a project or overarching programme.
307. Explicit in MINECOFIN's mandate is the responsibility to mobilise finance, not only from the private sector, but also from international financial institutions. Thus, the role that MINECOFIN will play in the design and implementation of the funding and fundraising strategy is critical. As this strategy builds, it will be important to determine how best to balance concessional resources, including grants, to leverage non-concessional resources.
308. The strategy must build on the suggested sources, and those proposed by national stakeholders based on pre-existing relationships, to consider the funding needs of each project in detail, and begin to narrow down to the most appropriate sources of financing, within viable financing mechanisms. This will likely include pursuing programme-level funding structures for some or all of the identified themes, exclusively or in conjunction with project-level financing where appropriate.
309. The strategy must also consider the most appropriate phasing of project development, including taking into account the two main development stages (project preparation, and project implementation), as well as operational time horizons and funding needs. This will be influenced (and vice versa) by the timing, nature, and quantum of funding and financing expected to be raised directly or indirectly across the four implementing agencies (MINAGRI, MoE, MININFRA, and MINILAF).
310. Finally, the strategy should define universal factors that should be considered in moving the identified programmes and projects forward and optimally positioning them for financing. These include:
- Alignment with funders' objectives and results areas - many investors and funders have specific funding objectives/criteria, and monitor their success based on specific Results Areas. Projects and programmes need to emphasise their alignment with these funders' objectives and result areas.
 - Local funding and support sources – even a small amount of financial or technical support from local or national government entities demonstrates will and commitment to the project or

programme in question. This can build the confidence of external funders and financiers in a project, and make it more attractive for financing.

- Sectoral and geographic reach – projects and programmes should emphasise not just their immediate and explicit sectoral impact, but also cross-over impact and secondary benefits, so as to appeal to as wide a range of financiers as possible. In addition, developmental funders and financiers typically like projects with expansive impact at a regional or continental level. Where possible, projects and programmes should also aim to accentuate their regional or continental impact so as to appeal to these sources, even if the physical intervention is designed for national impact.
- Revenue-generating “add-ons” – a project’s ability to generate internal revenue, even if not at self-sustaining levels, significantly increases viability and opens the door to numerous additional financing sources.
- Private sector participation – including the private sector to some degree in a project’s development and/or operation, where possible, can open access to a pool of developmental finance aimed at private sector entities. In addition, the private sector can bring additional capacity and expertise to a project. This is dependent upon Rwanda creating and sustaining an appropriately effective enabling environment for private sector participation, such as PPPs.
- Leveraging existing relationships – Rwanda has existing relationships with several of the potential financing sources identified in the finance review, in some cases through similar previous projects. These relationships should be taken advantage of in sourcing financing for new ventures.

311. In designing the funding strategy and mechanisms, particularly with a programmatic approach, it is imperative to understand the institutional and fiscal linkages amongst the various role-players in Rwanda. This centres around certain policy and fiscal governance questions such as: who raises the financing, who manages and deploys the financing, and who repays the financing? This becomes particularly complex with a programmatic approach that incorporates public sector stakeholders at both local and national levels, as well as potential private sector role-players in certain projects. Moving forward, it is recommended that a comprehensive diagnostic is undertaken to understand how the proposed entities will link together from a financing perspective, as a part of designing the overall approach to financing implementation of the SPCR.

9.3 PROJECT PREPARATION COSTS

312. Project preparation is a vital, first project life cycle phase that ultimately transforms an idea into a feasible and bankable venture ready for external project financing – it ensures that the project is viable,

risks are mitigated, and the project is ready to receive funds for implementation. Without thorough preparation, it is unlikely that a project will attract sufficient and appropriate financing to allow it to proceed. Conversely, a thorough and well-conducted preparation phase can open access to a wide pool of potential financing and significantly improve a project's chances of success.

313. Unfortunately, funding and financing to cover projects undertaken in this early phase has typically been a critical constraint to infrastructure development and service provision on the African continent. Projects at this early stage of their development are still inherently risky, and as a result most investors are not interested. Further, the funding that is available has often focused on the middle-to-late stage preparation projects, and neglected the foundational importance of early enabling and definition steps at the 'idea' or pre-feasibility stages. As a result, many promising and much-needed interventions have failed to get off the ground in a sustainable manner. There is, however, increasing awareness of this gap, and a growing number of initiatives, and project preparation facilities and funds, are attempting to expand and expedite critical project development in Africa.
314. FONERWA, with the World Bank as the lead MDB, is requesting a project grant of USD 1,900,000 to develop and elaborate Programme 2, Water Security for All: Strengthening Resilience in the Water Sector. The grant will be used to finance the preparation of a US\$ 310.5 million program on Water Security for All, particularly phases 1 and 2. The program has the following components to be implemented in three phases.

Table 7: Suggested Project Preparation Financing for Programme 2

No.	Component	Project	Phase	Estimated Cost (USD)	Total (USD)
1	Integrated Strategic Water Resource Planning and Management	1. Strategic catchment planning for all level one catchments	1	2,200,000	19 635 000
		2. Groundwater Study and Mapping Exercise	1	5,500,000	
		3. Complete and automated hydrological network	1	11,935,000	
2	Catchment Restoration and Protection	1. Catchment Rehabilitation through Agriculture	1	35,860,000	38 280 000
		2. Implementing the Water-Energy-Food Nexus through Hydropower	1	2,430,000	
3	Climate Resilient Water Infrastructure Planning and Development	1. Large-scale resilient water storage	2 & 3	194,150,000	252 560 000
		2. Small-scale water infrastructure	2	47,740,000	
		3. Rainwater Harvesting	1	10,670,000	
Total Programme Cost					310 475 000

315. Currently, it is proposed that financing for the entire plan will be secured in three phases. These sources are merely propositions; they are as follows:

- **Phase 1:** USD 35 million from CIF; USD 6 million from GEF; and SD 27 million from other sources, including possible MDB finance (under discussion with MINECOFIN)

- **Phase 2:** USD 50 million from GCF
- **Phase 3:** USD 192 million from multiple public and private sector sources

316. It is recommended that the three remaining programmes undergo a similar project preparation process. There are several project preparation funds and facilities set up and supported by multilateral or bilateral development banks and funds, specifically for the purpose of supporting project preparation, and expediting and strengthening project development. These facilities typically provide grant funding and technical assistance, although a small number also provide concessional loans or risk capital.

9.4 PROGRAMMATIC APPROACH TO FINANCING CLIMATE ADAPTATION

317. The above tables have depicted estimated costs and phasing for projects grouped within four broad thematic investment programmes: Agriculture-Driven Prosperity, Water Security for All, Climate Resilient Human Settlements, and Stable and Sustainable Landscapes. In addition to overall costs for the SPCR, indicative costs have been estimated for each investment programme, and costs have also been broken down for each investment programme by project, and by phase (between two phases, specified further in Section 9.5).

318. It is envisaged that a programmatic approach to financing the Investment Framework will be pursued. Typically, a financier or group of financiers will be sought to provide funding for Rwanda to pursue preparation and/or implementation of several projects within a specific thematic investment programme over a multi-year period.

319. A programmatic approach can take advantage of similarities in mandate, economies of scale, combined institutional resources, and cross-cutting linkages - it is often a more efficient and effective means of executing an investment plan of this nature compared to tackling projects individually. The approach also significantly reduces institutional and implementation risk.

320. There are several possible transactional mechanisms by which such an approach can be followed. Although a single investor is a possibility, Rwanda already has a mechanism through FONERWA it is to consolidate and ring-fence resources from several financiers that share common investment traits. Such committed funding can then be effectively allocated towards development of a number of initiatives over a multi-year horizon in a structured manner.

321. Institutional structuring is key to the efficacy of such an approach. In designing an appropriate programmatic financing mechanism, it is necessary to understand how and where funding will flow and be managed at national and/or local levels. The institutional and fiscal relationships between MoE – whose mandate covers climate change – and the range of other institutions identified as key actors and

implementers of the SPCR's cross-sectoral projects needs to be fully understood. As do Rwanda's policies governing the raising, deployment, and repayment of financing. It is recommended, as a next step after the finalization of the SPCR, that these relationships and policies be explored and defined in preparation for structuring the programmatic funding approach.

9.4.1 EXPLORING FINANCING OPTIONS

322. Sources of project implementation financing that can be considered include:

- **Internal Revenue Generation**
 - Can be used to directly cover costs, or leveraged to raise external financing
 - Project dependent
- **Local and National Government Budgets or Sovereign Loans/Bonds**
 - Government fiscal support, typically in the form of grants or transfers
 - Government as a co-financer often increases project's attractiveness to external sources, particular if it is structured as first-loss capital, or similar
 - Government can also provide investment guarantees, covering other investors to some degree for commercial risks
- **National Agencies or Funds** (with a relevant mandate)
 - Typically grant funding
- **Regional Finance Institutions**
 - Loans at concessional or commercial rates, equity, guarantees or credit enhancements
- **Climate Funds (typically a subset of bi- or multilateral offerings)**
 - Typically grant funding, or occasionally concessional loans
 - Often on "incremental" principle
- **Multilateral Development Agencies, Banks, and Funds**
 - Typically grant funding and concessional loans, also guarantee and credit enhancement instruments
 - A small number offer loans at commercial rates or equity capital
- **Bilateral Development Agencies, Banks, and Funds**
 - Typically grant funding and concessional loans
 - Equity capital and loans at commercial rates are rare
 - Export credits and trade assistance
- **Development Finance Institutions and Funds**
 - Loans at concessional or commercial rates, equity, hybrid instruments, guarantees
 - Dependent on project having private participation

- **Foundations**
 - Often proactive and independent in choosing their projects
- **Private Developers, Investors and Capital Markets**
 - Commercial loans, equity, hybrid instruments
 - Clean Development Mechanisms - trading credits (project dependent)

Screened sources of project implementation financing identified are listed in the table below.

Table 8: Possible Sources of Project Implementation Financing for SPCR Programmes

Source	Agriculture-driven Prosperity	Water Security for All	Resilient Human Settlements	Stable and Sustainable Landscapes
Adaptation Fund	✓	✓	✓	✓
African Development Bank	✓	✓	✓	✓
African Development Fund (African Development Bank)	✓	✓	✓	✓
Belgian Development Agency BTC	✓	✓	✓	✓
Global Environment Facility Trust Fund (GEF)	✓	✓	✓	✓
Green Climate Fund (GCF)	✓	✓	✓	✓
International Bank for Reconstruction and Development (World Bank)	✓	✓	✓	✓
International Development Association (World Bank)	✓	✓	✓	✓
International Fund for Agriculture Development (IFAD)	✓	✗	✗	✗
Least Developed Countries Fund (GEF)	✗	✓	!	✓
Nordic Climate Facility	✓	✓	✓	✓
Nordic Development Fund (NDF)	✓	✓	✓	✓
Special Climate Change Fund (GEF)	✓	✓	✓	✓
UK Aid DFID	✓	✓	✓	✓
US Aid	✓	✓	✓	✓

9.4.2 PRIVATE SECTOR ENGAGEMENT

323. Private sector participation in climate change response is key to mobilizing funds. It can also help to identify specific adaptation needs, bring additional technical capabilities, and leverage or scale up the efforts of governments. For such reasons, it is critical to increase the interest of businesses and private financial institutions in reducing climate risk and building climate resilience. In this sense, the SPCR caters to adaptation planning and investments for the private as well as public sector.
324. Private sector participation can be considered at different scales:
- Provision of financial instruments: e.g., weather insurance, Cat bonds, risk management instruments;
 - Provision of adaptation services: e.g., weather observation technology, early warning systems; drought-resistant crops; etc.; and
 - Investments that are critical to adaptation, such as the location and design of infrastructure investments and new buildings.
325. Furthermore, PPCR programs can include policy-oriented components that address barriers that prevent further private sector participation in climate adaptation.
326. There is a possibility that projects with the right characteristics could attract early-stage risk capital from the private sector, typically in the form of equity, which could be used to cover project preparation costs and shareholder or commercial loans once the projects are implemented. However, it should be acknowledged that this opportunity would be unlikely for most of the projects identified under the SPCR, as private sector funding for climate change adaptation projects is extremely rare (climate change mitigation efforts fare somewhat better in this regard).
327. Nonetheless, a number of projects identified in the SPCR have potential to unlock opportunities for private sector participation by demonstrating the feasibility and viability of infrastructure or financing mechanisms: for instance, financing mechanisms for export crops, implementation of climate-smart insurance products, and composting opportunities that arise from solid waste projects. Moreover, the Land Stabilization and Landscape Restoration in Areas Affected by Mining project offers an opportunity for the mining sector to fund and implement such projects, either as part of their CSR programs, or as part of their regulatory obligations.
328. It should be noted that traditional PPPs are unlikely to be viable for the projects identified as either the size of the investment will not justify the transaction advisory costs associated with a PPP or the returns required by the private sector under a PPP are unlikely to be affordable to the end users.

9.5 RESOURCE MOBILISATION PRIORITISATION

329. The planning and resource mobilisation environment in Rwanda is fundamentally dynamic. Indeed, these four programmes have emerged from extensive stakeholder consultation and are representative of some of the most pressing sectors in Rwanda, which require urgent responses. Thus, the projects outlined in each of the programmes components can very well be funded as stand-alone projects. They are designed to strengthen and draw upon one another, and when funding is mobilised for them, it critical that the project owners continue the spirit of cross-sectoral collaboration that this SPCR is built upon.
330. FONERWA will carefully watch the climate funding and DFI financing space, so as to ensure that MINECOFIN and involved sectors are prepared to align national priorities with available sources of financing.

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APPENDICES

APPENDIX A Matrix of Responses to Comments from the Independent Reviewer

Reviewer: Maarten van Aalst

Date of Review Completion: 13 October 2017

PART I: Setting the context (from the reviewer's overall understanding of the SPCR document)

Rwanda is a small east African country generally considered as a development success story, with high economic growth and good progress on several other indicators. However, it also faces high vulnerability to climate risks (including rising temperatures, and increasing variability in rainfall accompanied by flood, landslide and drought risk), partly due to the strong dependence on the agriculture sector and high population density.

The SPCR is a well-articulated strategy to address these risks, and increase resilience in several of key areas of development, while also achieving broader development aims, as reflected in overall national development planning documents and more specifically in the Rwanda NDC and the national Green Growth and Climate Resilience Strategy. It clearly has the scale of a major transformational investment in resilient development in key sectors, rather than the somewhat piecemeal standalone adaptation projects often submitted for climate finance.

The SPCR is structured around 4 investment programmes.

The first investment programme “Agriculture Driven Prosperity” aims to improve Rwanda’s adaptive capacity against climatic risks and hazards by improving the productivity of agriculture and livelihood subsistence farming, through a components on climate-resilient value chain development; and a component on climate-smart agriculture and agroforestry.

The second investment programme “Water Security for All” aims to provide water security in the face of socio-economic development and climate change, through improved and integrated water resource management, effective institutions and resilient infrastructure. It has three components, addressing integrated strategic water resource planning and management; catchment restoration and protection; and climate resilient water infrastructure planning and development.

The third investment programme “Resilient Human Settlements” aims to ensure that the built environment will be designed and constructed so that infrastructure and service delivery will be more flexible and resilient. This includes four components, addressing mainstreaming of climate resilience into urban land use planning; climate resilient storm water management and drainage; climate resilient waste management; and resilient transport.

The fourth investment program “Stable & Sustainable Landscapes” aims to reduce vulnerability to floods, landslides, and related disasters by strengthening the climate resilience of natural landscapes, and by enhancing preparedness and adaptive capacity through improved ability to predict, understand, and act on climate information. This includes three components: addressing flood risk management in high-risk locations; implementation and rollout of the National Framework for Climate Services; and landscape conservation in the context of fuel wood production and collection.

The SPCR does not explicitly call for CIF resources to be allocated to specific elements of these four programs, but rather just presents a coherent investment program to be picked up in future programming of the government, supported by MDBs and possibly other donors.

Part II: General criteria: The SPCR complies with the general criteria indicated in the ToRs ⁶ (Please provide here an extensive discussion how the SPCR meets the following criteria)

A. Takes into account country capacity to implement the plan		Response
The plan is built on implementation by a wide range of sector stakeholders, and fits their institutional mandates and capacities. It proposes a substantial investment (US\$534 million) but it is designed with a 5-10-year timeframe (section 98, page xxxi), so this compares to about 5-10% of the current annual international development investments. This should be feasible provided the activities are indeed taken on by all the institutions as an integral part of their regular priorities, as is the intention of the SPCR.		The final SPCR calls for an investment of \$ 534 million over ten years. Relative to Rwanda’s 2015 ODA of USD 1 billion, it is indeed feasible for 5% of the ten-year ODA to be focused on climate resilience.
B. Developed on the basis of sound technical assessments		Response
The technical basis for the document appears sound. There has been substantial prior work on climate risk in Rwanda, which is frequently referred to in the documents. It also reflects sound sector inputs. Some more recent climate analyses were not yet reflected explicitly, such as the recent FCFA program, which provides highly useful insights for the climate services component (component 2 of investment programme 4) https://cdkn.org/wp-content/uploads/2014/12/FCFA_PolicyBrief_Rwanda_FINAL.pdf http://www.futureclimateafrica.org/wp-content/uploads/2016/03/Rwanda-FCFA-final-report-vs-2.pdf In addition, I would also note that as part of this work, FONERWA is developing an agriculture decision support tool, which should be of use in investment programme 1 (agriculture) (currently not yet referenced).		Both the Gaps and Needs Analysis (which pre-dated and informed the SPCR) and the SPCR are based on extensive research (sources relied on are referenced as endnotes). Technical inputs from all sectors was also integrated throughout the SPCR process. The two documents suggested by the expert external reviewer have now been explicitly referenced. Programme 4 (including climate services) can definitely be prioritized for phase one by the GoR.

⁶ Each criterion is assessed in 3 colours: green = met the criteria; yellow = need for some additional work; red = did not meet the criteria yet.

http://www.futureclimateafrica.org/news/blog-integrating-climate-information-into-green-growth-finance-in-rwanda/ Of course, further technical work will be needed for detailed technical design of each of the components (as indicated in the SPCR), which should also incorporate an additional scoping of relevant technical inputs. In particular, it would be good to prioritize the development of the climate services component (component 2 in investment programme 4) so that it can support detailed design of the other elements of the SPCR. It would also be important to see that component as a cross-cutting elements linked to all investments, rather than just part of investment programme four on resilient landscapes).	
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C. Demonstrates how it will initiate transformative impact	Response
<p>The key transformative aspect of the SPCR is its scale and programmatic approach. Instead of sector-based programming, the SPCR centres around clusters of investments requiring cross-ministerial collaboration and the integration of climate resilience into broader development.</p> <p>If implemented with this vision, the SPCR would have an impact well beyond the specific investments, facilitating integration of climate resilience thinking across various ministries responsible for key issues in Rwanda's sustainable development.</p>	<p>The SPCR is indeed designed to support a multi-sectoral, cross-ministerial approach to building economy-wide resilience.</p>

D. Provides for Prioritization of investments, capturing of lessons learned, M&E, and links to the PPCR results framework	Response
<p>The executive summary states that prioritization was based four criteria: Paradigm Shift Potential (potential for scaling-up and replication; knowledge and learning potential; and systematic change towards low-carbon and climate-resilient development pathways; aligning with the PPCR Results Framework's focus on transformational impact); National Ownership (embedding climate resilience in national planning documents; coherence with existing policies; strategic engagement and sector coordination in planning and implementation; and capacity of implementing entity to deliver); Economic Efficiency (benefit-cost ratio of activity; impact per monetary unity; and cost-effectiveness) and Gender and Vulnerable Peoples Impact (pro-poor project agenda; and demonstrated ways in which project is inclusive).</p> <p>These criteria are appropriate and on general reflection the SPCR matches these concepts.</p> <p>However, the technical evaluation applying these evaluation criteria to arrive at the four investment programmes and especially the specific components within those programmes is not explicit in the SPCR document or the annexes.</p> <p>Then again, I would also note that the SPCR contains ample reflections to existing national policy documents which should already contain several aspects of this prioritization (especially national ownership, but also, for instance, effective impact on poverty, and integration of climate-resilient pathways into overall development planning). This particularly includes Rwanda's national Green Growth and Climate Resilience Strategy, but also, for instance, in investment programme 1 the alignment with the four draft objectives identified in the Draft Strategic Plan for Agricultural Transformation 2018-24; in Investment programme 2 the realization of Rwanda's Vision 2020 (protection and efficient management of water resources and water infrastructure development to ensure all Rwandans have access to clean water by 2020) and several sector strategies; and for Investment program 3 and 4 Rwanda's Vision 2050 and the new National Strategy for Transformation (NST), pillar four being "Sustainable and Productive Environment and Natural Resource Management.</p>	<p>The SPCR now includes explicit reference to prioritization under each of the four investment programmes. The sections on 'Development Objectives' under each investment programme end with a reference to how the programme meets the prioritization criteria.</p> <p>Given that almost all projects within the SPCR emerged from either government decision-makers who espoused national priorities when suggesting projects, or emerged from a detailed study of national policy and strategy documents (which themselves identify Rwanda's national priorities), the SPCR is inherently reflective of an organic prioritization process.</p> <p>In the final draft of the SPCR the reviewer's concerns about the M&E framework have been taken into account, and all references to indicators is now fully consistent with the PPCR results framework (and the summary table that the reviewer suggested the rest of the SPCR adhere to).</p>

<p>A more fundamental concern relates to the M&E and links to the PPCR results framework. Item 8 in the summary of the SPCR (page vi) contains results areas and indicators that match exactly the specified elements of the PPCR results framework. As long as this summary table is adhered to, all core indicators could in principle get a green score (as indicated below). This is also reflected in Table 1 on page xxxiv which indicates how each of the programs will contribute to the relevant PPCR outcomes and result indicators.</p> <p>HOWEVER, the full results framework in Annex F does not yet match this set of result indicators, and a more general concern on the results framework presented in Annex F is that many of the indicators are at output rather than results level.</p> <p>This could be updated in the current strategy, and should certainly be given additional attention during detailed project design.</p>	
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<i>E. Has been proposed with sufficient Stakeholder consultation and stakeholder engagement</i>		<i>Response</i>
<p>The consultation process described in the annex primarily lists government agency and donor partner representatives. It appears weaker in terms of explicit consultation with local government, private sector, civil society, and representatives of particularly affected communities.</p> <p>However, the intention to establish these linkages is reflected in the document, particularly in the sense that the PMUs responsible for the four investment programmes would be supported by members from the private sector, academia, NGOs, civil society, community-based organizations; and in a number of specific sector linkages throughout the investment programmes.</p> <p>Nevertheless, this aspect merits further attention during finalization of the SPCR and/or specific investment design.</p>		<p>The final draft of the SPCR has been updated to detail all stakeholder engagements throughout the investment plan's development. Outreach took place (emails and phone calls) to key stakeholders from outside government, and efforts were undertaken to secure their attendance at stakeholder events. Nevertheless, government stakeholders were more numerous and more active. In terms of engaging donors, FONERWA plans a period of donor engagement for resource mobilization once the SPCR is finalized.</p>

<i>F. Adequately addresses social and environmental issues, including gender</i>		<i>Response</i>
<p>Social and environmental issues are partly reflected in the prioritization reflected in the document, and the approach taken to the overall SPCR. Both social priorities and embedding in environmental strategies are cross-cutting elements in several of the investment programmes (e.g. the focus on landscapes in managing disaster risk).</p> <p>The SPCR clearly describes the gender dependence of climate risks, and each of the four investment programmes contain a detailed and well-articulated gender perspective, although this will need to be followed up with more concrete elements for implementation during project design.</p> <p>Specific social and environmental safeguards are not included in the current SPCR but would presumably be applied during detailed investment design.</p>		<p>Throughout the development process there has been clear intention on the part of all involved in the SPCR to ensure the investment plan reflects the needs and interests of vulnerable groups, and is gender sensitive. Additional guidance from a gender expert was sought to further supplement content on environmental and social issues. The SPCR emphasizes that these issues should also receive primacy during the detailed project design and scoping stage.</p>

<i>G. Supports new investments or funding additional to on-going/planned MDB investments</i>		<i>Response</i>
<p>The current SPCR does not include a dedicated proposal to allocate CIF resources. In that sense, it is difficult to assess this criterion.</p> <p>However, the CIF preparatory resources have clearly supported an investment strategy that would need to be supported by a range of other investment streams,</p>		<p>In light of the CIF's diminished funding capacity and uncertainty about CIF's ability to financially support the SPCR beyond its</p>

including existing or potential new MDB (WB and AfDB) financing. It also builds on existing MDB engagement; as one example, the infrastructure component is listed as complementing an existing AfDB-NDF investment to develop capacity for climate resilient road transport infrastructure, by extending it from national to district roads, which tend to be even more vulnerable to climate impacts. There also appears to be some ownership of the investment programmes in the sense that each of them is already assigned to one of the MDBs, but as of yet, no specific resources appear to be allocated to the SPCR.	development, the SPCR envisages the need for resource mobilization from multiple funding sources. A dedicated project preparation funding proposal to the CIF will, however, be developed to seek preparatory support for programme four (and will be allocated to the chosen MDB).
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H. Takes into account institutional arrangements and coordination	Response
<p>The SPCR proposes new institutional arrangements building on existing institutions but working together for the implementation of the SPCR at large and the four investment areas. These are well thought-through, but of course still need to be proven in practice.</p> <p>The SPCR will be coordinated by a Steering Committee comprised of members from the Environment and Natural Resources Working Group, co-chaired by the and the ministry of finance. This link to the “regular” national planning system is a critical one, which will merit close attention during further development of the investment programmes and their institutional set-up, especially given that this is also one of the SPCR’s critical transformative impacts, and is essential for continued integration into the national budgeting process. In addition, overall M&E would be carried out by the existing environment fund, FONERWA, enhancing integration with other climate investments.</p> <p>The SPCR’s four investment programmes would each be implemented through cross-ministerial cooperation, led by a PMU chaired by the lead ministry but also including other relevant sectoral ministries and institutions, academia, NGOs and the private sector. Again, this set-up addresses the key needs for cross-sectoral approaches, but can also prove challenging in practice, and will need to be carefully carried forward during the design of the investment programmes.</p> <p>The SPCR also includes implementation in specific target locations and includes implementation through subnational government – a critical factor in success of resilience building efforts. It is recommended to play special attention to capacity building for these subnational government institutions (and their partners), including systematic generation of lessons learned and application in other subnational governments.</p>	<p>The SPCR’s suggested institutional arrangements emerged from detailed consultations and several rounds of debate and discussion within Rwanda. The government of Rwanda (the custodian of the SPCR) provided clear guidance for the arrangements to be built on and leverage existing institutional architecture. However, keeping in mind the objective of making the SPCR a cross-sectoral effort, some innovative thinking has been added into the institutional arrangements to reduce risks of siloed programme implementation. Several programmes (especially ones with decentralized projects) include capacity-building and training elements.</p>

I. Promotes poverty reduction	Response
<p>All investments reflect an implicit imperative to reduce poverty and increase economic development (also part of the government’s priorities on climate and environmental mainstreaming). There are ample references to alignment of the investment programmes with the government’s overall development strategies (which have a central focus on poverty reduction).</p> <p>From a technical standpoint, each of the four investment programmes and their components contribute to increasing resilience of vulnerable groups, or landscapes, services and systems they particularly rely on.</p>	<p>The SPCR views climate resilience through the lens of inclusive and sustainable economic development, and has made efforts to align with Rwanda’s recent Economic Development and Poverty Reduction Strategy (EDPRS II), the National Strategy for Transformation (NST), and Vision 2020 and 2050 – all of which have strong poverty reduction tenets.</p>

J. Sufficiently considers cost effectiveness of proposed investments	Response
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<p>Economic efficiency, including cost-effectiveness, is listed as a cross-cutting criterion for developing the SPCR, and the investment areas chosen make good sense given the structure of the economy and the high potential of the proposed interventions to increase resilience.</p> <p>However, the way this criterion was applied is not explicitly reflected in the description of the investment programmes and their components. It would be important to assess cost-effectiveness of specific investments during detailed project design.</p>	<p>Economic efficiency has been one of the four principal criteria for selecting and prioritizing SPCR programmes and projects. Additional language has now been added to each programme to highlight this factor.</p>
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Part III: Compliance with the investment criteria of SPCR

Provide extensive comment on whether the SPCR complies with the following criteria specific for PPCR (see TORs).

<p>A. Climate risk assessment: The SPCR has been developed on the basis of available information on the assessment of the key climate impacts in the country; the vulnerabilities in all relevant sectors, populations and ecosystems; and the economic, social and ecological implications of climate change impacts.</p>		<p>Response</p>
<p>The SPCR generally describes the right risks, and highlights the parts of the countries and sectors in the economy most at risk, based on sound technical references.</p> <p>It also clearly identifies a number of the past and ongoing investments in climate risk information, although a few could still be added (including the FCFA program mentioned above). In my opinion this would not significantly change the overall outcomes of the risk assessment in terms of priorities identified in the SPCR.</p>		<p>The SPCR drew on robust pre-existing risk and vulnerability studies, and has linked each programme to specific climate risks and adaptive capacity needed to reduce such risks. The FCFA study, previously reviewed but not specifically cited, has now been explicitly referenced.</p>
<p>B. Institutions/ co-ordination: The SPCR specifies the coordination arrangements to address climate change: cross-sectoral; between levels of government; and including other relevant actors (e.g., private sector, civil society, academia, donors, etc).</p>		<p>Response</p>
<p>The SPCR proposes that the investment programmes would be led by PMUs chaired by the lead ministry but also including other relevant sectoral ministries and institutions, academia, NGOs and the private sector. See also the comments above regarding the attention needed for the success of this structure, including the ownership by the ministry of finance and planning.</p> <p>Engagement of the private sector and other actors is also reflected in various specific components, eg. Investment programme 1 component 2 on “unlocking barriers to investment in agriculture”; Investment programme 2 contains a component to develop a NEXUS toolkit to involve key stakeholder groups in the key basins, including government, academia, communities, Community Catchment Committees, NGOs and the private sector.</p> <p>The fundraising strategy highlights the need to involve private sector actors, but also identifies the challenges so far in attracting private investment into adaptation, and recommends comprehensive diagnostic work in this area to facilitate effective engagement in the implementation of the SPCR, in areas related to financial instruments, adaptation services and specific investments.</p>		<p>The SPCR’s recommended institutional arrangements are based predominantly on clear and specific guidance from the government of Rwanda. However, efforts were made to ensure that the institutional arrangements be further expanded to allow for greater diversity in decision-making and project management, as well as to ensure a truly cross-sectoral character to the SPCR in Rwanda.</p> <p>The final draft of the SPCR devotes additional attention to engaging the private sector, especially in the resource-mobilization stage.</p>

C. Prioritization: The SPCR has adequately prioritized activities taking into account relevant climate/risks and vulnerabilities and development priorities, sectoral policies; ongoing policy reform processes and existing, relevant activities and strategies.		Response
<p>The SPCR contains a good analysis of key climate risks, vulnerabilities and development priorities, including ample references to existing national development, climate, and sector strategies.</p> <p>However, it is unclear to me why the current SPCR prioritizes investment programmes 1 and 4 for the first 5 years, and 2 and 3 for the subsequent 5 years (as stated in paragraph 327). Given the strong case made for all of the elements of the SPCR, it seems more of them could in principle be implemented in parallel.</p>		<p>All programmes and projects within the SPCR are informed by climate risks and vulnerabilities, and are responsive to priority needs for climate resilience in Rwanda.</p> <p>The suggested phasing, i.e. to prioritize programmes one and four for phase one (first five years), and programmes two and three for phase two (next five years), reflects the MDBs and government of Rwanda's recognition that programmes one and four may already have garnered the interest of some potential donors and funders, so resources for these programmes may be more proximate while resources for programmes two and three (which are more expensive) may need to be raised over a longer lead period.</p> <p>Nevertheless, it is the intention of the government of Rwanda to raise funds for the whole SPCR at the earliest, and to be flexible with the phasing so that whatever project funding becomes available for can be brought forward and commenced forthwith.</p>

D. Stakeholder engagement/ participation: The SPCR has identified and addressed the needs of highly vulnerable groups.		Response
<p>The SPCR addresses the needs of some especially vulnerable groups, and has strong attention for gender, but currently does not reflect explicit stakeholder engagement and participation, especially of highly vulnerable groups.</p> <p>This merits further attention during technical design of each of the specific investment programmes.</p>		<p>The final draft of the SPCR has taken note of these concerns and amplified focus on highly vulnerable groups. The SPCR underscores the need for such groups to receive primacy and even greater attention during the detailed scoping and project design stage.</p>

(1) Complies with the principles and objectives of PPCR as specified in the design documents and programming modalities.

PPCR principles:		
A. Embedded in the broader context of sustainable development		Response

The SPCR clearly addresses key development priorities, and explicitly links to a range of existing national and sector planning documents, including the overall development plans as well as the Green Growth and Climate Resilience Strategy.	The SPCR is embedded in Rwanda's national sustainable development context, including the policy, strategy, and regulatory landscape. Special focus was given to Rwanda's national climate change guidance documents like the GGCRS.	
B. Ambitious and innovative in their objectives towards climate resilience		Response
The SPCR is clearly ambitious in its scale, and innovative in its approach to resilient development, truly tackling resilience as a part of sector development investments, rather than a small add-on activity. Its cross-sectoral institutional setup is also ambitious and if successful would also facilitate cross-fertilisation across sectors and scales	The SPCR reflects Rwanda's own ambition for transformation and for systemic, economy-wide, cross-cutting climate change resilience. The institutional set up also reflects the innovative spirit of the SPCR to spur "business un-usual" in its Rwanda's approach to strengthening climate change resilience.	
C. Strengthen collaboration and complementarity with other development partners and seek to identify other sources of financing		Response
Within several of the specific investment programmes there is ample reference to existing programmes, including clear synergy with investments implemented by other development partners. At the level of the SPCR at large, there are clear overview table of potential sources of project preparation financing and implementation financing for the SPCR projects, but with at this point limited specific commitments, except for AfDB interest in components focused on value chain development, and agroforestry. This is clearly an issue of concern, given that buy-in of specific donors would ideally already be secured during strategy formulation, rather than only for specific pieces of the investment program.	The SPCR's investment programmes consciously build on and leverage lessons learnt (as well as coordination and project management arrangements) from prior interventions. As the SPCR development process evolved, engagement with donors and partners steadily increased. Given the CIF's own diminished capacity to fund the SPCR, the government of Rwanda is aware of the need to invest its own energy in a resource mobilization drive and to engage partners and donors in a more comprehensive, strategic manner. This is already being planned. Engagement with MDBs also continues in order to identify possible MDB funding for the SPCR.	
D. Build on existing efforts supporting climate resilience (including NAPAs), taking care not to duplicate		Response
The Strategy builds on the Green Growth and Climate Resilience Strategy and the NDC. The NAPA dates back to December 2006; its priority activities were Integrated Water Resource Management; Setting up an information systems to early warning of hydro-agro meteorological systems and rapid intervention mechanisms; Promotion of non-agricultural income generating activities; Promotion of intensive agro-pastoral activities; Introduction of species resisting to environmental conditions; and Development of firewood alternative sources of energy. Most of these priorities are still relevant and taken forward in the SPCR or the forestry plan. There are no ongoing projects specifically related to NAPA implementation so duplication is not a risk. There are clear references to existing climate-related investments by other donors.	The SPCR was informed by a detailed and iterative gaps and needs analysis, which itself was based on extensive literature review, expert interviews, and stakeholder consultation. Emerging from this process, the SPCR was informed by and took cognizance of Rwanda's NAPA, its INDC (now NDC), and ongoing NAMAs. The SPCR has been very deliberate to avoid duplication, but has strategically chosen to build on and expand (scale up and consolidate) successful prior interventions if they lent themselves to taking on an even stronger climate change resilience character or being integrated into more consolidated, holistic, multi-sectoral approaches.	
E. Outline how lessons learned will be captured and widely shared		Response

Knowledge generation and learning potential are listed as key criteria applied in the development of the SPCR, but not systematically outlined in subsequent description of the investment components. This needs to be flagged more structurally throughout the document, so it gets appropriate attention during detailed project design. See also the comment on learning-by-doing below.	The final draft of the SPCR has taken note of these concerns and has built in additional elements within several projects that would allow for knowledge-generation and capturing of lessons learnt. Furthermore, the SPCR has added language to emphasize that institutional arrangements (both at the SPCR steering committee level and programme level) must devote attention to capturing lessons learnt.
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PPCR Objectives: Help countries transform to a climate resilient development path, consistent with poverty reduction and sustainable development goals. As a pilot program and supporting learning-by-doing, PPCR implementation ultimately aims to result in an <i>increased application of knowledge on integration of climate resilience into development</i> .		
A. Pilot and demonstrate approaches for integration of climate risk and resilience into development policies and planning		Response
<p>The proposed SPCR would clearly demonstrate approaches for integration of climate risk and resilience into development policies and planning, within sectors and through cross-sector coordination in each of the specific investment programmes.</p> <p>Its scale clearly takes it beyond the realm of pilot implementation for the country itself, and would make Rwanda a valuable pilot country for regional and global learning (hence the need to address slightly more systematically the aspects of learning and capturing of experience – see below).</p>		<p>Several projects within the SPCR are explicitly designed to integrate climate change risks and resilience approaches into development planning (for instance into national and local level land use master planning). The SPCR also emphasizes the role of climate services and climate information and data to inform decision-making, and highlights climate services as a cross-cutting theme that has resonance across all four of the SPCR's investment programmes.</p> <p>Rwanda has already had a multitude of pilot projects, and the government gave a clear signal that the scale of the SPCR must take Rwanda beyond mere pilots and towards more transformative, economy-wide resilience.</p>
B. Strengthen capacities at the national levels to integrate climate resilience into development planning		Response
<p>As noted above, the SPCR proposes a clear structure that builds on existing institutions but also requires closer coordination and collaboration.</p> <p>However, I would note that these institutional structures still need to be proven in practice – a key priority for success of the SPCR which will require continued political leadership.</p> <p>In addition, I would highlight a concern that the SPCR does not explicitly reflect strong ownership and leadership by the Ministry of Finance and Economic Planning, other than in the envisaged role as co-chair of the Steering Group.</p>		<p>The SPCR's proposed institutional arrangements support cross-sectoral and inter-ministerial collaboration on climate change resilience. While innovative and ambitious, the arrangements are built on and integrate well with existing structures, and thus should be viable.</p> <p>MINECOFIN has been engaged throughout the SPCR development process, in particular senior officials at MINECOFIN responsible for environment, natural resources, and climate change. The Ministry will play a strong leadership role in shepherding the SPCR forward, in partnership with the Ministry of Environment.</p>
C. Scale-up and leverage climate resilient investment, building on other ongoing initiatives		Response
<p>The SPCR presents a major transformational investment in resilient development in key sectors, rather than the somewhat piecemeal standalone adaptation projects often submitted for climate finance. In that sense, it also clearly contributes to a scaling up of the level of ambition of climate resilient investment.</p> <p>Whether it will leverage additional finance is at this point difficult to assess, given that it only presents a case for</p>		<p>The SPCR identifies several prior or ongoing projects and investments that are suitable to leverage, scale-up, and build on. It also reflects interest from the MDBs in exploring potential funding options for certain themes within the SPCR. Beyond these sources of investment, the government of Rwanda plans to engage in a comprehensive resource-mobilization effort that includes seeking CIF funding but – given the CIF's diminished capacity to fund SPCRs beyond</p>

investment, not yet an overview of already committed resources from other financing instruments.	their initial development – will have to extend to donors and funders beyond the CIF as well.
D. Enable learning-by-doing and sharing of lessons at country, regional and global levels	Response
<p>There is in principle ample opportunity for learning-by-doing, given the ambitious scope of the SPCR, and the nature of the activities listed.</p> <p>However, this sharing of lessons learnt is not explicitly described in the current SPCR (there are references to building on lessons from prior projects, no explicit strategy for how to generate and document learning within the SPCR, for continuous learning within Rwanda as well as regional and global sharing of lessons.</p> <p>This merits further attention in the current SPCR, and certainly during detailed design of the investment programmes and their components, but not just in terms of specific lessons learned in particular technical areas or geographies, but also regarding institutional approaches, cross-sectoral coordination, exchange of knowledge, capacity building, etc. etc.</p> <p>It would be important to establish some central capacity, possibly attached to the Steering Committee or linked to the PMUs of the investment areas, dedicated to this learning by doing within the project and aimed at documenting lessons learned for wider applications beyond Rwanda.</p>	<p>The final draft of the SPCR has taken note of these concerns and has built in additional elements within several projects that would allow for knowledge-generation and capturing of lessons learnt. Furthermore, the SPCR has added language to emphasize that institutional arrangements (both at the SPCR steering committee level and programme level) must devote attention to capturing lessons learnt.</p> <p>The SPCR also underscores that capturing of lessons learnt must be regarded as a crucial factor when individual projects are scoped by funders during the detailed project design stage.</p>

(2) Assessment towards the PPCR results framework

As noted above, item 8 in the summary of the SPCR (page vi) contains results areas and indicators that match exactly the specified elements of the PPCR results framework. As long as this summary table is adhered to, all core indicators could in principle get a green score (as indicated below). This is also reflected in Table 1 on page xxxiv which indicates how each of the programs will contribute to the relevant PPCR outcomes and result indicators.

HOWEVER, the full results framework in Annex F does not yet match this set of result indicators, and a more general concern on the results framework presented in Annex F is that many of the indicators are at output rather than results level. This should be updated in the current strategy, and given additional attention during detailed project design. With a stricter interpretation, the respective indicators could also have been rated orange or red. I have reflected this concern in the orange rating for the M&E criterion above.

Results	Indicators	Comments	Score	Response
A1. Increased resilience of households, communities, businesses, sectors and society to climate variability and climate change				

Results	Indicators	Comments	Score	Response
	INDICATOR A1.1 (optional): Change in percentage of households (in areas at risk) whose livelihoods have improved (acquisition of productive assets, food security during sensitive periods of the year)		n/a	The PPCR results framework (including results and core indicators) have been strictly adhered to in the final draft of the SPCR. Each of the four investment programmes now explicitly identifies the PPCR indicators that are relevant to it, without deviation from or expansion of the PPCR results framework.
	INDICATOR A1.2 (optional): Change in damage/losses (\$) from extreme climate events in areas at risks that are the geographical focus of PPCR intervention		n/a	
	INDICATOR A1.3: (core) Numbers of people supported by the PPCR to cope with effects of climate change	Item 8 in the summary of the SPCR (page vi) contains this result and indicator. However, it is not explicitly listed in the results for the components, or the results table in Annex F. There is a “number of people” indicator in most of the components, but it is not yet systematically listed as “numbers of people supported by the component”. It is recommended to add this to facilitate easier aggregation into the PPCR results framework.		The PPCR results framework (including results and core indicators) have been strictly adhered to in the final draft of the SPCR. Each of the four investment programmes now explicitly identifies the PPCR indicators that are relevant to it, without deviation from or expansion of the PPCR results framework.
	INDICATOR A1.4: (Optional) Percentage of people with year round access to reliable and safe water supply (domestic, agricultural, industrial)	Optional indicator not included in the results table. Note that while this indicator is not explicitly included, similar water supply indicators are listed in the water component (the indicators in the SPCR component 1 tend to be slightly more at output level, whereas it would be good to make it more about the result (as implied in the PPCR results indicator)	n/a	The PPCR results framework (including results and core indicators) have been strictly adhered to in the final draft of the SPCR. Each of the four investment programmes now explicitly identifies the PPCR indicators that are relevant to it, without deviation from or expansion of the PPCR results framework.
A2. Strengthened climate responsive development planning				
	INDICATOR A2.1: (core)			The PPCR results framework (including results and core indicators) have been strictly adhered to in the final draft of the SPCR.

Results	Indicators	Comments	Score	Response
	Degree of integration of climate change in national, including sector planning - e.g., national communications to UNFCCC, national strategies, PRSPs, core sector strategies, annual development plans and budgets, and NAPs			Each of the four investment programmes now explicitly identifies the PPCR indicators that are relevant to it, without deviation from or expansion of the PPCR results framework.
	INDICATOR A2.1: (core) Degree of integration of climate change in national, including sector planning - e.g., national communications to UNFCCC, national strategies, PRSPs, core sector strategies, annual development plans and budgets, and NAPs			The PPCR results framework (including results and core indicators) have been strictly adhered to in the final draft of the SPCR. Each of the four investment programmes now explicitly identifies the PPCR indicators that are relevant to it, without deviation from or expansion of the PPCR results framework.
	INDICATOR A2.2: (optional) Changes in budget allocations at national and possibly sub- national level of government to take into account effects of CV&CC	Optional indicator not included in the results table.	n/a	The PPCR results framework (including results and core indicators) have been strictly adhered to in the final draft of the SPCR. Each of the four investment programmes now explicitly identifies the PPCR indicators that are relevant to it, without deviation from or expansion of the PPCR results framework.
B1. Strengthened adaptive capacities				
	INDICATOR B1: (core) Extent to which vulnerable households, communities businesses and public sector services use improved PPCR supported tools, instruments, strategies, activities to respond to Climate Variability and Climate Change.			The PPCR results framework (including results and core indicators) have been strictly adhered to in the final draft of the SPCR. Each of the four investment programmes now explicitly identifies the PPCR indicators that are relevant to it, without deviation from or expansion of the PPCR results framework.
B2. Improved institutional framework in place				
	INDICATOR B2: (core) Evidence of strengthened government capacity and coordination mechanism to mainstream climate			The PPCR results framework (including results and core indicators) have been strictly adhered to in the final draft of the SPCR. Each of the four investment programmes now explicitly identifies the PPCR indicators that are relevant to it, without

Results	Indicators	Comments	Score	Response
	resilience			deviation from or expansion of the PPCR results framework.
B3. Use of climate information in decision making routinely applied				
	INDICATOR B3: (optional) Evidence showing that climate information products/services are used in decision making in climate sensitive sectors	Optional indicator not included in the results table.	n/a	The PPCR results framework (including results and core indicators) have been strictly adhered to in the final draft of the SPCR. Each of the four investment programmes now explicitly identifies the PPCR indicators that are relevant to it, without deviation from or expansion of the PPCR results framework.
B4. Climate responsive investment approaches identified and implemented				
	INDICATOR B4: (optional) Leverage of PPCR funding against public and private investments in climate sensitive sectors	Optional indicator not included in the results table.	n/a	The PPCR results framework (including results and core indicators) have been strictly adhered to in the final draft of the SPCR. Each of the four investment programmes now explicitly identifies the PPCR indicators that are relevant to it, without deviation from or expansion of the PPCR results framework.
B5. Climate responsive investment approaches identified and implemented				
	INDICATOR B5: (core) Quality of and extent to which climate responsive instruments/ investment models are developed and tested			The PPCR results framework (including results and core indicators) have been strictly adhered to in the final draft of the SPCR. Each of the four investment programmes now explicitly identifies the PPCR indicators that are relevant to it, without deviation from or expansion of the PPCR results framework.

Part III: Conclusions and Recommendations

Overall, the reviewer assessed a total of 30 criteria and indicators with the following scoring:

24	The criteria and/or indicator has been generally met and there is no need for any revision or larger complement at this stage
4	The criteria and/or indicator is partially met, it is recommended to relook at some of aspects that need further clarification
2	The criteria and/or indicator is partially met and need to be developed [or, at the current stage the criteria is not relevant]

The SPCR overall gives a really strong impression as a convincing investment strategy for climate resilience in Rwanda. My key recommendations to strengthen the strategy document and/or enhance its implementation:

It will be essential to **ensure the ambitious institutional setup works in practice**, which requires continued close partnership between all the various ministries, and ideally strong ownership and leadership also from the ministry of finance and economics (currently not yet very explicitly reflected in the SPCR documents).

Response: The ambitious and cross-sectoral institutional set up builds on existing inter-ministerial coordination mechanisms in place, and has been described in the SPCR based on guidance from the Government of Rwanda. Leadership from the steering committee will be critical to ensure the collaborative and multi-sectoral nature of the SPCR's governance arrangements are indeed maintained.

In this light, it would be important to **ensure that the SPCR clearly reflects high-level ownership**, for instance through a foreword signed by the Minister of Environment and/or the Minister of Finance (the SPCR currently reads and looks more like a technical investment design than as a government-owned strategy document). This political leadership will be critical throughout the implementation of the SPCR, and also requires leadership on the part of the MDBs supporting Rwanda in that endeavour.

Response: The SPCR already has significant high-level ownership, with support from the Ministry and Environment and Ministry of Lands and Forestry throughout the SPCR development process. Senior officials from MINECOFIN has been involved in the process from the very start, and have consistently provided helpful input and guidance. A joint MoE and MINECOFIN foreword is under development and will be a useful signal of national ownership of the SPCR.

It is unclear how the SPCR proposes **CIF (or other climate finance) to leverage additional resources** for the ambitious investments (US\$ half a billion) – currently the tables of potential donors just list the potential sources, rather than addressing the leveraging aspect. It would be interesting to reflect on what mix of specific climate-related resources (CIF and/or also GCF or other sources) could be mixed with regular development finance to leverage the required level of investment to implement the SPCR (and to reflect a government vision on this).

Response: Part C (financing and investment for the SPCR) has been expanded in the final draft to highlight funds that are extremely suitable candidates to provide support. In acknowledgement of the CIF's diminished capacity to support the SPCR with significant funds (beyond the development of the SPCR), the government of Rwanda plans an extensive resource-mobilization effort after the SPCR is finalized. The MDBs are also engaged in actively exploring funding options. As noted, support for the SPCR may come from beyond traditional climate finance and could involve the private sector as well as more conventional development and infrastructure finance.

Additional attention is needed to ensure full **engagement of a wide range of stakeholders**, including especially those particularly representing the most vulnerable groups (e.g. civil society organisations working at the local level and with vulnerable groups).

Response: The final draft of the SPCR devotes further attention to gender and vulnerable groups, and elevates their needs and concerns within the four programme areas. As suggested, these groups should receive primacy during wider stakeholder engagements that continue during the resource mobilization stage and during the detailed project design and scoping phases. Such stakeholder consultations will make particular efforts to involve more civil society and local level participation. The SPCR articulates this commitment.

A clear recommendation, also reflected in the current ratings, is to **pay more attention (add a specific section?) on learning**, within and among institutions in Rwanda, but also to inform regional and global resilience building efforts.

Response: The final draft of the SPCR has taken note of these concerns and has built in additional elements within several projects that would allow for knowledge-generation and capturing of lessons learnt. Furthermore, the SPCR has added language to emphasize that institutional arrangements (both at the SPCR steering committee level and programme level) must devote attention to capturing lessons learnt. The SPCR also underscores that capturing of lessons learnt must be regarded as a crucial factor when individual projects are scoped by funders during the detailed project design stage.

Finally, a specific technical recommendation is to **frontload the component on climate services** (component 2 of investment programme 4) so that it can be developed along with and support the design of all of the other investments.

Response: Climate services have been identified both as a cross-cutting element across the entirety of the SPCR, as well as a critical component of programme four. Given the centrality of actionable, credible, decision-ready climate data and information for building resilience across all sectors in Rwanda – and the ability of robust climate services to enhance all four investment programmes – climate services should be amongst the first few interventions in the SPCR to attract funding and commence project implementation. In recognition of this, programme four has been prioritized for phase one (i.e. immediate resource mobilization and implementation in the SPCR's first five-year period).

References

Main document reviewed:

- SPCR for Rwanda (version 2017.10.06, previously version 2017.09.29)

Additional documents consulted:

- PPCR Design Document (2009)
- PPCR Programming and Financing Modalities (2011)
- Revised PPCR Results Framework (2012)
- PPCR Revised procedures for the preparation of independent technical reviews of the SPCR (2016)

APPENDIX B SPCR Performance Monitoring Matrix

OBJECTIVES	OUTCOMES	INDICATORS	MEANS OF VERIFICATION	RESPONSIBILITY
SPCR GOAL	OUTCOME			
To mainstream climate change into key sectors and increase resilience of highly vulnerable communities and infrastructure in Rwanda.	<ul style="list-style-type: none"> Increased cross-sectoral collaboration for building climate resilience and mainstreaming climate change into socio-economic development in Rwanda; Increased resilience of vulnerable communities, particularly gender responsive resilience, and key infrastructure to withstand the effects of climate change and variability; Increased use of climate information by target groups (vulnerable communities, private sector, policy makers); Strengthened government capacity to coordinate, manage and implement Rwanda's SPCR; Increased investment by private sector into building climate resilience in the priority sub basins in a range of economic sectors; Improved engagement of key stakeholder groups, including Non-Governmental Organizations (NGOs), Civil Society Organizations (CSOs), youth organizations, women, academia and private sector, in initiatives to reduce the adverse consequences of climate change; and Increased sharing of best practices for mainstreaming climate resilience within Rwanda, regionally, continentally and globally. 	<ul style="list-style-type: none"> No. of national and local institutions that mainstream climate change into strategic planning % increase of budget allocation to support climate action at a national and district level No. of households with improved and less variable income as a result of climate resilience programs and investments No. CSOs/NGOs/youth organisations, etc. integrated into the climate change discussion Number of men, women and youth trained in ways to build climate change resilience 	Review of Institutional Budgets, National and District Statistics, Project Reports	FONERWA, MoE Sector Working Groups

PROGRAMME OBJECTIVE	RESULTS	INDICATORS	MEANS OF VERIFICATION	RESPONSIBILITY
Agriculture-Driven Prosperity: To improve Rwanda's agriculture adaptive capacity against climate risks and hazards by improving the productivity of agriculture and subsistence farming. To build inclusive (gender inclusion, vulnerable groups and youth) resilience in selected value chains.	<ul style="list-style-type: none"> Improved climate resilient value chains identified Investment leveraged from the private sector to support climate resilient adaptation in selected agricultural and agroforestry areas Increased cross-sectoral collaboration for mainstreaming climate resilience in national and local planning documents and projects; and Increased agricultural production and added value from agroforestry resources to increase climate resilience. 	<ul style="list-style-type: none"> Numbers of people supported by the PPCR to cope with effects of climate change Change in damage/losses (\$) from extreme climate events in areas at risks that are the geographical focus of intervention Degree of integration of climate change in national planning Extent to which vulnerable households, communities, businesses and public-sector services use improved PPCR supported tools, instruments, strategies, activities to respond to Climate Variability and Climate Change Evidence of strengthened government capacity and coordination mechanism to mainstream climate resilience Climate information products/services used in each sector in decision making at various levels Quality of and extent to which climate responsive instruments/ investment models are developed and tested Leverage of funding against public and private investments in climate sensitive sectors 	MINAGRI, RDB, and MINICOM databases	MINAGRI
Water Security for All: To promote water security for all in Rwanda in the face of socio-economic development and climate change, through improved and integrated water resource management, effective institutions and resilient infrastructure. To promote water security for all (especially of women and other vulnerable social groups) in the implementation and use of resilient infrastructure.	<ul style="list-style-type: none"> Effective and efficient water management in the face of socio-economic development and climate change; An integrated approach to water resource management; A high-level understanding of the surface and groundwater resources; Systems that alert decision-makers and citizens of impending water-related climate disasters; Rehabilitated catchments that provide agricultural opportunities; Resilient infrastructure that is adaptable to the impacts of climate change, which also ensures that water users are more climate resilient; Increase access to water resources and improved livelihoods for women and girls; and Improved household and community resilience due to reliable service delivery in terms of waste management. 	<ul style="list-style-type: none"> Numbers of people supported by the PPCR to cope with effects of climate change Change in damage/losses (\$) from extreme climate events in areas at risks that are the geographical focus of intervention Degree of integration of climate change in national planning Extent to which vulnerable households, communities, businesses and public-sector services use improved PPCR supported tools, instruments, strategies, activities to respond to Climate Variability and Climate Change Evidence of strengthened government capacity and coordination mechanism to mainstream climate resilience Climate information products/services used in each sector in decision making at various levels Quality of and extent to which climate responsive instruments/ investment models are developed and tested Leverage of funding against public and private investments in climate sensitive sectors 	RWFA and MoE databases	MoE

PROGRAMME OBJECTIVE	RESULTS	INDICATORS	MEANS OF VERIFICATION	RESPONSIBILITY
<p>Climate Resilient Human Settlements:</p> <p>To improve climate resilience of the country's built environment by designing and constructing in ways that allow infrastructure and service delivery in human settlements to be more resilient to temperature and rainfall extremes as well as extreme weather, and to enable rural and urban socio-economic growth, and thereby reinforces broad-based resilience to climate change.</p> <p>To increase economically viable and environmentally sustainable livelihood options with a strong focus on integrating women's specific needs and reducing vulnerability to increased climate variability" or say special attention to gender dimensions.</p>	<ul style="list-style-type: none"> • Reduced risk of damage to human settlements from future climate change impacts including rising temperatures, heavy rainfall, flooding, wildfires etc. (with a focus on reduced risk of women and vulnerable groups); • Improved preparedness for and response to large volumes of water from heavy precipitation, through better drainage and storm-water management, in targeted secondary cities and associated communities (especially amongst women and vulnerable groups in such communities); • Improved household and community resilience due to reliable service delivery in terms of waste management, as well as improved resource-efficiency (from re-use and recycling) that will strengthen longer term economic resilience in the face of resource constraints sparked by climate change; • Enhanced robustness of district roads and of the Nyabarongo bridge to face the impacts of climate change, and reduced risk of depreciation of asset value from climatic stresses; and • Increased cross-sectoral collaboration to develop and strengthen climate change resilience in human settlements, at the national level, in secondary cities, as well as district level (in the districts involved). 	<ul style="list-style-type: none"> • Numbers of people supported by the PPCR to cope with effects of climate change • Change in damage/losses (\$) from extreme climate events in areas at risks that are the geographical focus of intervention • Degree of integration of climate change in national planning • Extent to which vulnerable households, communities, businesses and public-sector services use improved PPCR supported tools, instruments, strategies, activities to respond to Climate Variability and Climate Change • Evidence of strengthened government capacity and coordination mechanism to mainstream climate resilience • Climate information products/services used in each sector in decision making at various levels • Quality of and extent to which climate responsive instruments/ investment models are developed and tested • Leverage of funding against public and private investments in climate sensitive sectors 	MININFRA databases	MININFRA

PROGRAMME OBJECTIVE	RESULTS	INDICATORS	MEANS OF VERIFICATION	RESPONSIBILITY
<p>Stable and Sustainable Landscapes:</p> <p>To enhance Rwanda's adaptive capacity against climatic risks and hazards by strengthening landscape based resilience, building technical and managerial capacity for the complete value-chain of climate services, and supporting communities in efforts to reduce landscape degradation and instability, thereby reducing overall disaster risk and vulnerability.</p> <p>To build inclusive (gender inclusion, vulnerable groups and youth) stable and sustainable landscapes.</p>	<ul style="list-style-type: none"> • Strengthened adaptive capacities • Improved institutional framework in place • Use of climate information in decision making routinely applied • Strengthened climate responsive development planning • Climate responsive investment approaches identified and implemented • Promote gender mainstreaming in policies, programmes and projects, women's access to climate services, gender equity in access and control over resources (land, access to credit) 	<ul style="list-style-type: none"> • Numbers of people supported by the PPCR to cope with effects of climate change • Change in damage/losses (\$) from extreme climate events in areas at risks that are the geographical focus of intervention • Change in percentage of households (in areas at risk) whose livelihoods have improved (acquisition of productive assets, food security during sensitive periods of the year) • Degree of integration of climate change in national planning • Extent to which vulnerable households, communities, businesses and public-sector services use improved PPCR supported tools, instruments, strategies, activities to respond to Climate Variability and Climate Change • Evidence of strengthened government capacity and coordination mechanism to mainstream climate resilience 	REMA, Meteo Rwanda and MIDIMAR databases	MINILAF

APPENDIX C Summary of the SPCR Consultation Process

A full list of engagements, including individuals who participated, their institutional affiliations, the name, date, and theme of the event they participated are referred to in this Appendix. The table below provides a summary of these events.

Date	Event
10 - 13 April 2017	Inception Meeting and kick-off workshop with core stakeholders
15 - 19 May 2017	Joint Technical Mission <i>(including stakeholder workshop at Lemigo Hotel and field visits)</i>
19 - 23 June 2017	Internal Technical Mission <i>(including stakeholder consultations with ENR sector working group in Musanze)</i>
28 - 31 August 2017	MDB Technical Mission <i>(including presentation at ENR sector working group in Kigali and technical working group sessions for the SPCR's four programmes)</i>
2 - 6 October 2017	Joint Technical Mission <i>(including national validation workshop and high-level meeting with Minister of Environment)</i>

C 1. INCEPTION MEETING: 10 - 13 APRIL 2017

INCEPTION WORKSHOP AGENDA

Date: Tuesday, April 11, 2017

Venue: REMA Building, Gasabo District, Kigali City, Rwanda, B.P 7436 Kacyiru

Time: 09:30 am - 12:30 pm

Time Period	Agenda Item	Remarks By
09:00 – 09:30 am	Arrivals, registration, tea	N/A
09:30 – 09:45 am	Welcome and introduction to the SPCR development process	FONERWA
09:45 – 10:15 am	Overview of planned SPCR development activities and timeline	Pegasys
10:15 – 10:30 am	Rwanda's Green Growth and Climate Resilience Strategy + Key Priorities	Pegasys
10:30 – 11:30 am	Sector-wise sharing of major climate change adaptation activities (projects, programmes, interventions) underway in Rwanda: <ul style="list-style-type: none"> • Agriculture • Land Management • Water Resources • Disaster Management • Climate Services / Meteorology • Urban Development • Transport • Others 	Meeting Participants, by Sector
11:30 – 11:45 am	Tea / Coffee Break	N/A

11:45 – 12:00 noon	Approach to and Considerations for Investment Strategy Development	Pegasys
12:00 – 12:45 pm	Key Priorities and Focus Areas for Rwanda, to Inform the SPCR	Open Roundtable Discussion
12:45 – 13:00 pm	Wrap up and Note of Thanks	FONERWA

Questions Guiding the First Mission

- Are there specific programmatic areas that MINIRENA, FONERWA, and the World Bank already consider high-potential target areas for the SPCR? Is there a leaning towards particular interventions?
- Is there intent to use the SPCR as a basis for initiating a Green Climate Fund application?
- Have specific donors already expressed interest in supporting the work to be captured in the SPCR?
- What are the expectations for and the potential schedule for the World Bank visit, May 15-19?
- Clarifying timing and objective of proposed workshops: the project approach suggests workshops in two phases – one, before finalizing the gap analysis, and the second before finalizing the SPCR. However, the contract suggests that FONERWA wishes to have two workshops when finalizing the SPCR. Need to resolve.

During this mission, the SPCR Team began to look for:

- Ongoing (or very recently completed) climate change resilience programs and/or projects within their sector;
- Planned future climate change resilience programs and/or projects within their sector;
- Ongoing (or very recently completed) growth and development oriented programs and/or projects within their sector, if they have a strong environmental component (even if there is no explicit climate change adaptation or resilience element built in yet);
- Planned future growth and development oriented programs and/or projects within their sector, if they have a strong environmental component (even if there is no explicit climate change adaptation or resilience element built in yet);
- Sector climate change resilience or adaptation strategies and implementation plans;
- Sector investment strategies or investment plans (even if there isn't an explicit climate change adaptation / resilience element built in yet);
- Any M&E (monitoring and evaluation) or MRV (monitoring, reporting, and verification) studies and assessments that have been done recently regarding the performance of climate resilience programs or projects in their sector.

- In particular, the team is keen to secure the following documents that have already been mentioned to us:
 - Rwanda's water sector climate resilience strategy
 - Existing catchment management plans
 - ToRs for the *Strategic Conservation for Wetlands Study*
 - Decree or Notification on Wetland Conservation, Restoration, and Management
 - Rwanda's Organic Environmental Act / Legislation
 - Midterm Review Reports for REMA; Impacts of Climate Change (2012)
 - National Forestry Plan
 - Climate vulnerability data/maps on Rwanda
 - Disaster Management Law of 2015
 - National Disaster Management Act and Framework
 - National disaster risk maps (for floods, droughts, forest fires etc.)
 - Opportunity Assessment for Agro-ecological Zones
 - Rwanda Waste Management Strategy
 - National land use master plan and/or any other National Integrated Master Plans
 - Secondary cities strategy or plan
 - Transport BRT Plan (specifically non-motorised transport plan) and Feeder Road System
 - Composition of and/or documents on Public Investment Committee
 - Rwanda's GCF National Priorities List (and any related documentation)
 - ToRs and Concept Notes for Vision 2050 and EDPRS III
 - Project appraisal documents and/or process form the Department of National Investment Planning

C 2. GAPS AND NEEDS ANALYSIS ENGAGEMENT: 15 - 19 MAY 2017

RWANDA'S STRATEGIC PROGRAM FOR CLIMATE RESILIENCE (SPCR)

– STAKEHOLDER WORKSHOP, MAY 17, 2017

Summary Notes from Breakout Group Thematic Discussions on Gaps and Needs

Workshop Agenda

Time Period	Session	Activity Description	Remarks By
08:30 – 09:00	Arrivals and Registration	Participants arrived, signed in, and took their seats.	N/A
09:00 – 09:10	Welcome Remarks	A welcome address, with a high level introduction of the SPCR process, and articulation of project objectives	MINIRENA

09:10 – 09:20	Introductions	Workshop attendees introduced themselves by name and professional affiliation	All
09:20 – 09:30	The PPCR in Rwanda	Brief remarks reflecting on the importance of the PPCR in Rwanda and a very broad overview of PPCR process	Stephen Ling, World Bank
09:30 – 09:40	The FIP in Rwanda	Brief remarks reflecting on the importance of the FIP in Rwanda and a very broad overview of FIP process	Laouali Garba, African Development Bank
09:40 – 09:50	Forestry and Climate Resilience in Rwanda	Presentation about forestry sector initiatives in Rwanda under FAO	Joseph, FAO
09:50 – 10:00	Technology to Support Resilience in Rwanda	An introduction to the European Space Agency's technology initiatives on remote sensing and information access, in support of resilience and development.	Simon Hughes, Hatfield Group
10:00 – 10:10	GGCRS as a Framework for Climate Resilience in Rwanda	Comments on the utility of the GGCRS as a framework for climate resilience in Rwanda, and the development process of the GGCRS (including vulnerability assessments)	Alex Mulisa, FONERWA
10:10 – 10:20	Approach for SPCR Development	A brief summary of the intended project outcome, project scope, planned activities and timeline for developing Rwanda's SPCR Investment Framework	Pegasys (Nura Suleiman)
10:20 – 10:30	Intersectoral linkages and economy-wide climate resilience	Remarks on the project's conceptualization of climate variability, shocks and stresses, and climate resilience, including intersectoral linkages	Pegasys (Dr. Guy Pegram)
10:30 – 10:50	Climate Resilience in Rwanda – Highlights of Progress	Presentation of preliminary ideas and observations about progress on climate resilience in Rwanda in support of the GGCRS's programmes of action	Pegasys (Shravya Reddy)
10:50 – 11:15	Q & A	A question and answer session for workshop participants to respond to the morning's presentations.	All
11:15 – 11:30	TEA AND COFFEE BREAK	Brief recess for refreshments	All
11:30 – 11:40	Introduction to Morning Breakout Group Sessions on Achievements and Bottlenecks in Climate Resilience in Rwanda	Workshop attendees were introduced to the breakout group sessions to follow, and were provided instructions on the sessions' format and content; key sectors were grouped in clusters	Pegasys
11:40 – 12:45	Breakout Group Discussions on Achievements and Bottlenecks in Climate Resilience in Rwanda	Participants (in clusters) identified achievements and milestones since the GGCRS on climate resilience initiatives (programmes and projects) in their respective sectoral clusters	All (Facilitated by Pegasys / National Consultants)
12:45 – 13:45	LUNCH	An hour's recess for lunch	All
14:00 – 14:10	Introduction to Afternoon's Breakout Group Sessions on Opportunities for Action and Investment in Climate Resilience in Rwanda	Workshop attendees were introduced to the breakout group session to follow, and were provided instructions on the sessions' format and content; key sectors were grouped in clusters	Pegasys
14:10 – 15:10	Breakout Group Sessions on Opportunities for Action and Investment in Climate Resilience in Rwanda	Participants (in clusters) articulated opportunities for impact on climate resilience (programmes and projects) in their respective sectoral clusters, including identification of initiatives that merit new investment	All (Facilitated by Pegasys / National Consultants)
15:10 – 15:25	Breakout Group Report Backs	Pegasys representatives from each breakout group reported back to the plenary with highlights of their group's discussion and key takeaways from the morning's and the afternoon's breakout group discussions	Pegasys

15:25 – 15:30	Note of Thanks	Wrap-up remarks, identification of next steps, and thanks	MINIRENA
15:30	Meeting close	Attendees dispersed	All

Highlights of Breakout Group Discussions

I. Breakout Group One: Agriculture

Representatives in the working groups from:

- AfDB, Civil Society FONERWA, MINAGRI, Ministry of Gender, NIEB, World Bank

Introduction of Climate Relevant Programmes from MDBs

AFDB: Feed Africa Strategy

- No longer about importing food, movement to climate resilient seeds, incorporating climate change activities, private sector support, business-oriented sector and involve youth in the sector
- Mindful for co-financing to attract further financing; 1-2 projects in agriculture and using the AfDB as the baseline (maybe: value chain project with climate smart agriculture)

WB, Africa Climate Smart Coordinator

- 5 billion investment in CSA across Africa by 2021
- Covers agriculture policy, CSA technology and practices, framework for implementing AS Business plan; 25 x 25 of the Malabo Declaration (25 million farmers having access by 2025)
- Opportunity to zero in on scaling up technologies

Missed Opportunities in the Literature Review

[Please see full working draft document for current list of programmes]

- Gender: Ministry of Gender has gender strategy with sector specific regulations and areas of intervention; every project that comes through the ministry must take into account the gender aspect
 - a. Missing project: Gender, Climate Change and Agricultural Support Program (NEPAD supported)
 - b. Issues of land ownership: (1) co-owned, 54%, (2) female registered land, 26%, (3) male registered, 18% [see World Bank work on land registration and titles]
- Need to include projects on Feeder Roads into the program review: supported by the EU and the other by the World Bank, started with 6 districts
- Ministry of Local Government: decentralization policy where all districts are formulating their value chain development on a district level (local economic development strategies)

Gaps

- **Crop insurance:** There are initiatives, but they have not yet taken hold.
 - Current Support: Rwanda Society Insurance (SORAS) Company had insured a total of over 200 million RWF through Kilimo Salama weather index insurance project. MicroEnsure arrived in

Rwanda in 2010 and started pilots in 2011; the Syngenta Foundation for Sustainable Agriculture began in 2012 under HINGA URISHINGIWE Program. Recent introduction of Weather Index Insurance, a product that helps banks get back their money in case of losses by farmers due to climate changes.

- Hurdle: Need to examine the public financial literacy and ability/desire to buy into crop insurance.
- **Access to finance**: Agriculture is vulnerable to drought and floods, which complicates assessment of borrower's ability to repay. Agriculture, despite being the largest sector, is regarded as most risky by financial institutions. Still an issue around mainstreaming climate resilience into the agricultural sector for favorable lending.
 - Current support: BRD is leading in extending credit to the sector with 30% of its outstanding credit (worth RWF 140 billion) to private sector by end of 2015. Business Development Fund-BDF that provides guarantees and grants to farmers and other businesses. The fund goes up to 75% on loans by women and youth and 50% on other clients. Since its establishment in 2012, the fund gave out RWF 31 billion worth of guarantee funds to 1,780 borrowers mainly smallholder farmers. A borrower was given RWF 18 million on average.
- **GGCRS Program Alignment**: Action areas for Sustainable Intensification of Small Scale Farming do not necessarily facilitate sector development. Still need to strengthen the mainstreaming of climate resilience strategies.
- **Value-chain Development**: need to diversify cash crops (coffee and tea) based on changing climate.
 - Current support: dedicated agriculture financing department at the Development Bank of Rwanda that works closely with individuals and companies in agriculture export, as well as SACCCOs to increase access to finance for exporters. There is a division in charge of quality standards for coffee and tea at NIEB, for fruits and vegetables there is a pack house, and an officer at the airport to support exports.
 - Hurdles: Gap in quality and quantity of export goods, as well as improve food safety and food quality standards, particularly if there is a desire to target export markets. Still need to establish concrete links to export markets. The private sectors can help to aggregate the producers and link farmers to markets.
- **Blue economy**--fisheries, still room for growth, particularly in accessing local and export markets
 - Current progress: The national fish production is estimated at 26,732 tons (2015) of which capture fisheries contribute 25,159 tons and aquaculture 1,573 tons. Rwanda is currently by far a net importer of fish from neighboring Uganda and Tanzania. Fisheries and Aquaculture sectors provide about 200,000 jobs (both direct and downstream jobs) though it is not a traditional enterprise. On the whole however, fishing in Rwanda has remained artisanal characterized by smallholder fishers and farmers.

- **Livestock:** Underutilized role of livestock and dairy, livestock integral to building resilience, increasing protein in rural diets; need to explore drought resistant varieties and artificial insemination to increase yields
- **Storage (both water and crop):** to improve post-harvest losses
 - Current status: Despite the national post-harvest strategic policy to reduce the losses of food grain crops from nearly 30% in 2010 to 15% in 2015, the Ministry of Agricultural and Animal Resources reports that losses are still hovering around 25%.
 - Hurdles: (As cited by the USAID/EMIRGE Post-Harvest Handling and Storage (PHHS)) 1) lack of adequate extension services to build farmers' skills in PHHS; 2) lack of proper packaging and storage; 3) insufficient or absence of appropriate on-farm drying and storage facilities; and 4) poor market access leading to the need for storage. For cooperatives and other groups, another key factor is their limited access to financing that would allow them to invest in small to medium processing services.
- **Irrigation:** still missing projects that will fulfill the country's irrigation potential
 - Current status: Several projects at play—Gishwati Water And Land Management Project (Gwlm), Agricultural Mechanisation Program, Government Funded Irrigation-Immediate Action Irrigation, Irrigation and Mechanisation Task Force, etc. Rwanda has identified and mapped 589,000ha Potential Irrigation Area for both hillside and marshland development. A huge potential (96%) is free for irrigation development. With 24000ha of developed schemes, Rwanda offers a unique opportunity for contract farming on grains and pulses. The Government Policy on 45 year Land lease Rwanda offers attractive opportunities for “greenfield” leases for long term private investment in irrigation infrastructure development
- **Communication around Information:** Although there are early warning systems, the method in which information is communicated to farmers is not user-friendly.

Roadblocks and Bottlenecks

- General sector vulnerability to climate variability and change
- Land-locked country: huge impediment to the ability to increase exports, coupled with logistical issues around transport
- Quality and quantity of exports, both from a standards perspective as well as the skills required to upscale subsistence farming
- Access to finance and cheap, climate smart technologies
- Farmers capacity to integrate climate smart agriculture; mind-shift around water use
- Access to information--early warning systems and the information around changing weather patterns, access to information on available water use, soil mapping, optimal crop location, etc.

- Resilient seed varieties
- Issue around capacity to understand the business model/case for agriculture
- Land issues: (1) small parcels of land, (2) lack of available land, (3) gender role of land
- Stress between the forestry sector and agricultural sector

Opportunities/Recommendations for Priority Areas of Action from MINAGRI

Main objectives of the sector: national food security, improve productivity to achieve food security, improve incomes of farmers, contribute to economic growth of the country given that agriculture is the major employer (70%)

- **Business of small holder farming:** Most farmers focus on subsistence farming, but do not necessarily understand or have the capacity to manage the commercial aspect. Need to mainstream business modeling into the agricultural practices. This program must include access to finance and credit for farmers, storage to reduce post-harvest losses and allow for increased agricultural outputs, as well as the potential to include climate insurance.
- **R&D:** research development into genetic intensification (seeds, cattle, etc.), potential to offer research grants through RAB
- **Upscaling of current projects:** (1) pest reduction projects; (2) seed programs (more than 40% of seeds are still imported), (3) irrigation projects (Akagera & Morofu) project
- **Information systems:** Early Warning System, how farmers access information about changing weather patterns
- **Value chain integration around any of the commodities:** Given that Rwanda does not have a competitive advantage over neighbors in producing most crops [small land plots, expensive cost of production, etc.], the need to cater to a niche, high-end market is apparent. Infrastructure development to support export markets will need to align with regional integration strategies, as well as further develop internal road networks and feeder systems. MINAGRI has a project in the pipeline to develop a value chain around horticulture (in particular, flower) export to markets in Belgium, France and the UK. The project is valued at 200 million USD. The project would partner with Rwanda air for cargo flights.
 - AfDB has suggested that this could be a potential project for them, with an investment of 20-40 million, supported by co-financing.
 - The horticulture export sector alongside artisanal mining and manufacturing for value addition are two of the most underfunded sectors, which struggle to access finance. BRD has designed the Export Growth Fund (EGF) to support these sectors and the export sector as a whole to address the existing trade deficit. The project could look to support from BRD for further expansion.

- **Irrigation:** In order to develop the resilience of farmers so that they are able to have a continuous food supply, they need irrigation to be able to grow crops year round. Currently, only 7-8% of agricultural land is irrigated. The shift must be towards doing irrigation in a more and efficient manner, thereby shifting from conventional and cheap irrigation like canals and surface irrigation, to piped conveyance and drip irrigation. 50-600,000 hectares of land have irrigation potential. MINIRENA's is currently working on a project, funded by the Dutch to map the four catchments throughout the country. Given that the last Master Irrigation Plan was in 2012, there is potential to update the Master Plan so that it is aligned with the new catchment mappings.
 - Due to country-wide water targets, MINIRENA has been asked to reduce its water consumption, while at the same time trying to hit increased irrigation targets. The need for institutional coordination with regard to water allocation will be critical should continued efforts be invested in irrigation.
- **Soil Health Program:** The most recent, comprehensive soil map of Rwanda was carried out in 1989. A smaller scale soil map was done more recently with IFDC; it separated the country into zones and made recommendations for fertilizer use based on crop variety. There is a push from the government to redefine soil health throughout the country, shifting the understand from fertilizers (compost + fertilizer blend) catered to different crops to fertilizers that are based on agro-ecological zones. This must begin with a mapping exercise to look at the entire soil resources of the country, map and categorize the different zones. Total investment required is estimated at 10 million.
 - **R&D:** This project can be paired with an R&D component, supported by RAB. Some additional ideas were: slow releasing fertilizers accompanied with soil testing, fungal dominant bacteria compost, and a push for biosafety regulations. Further exploration in agroforestry geared to crops and foods rather than tree species, recycling/composting (bacteria dominant compost is good for some crops, but bad for others; fungal dominant compost alternative).
 - Can explore a similar program that is being carried out in Ethiopia.
- **Livestock:** Given the growing livestock sector [programs like the one cow per family project (300,000 cattle have currently been distributed)] and an increasing need for food security, potential project to look at crossing robust breeds with high-yielding exotic cattle. The Eastern part of the country, within the cattle corridor, has been hit by drought. Several extension projects in that region have looked into storage techniques (construction of valley dams) to provide provisions for cattle during the dry period. A successful cattle market would allow for cross-border trader to increase; current cross-border trade includes beef to the DRC and milk to Uganda.
- **Fisheries:** Have a low fish intake per capita consumption; most water bodies were exhausted during turmoil period (Lake Kivu, Lake Muazi). Need to support fishermen into cooperatives, cage farming supported by the private sector and the program of fish farming, hatchery in the South.

II. Breakout Group Two: Landscapes, Land Use, and Natural Resources Management

Representatives in the group included: Simon Hughes; MINIRENA staff; REMA staff; Rwanda Forestry and Water Authority staff; MINECOFIN staff; others.

Key projects and initiatives to date (achievements to strengthen climate change resilience)

- There has been a lot of activity in the water sector to strengthen climate change resilience, from the national policy and strategy level, through actual projects implemented. Examples of efforts to address climate change resilience in the water sector include:
 - A Strategic Wetland Management Plan
 - Establishment of Inter-Ministerial Committee for Water Resource Management, and consultative commissions on water management
 - Development of a national water policy; water master plan
 - Water balance studies are now available for all level-1 catchments (nine catchments)
 - District level committees (hydrographic committees). In Rwanda there is a lot of activity and decision-making about water resources management at the district level.
 - A large donor-funded project: Water for Growth (Rwanda)
 - Aimed at developing IWRM catchment plans [4]
 - The catchments are spatially distributed to cover diverse geographies in Rwanda
 - Dutch have 8 million euros for implementation, investment final/mobilisation
 - Hydrological data network: river flows are being measured and monitored through 32 stations, but there is a need for further data acquisition.
 - Rainwater harvesting programs have been implemented in several locations, and through multiple pilot programs. These include harvesting of rainwater on rooftops as well as public spaces and roadside points, to use for recharge.
 - E.g. - rainwater harvesting project in high density areas of Nyarugenge, Gasabo, Kicukiro, Musanze, Nyabihu and Rubavu districts – by the RNRA
- There are a number of watershed management projects across Rwanda. Some examples include:
 - A project focused on rain water harvesting and reuse in Kamonyi District
 - A Akanyaru Watershed Protection Project
 - A project focused on sustainable forest and watershed resources management in Nyagatare District
 - A project focused on restoring Yanze River and watershed through scaling up agroforestry technologies for resilience to climate change - Rulindo

- The Adaptation Fund is supporting a 5-year project in the north west implemented by RNRA which includes a watershed management component
- Similar to the water sector, the land sector and land use management field in Rwanda have seen a number of initiatives in recent years that have strengthened climate resilience. These include high level policy and regulatory initiatives, as well as specific projects and programmes:
 - National Land Policy
 - Land use master plan— including district plans, zonation, revised when needed
 - Rwanda has been improving access to spatial data for land use planners and decision makers. There is a spatial data portal for land use.
 - GIS available in all 30 districts
 - LAIS system is being used in all 30 districts
 - Land registration has been done for the entire country (all digital and publicly accessible). The district verifies land claims and ownership, but paperwork at province level is captured digitally
 - Kigali information on land use is all online
 - Climate change risk and vulnerability is a factor that's looked at during the land registration, land use planning, district identification process; 2009 registration was done against serious look at risk zones/benefit in original plan, with integration of risk and overlay of vulnerability
 - There are progressive and robust environmental laws about protecting wetlands, and buffer zone are being followed, of 10 m rivers | 50 m lakes
 - Included in land use masterplan, controlled and enforced
 - There is an ongoing study to manage land use plan according to natural resources distribution and vulnerability in Lake Victoria Basin, based on SEAs conducted.
 - There was a project for greening of district development plans (3 district pilots), CDKN provided some support

Roadblocks and bottlenecks

- There is a far greater need for funding than there is funding / budget available
- FONERWA has not been able to disburse its money adequately; as a challenge fund, it has not drawn enough investment-worthy programmes that support and strengthen climate resilience in the natural resources management space.
- The private sector is not aligned with the fund.
- Technical capacity to integrate climate change resilience in programmes and projects is limited across sectors.

Significant opportunities to strengthen climate resilience (need for further action in this sector)

There are many opportunities in Rwanda to support the implementation of GGCRS and to strengthen climate resilience. Projects that are already in the pipeline of development could also be shaped and modified to receive funding for climate change, if they can amplify linkage to climate resilience. Some areas of need and potential future opportunities are as follows:

In the water sector

- Basin plans should be linked to land use master plan, with climate resilience being an important factor for both, and tying both together
- Lots of opportunities with agroforestry, especially for watershed management
- Water quality management and water quality issues in the face of climate change are going to become increasingly important.
- There's a huge need for catchment protection and river bank management for the Nyabarongo
- As Rwanda enters the planning phase for EDPRS 3, it will be valuable to link major EDPRS 3 objectives to climate resilience and very specifically to catchment planning and interventions
- Pilot projects should be scaled up and improved. Setting buffers and terraces and land use has been effective, but more needs to be done to really protect watersheds fully.
- There is need for greater storage capacity. Rwanda's storage at present is extremely minimal, and this is particularly important for climate resilience, given rainfall and water variability in the future. Storage is especially important in the drier Eastern parts of the country. Current storage per capita: 0.68 cubic w/capita = 2018
Several projects are underway to address the water storage challenge, E.g. Mavemba Dam Development
 - o Feasibility study and design, \$90 m
 - o Link to irrigation, shifting water, etc \$250
- Nyando project is an opportunity to integrate climate resilience into ecotourism
 - o Nyando is doing a detailed design of flood defences, with a view to protecting and safeguarding ecotourism. Feasibility study being developed.
- There is a need for improved data collection and management in Rwanda, i.e. efforts to
 - o Introduce new technology
 - o Build capacity for data management and data dissemination
 - o Use new technology and climate data
- Besides agroforestry, traditional afforestation activities could also contribute towards climate resilience, although these result in competition for land with agriculture

- Rwanda needs a more holistic and integrated rainwater harvesting strategy that goes beyond pilot projects; there is an opportunity to look at financial mechanisms that can support families to afford rainwater tanks.
- Water supply infrastructure and systems are also critical for climate resilience, and more investment is needed in water supply.

In the land use sector

- Secondary cities offer an important opportunity to integrate climate resilience into land use planning, not just with road construction but in a more holistic way
- There's a need for more integration in land use planning, i.e. to better incorporate natural resource assessments and climate change factors into land use planning at all levels. There should be alignment with infrastructure planning and siting, including transport corridors.
- Land planning department should be better equipped to use earth information systems
- Climate resilience needs to be the driving force when developing land use plans. It appears that the district government or district administration is the appropriate locus for such mainstreaming, as it is a one stop shop for implementation across sectors.
- There is a need for plus opportunity for more integrated catchment management and restoration, that looks not only at present land use in the area but looks at spatial connectivity issues as well as future trends in land use.

III. Breakout Group Three: Knowledge Generation and Management - Climate Services and Disaster Risk Reduction

Representatives in the group included: World Bank consultant and technical specialist Michael Hammond; MINECOFIN staff; Meteo Rwanda staff; and REMA staff.

Key projects and initiatives to date (achievements to strengthen climate change resilience)

- Rwanda has a national meteorology policy, a draft climate data policy, a national disaster management plan, and several key guidance instruments for the climate services and DRR sector.
- Rwanda released a Risk Atlas in 2015, which contains detailed maps of risks and vulnerabilities. http://midimar.gov.rw/uploads/tx_download/National_Risk_Atlas_of_Rwanda.pdf
- The new weather radar in the Eastern Province has good coverage of the whole country.
- MIDIMAR has developed its own software for disaster reporting, including a crowd-sourced element.
- Meteo Rwanda has developed an online platform that is part of their website, called Meteo Rwanda Map Room. This site offers the public climate data (such as decadal temperature data sets and

trends, rainfall etc.) as well as specifically tailored data for agriculture and for malaria transmission.
<http://maproom.meteorwanda.gov.rw/maproom/>

- A project implemented by UNEP for USD 3.31 million, focusing on reducing vulnerability to climate change by establishing early warning and disaster preparedness systems and support for integrated watershed management in flood prone areas.
- A project implemented by Least Developed Country Funds (LDCF) for USD 8.825 million, focusing on increasing the Capacity of Vulnerable Rwandan Communities to Adapt to Adverse Effects of Climate Change: Livelihood Diversification and Investment in Rural Infrastructure.
- FONERWA is financing a Rwanda Meteo project (GBP 1.1 million) to develop and apply a weather and climate information system, forecasting products and install weather stations, develop the capacity of staff, and increase access to weather and climate information.
- A project by the Rwanda Climate Services for Agriculture project is being implemented by the International Research Institute for Climate and Society, using the ENACT climate information system to help provide climate related intelligence to the agriculture sector.
- Several districts and secondary cities have developed their own disaster risk and vulnerability reports.
- Studies have been conducted about risk and vulnerability of lightning strikes.
- Early Warning Systems have been piloted in four districts (with the intention of expanding EWS systems nationwide). In four districts (out of Rwanda's 30) the systems provide warning with even a 2-3 day lead time for some hazards. Warnings are even being sent to people through SMS technology and mass media such as television and radio.
- Early Warning Systems (EWS) trainings have been conducted in several districts.
- All districts have an emergency response plan in place.
- National contingency plans exist for several hazards (including floods, landslides, droughts etc.)
- District Disaster Management Committees have been constituted.
- In flood risk areas, 85% of at-risk populations have already been relocated.
- Rwanda has a strong partnership with South Korea to enhance capacity in disaster risk reduction and management.

Roadblocks and bottlenecks

- Lack of financial resources and budget to enhance climate change related information and products.
- Dearth of technically trained climate science capacity in Meteo Rwanda and several key government agencies in Rwanda. (Participants felt that there was no one with a climate science

background in Meteo Rwanda; a few staff have received training on some modules and specific tools, but there are no climatologists or atmospheric scientists or climate modellers on staff).

- Even as data systems and analytics improve, there is a sense that climate information remains dense, impenetrable, and unhelpful for the purpose of decision-making. There is a need for decision-relevant, actionable climate science and information that is tailored to the audience and is framed so that the targets understand the implications for them and what they must do in response.

Significant opportunities to strengthen climate resilience (need for further action in this sector)

- Real-time flood forecasting, using catchment models
- Real-time disaster risk warnings and alerts
- Broader reach of public warnings, through telecom systems and ICT (e.g. more people could “sign up” for alerts from Meteo Rwanda and MIDIMAR)
- Scaling up of several successful pilot initiatives so that they benefit more people and regions in Rwanda.
- Meteo Rwanda would like to develop more climate change related products for a greater number of sectors and regions, with greater resolution. For this it needs more financial, technical, and computing resources.

IV. Breakout Group Four: Urban Connectivity and Urban Sustainability (including transport, cities infrastructure, waste management, rural/urban connectivity etc.)

Representatives in the group included: Rwanda Transport Development Authority (RTDA); Global Green Growth Institute (GGGI); PSF; MININFRA; REMA.

Key projects and initiatives to date (achievements to strengthen climate change resilience)

- So far in Rwanda there has been a major focus on roads in terms of climate resilience in transport – improving economic and social accessibility and connectivity, and robustness of road networks. Initiatives this far have included:
 - Construction and upgrades
 - Most have involved gravel to tarmac
 - Examples of resilient design include taking into account current and projected flood levels, also impact of development on landscape
 - Biggest project – 67km of roads have been upgraded
 - 283km upgraded in total, across all projects combined
- Inland waterway and rail studies also in process or completed
- BRT – the project for Kigali city is at a prefeasibility stage

- Development of sustainable and resilient conceptual urban development master plans across the country
- Urban planning codes have been developed to take resilience into account, for example
 - Location of new settlements take into account floods and landslides
 - Open access for evacuation and planning/design for community disaster response
 - Energy efficiency and diversity, waste management
- Building codes have been developed or updated with sustainability and green standards. These codes are being actively mainstreamed. The Rwanda Building Code was adopted in 2015.
 - Eg. reduction of energy consumption, low carbon materials and methods
 - Planning to promote multi-modal urban transport and walkable cities
 - Resilient infrastructure; also impact of new or upgraded infrastructure on resilience of wider urban space
 - Secondary cities planning is being given a lot of importance in Rwanda. The emphasis in such planning appears to be on resource efficiency (energy, water, waste) and sustainable accessibility
- Building codes have been developed or updated with sustainability and green standards. These codes are being actively mainstreamed

Specific projects to date that were referenced

- The AfDB, the Nordic Development Fund (NDF), and the Government of Rwanda are jointly financing a 21.43 million Euro project – **Developing Capacity for Climate Resilient Road Transport Infrastructure**. The project runs from 2015 to 2020. AfDB is financing 12.5 million Euros of the total, NDF's grant covers 4.4 million Euros, and the Government of Rwanda is matching this with another 4.4 million Euros. The project focuses on the following interventions:
 - (i) Strengthening the knowledge base and tools development;
 - (ii) Physical works put in place to enhance landslide protection in right-of-way areas prone to landslides and erosion, while providing benefits to local populations; and
 - (iii) Increased involvement by transport sector experts in disaster risk management.
- **Rwanda Feeder Road Development Project** (2014 – 2021): the World Bank is undertaking a 45 million USD project (with an additional 4 million contribution from the Government of Rwanda) to enhance all-season road connectivity to agricultural market centres in select districts. The project involves (i) the rehabilitation, upgrading, and maintenance of select feeder roads – approximately 270 km of roads in four districts; (ii) strategy development for rural access, transport, and mobility improvement; and (iii) institutional development and project management.
- **Rwanda Transport Sector Development Project** (2007 – 2014): the Bank provided credit of 20.9 million USD for a project that involved: (i) paved road rehabilitation and maintenance; (ii) sector

governance and policy support; (iii) sector analysis and policy support; and (iv) project and Programme management support. The project was implemented in collaboration with the Africa Catalytic Growth Fund.

- Significant momentum appears to have picked up on **green growth in secondary cities**. The Global Green Growth Institute (GGGI), through implementing partners ECA and IMC, have launched a project on green growth in secondary cities, involving: Rubavu, Musanze, Huye, Rusizi, Nyagatare, and Muhanga.
- The World Bank is supporting **Rwanda's Urban Development Project**, with the objective of providing access to basic infrastructure and to enhance urban management in select areas in participating districts. Expected to last from 2016 through 2021, the project costs USD \$ 100 million, of which the Bank is funding USD \$ 95 million. The project involves four components:
 - Provision of basic infrastructure in six secondary cities;
 - Upgrading of unplanned settlements in Kigali;
 - Technical assistance for sustainable urban management (which includes creating an enabling environment for local economic development, management of urban infrastructure, improving urban planning and strategic decision making through the use of geographic information systems, and capacity building for urban upgrading); and
 - Support for project management.
- UNDP financed the **Consolidated Waste Management Project in Rwanda**, to improve practices at and management of Kigali's erstwhile primary landfill site, Nyanza. The project, which ran between 2009-2013 and cost USD \$ 3.5 million, accomplished the following:
 - A feasibility study on the Fukuoka method (from Japan) was conducted to improve the daily maintenance of the landfill located in Nyanza;
 - A detailed design of a new sanitary landfill with recycling facilities was completed for the City of Kigali. An Environmental Impact Assessment for the same was conducted;
 - Public awareness in proper solid waste management was raised, through stakeholder meetings, workshops and sensitization Programmes.

Roadblocks and bottlenecks

- Adaptation costs (and associated opportunity costs with large need and limited finance) act as an impediment / disincentive because they add costs to infrastructure projects
 - Private sector – no investment or non-adapted investment are the only two options
 - Motivation of the increased cost for adaptation is difficult, given future uncertainty
 - Climate projection variability makes it difficult to promote confidence
- Rwanda is undergoing a transitional period in mainstreaming adaptation

- Inherent challenges exist in getting sectors to think of adaptation and resilience (which are less tangible to grasp than mitigation), but there is confidence this is a transitional period as people and institutions internalise the “meaning” of climate resilience

Significant opportunities to strengthen climate resilience (need for further action in this sector)

- BRT – a major project that can both integrate and contribute to climate resilience if this is internalized and climate considerations are included.
 - Prefeasibility will be complete within next 12 months
- Roads – remain a priority theme, but there is still no major integration of future climate change resilience as an element into road infrastructure and planning.
 - Kigali ring –road
 - Design complete, in negotiations for funding
 - PPP/concession model being adopted
 - Nyabarongo II bridge and access road
 - Upgrading and widening of many existing roads
 - Intra and interurban roads are being identified for widening.
- Waterways are being planned in Rwanda; there are significant climate resilience implications
- Rail networks are being planned; climate resilience can be taken into account for these too.
 - Northern and central corridors
- Smart green transport systems are being evaluated and are likely to be a major theme in Rwanda in the transport and urban sector.
 - Public or private (traffic management)
 - Prep within next 3 years, construction 3+ years
- Secondary cities will grow rapidly and these offer scope for building and strengthening climate change resilience.
 - Detailed land use and urban master plans (building on conceptual plans)
 - Physical plans integrating regulations – such plans are an opportunity to implement optimal solutions
- Continue to iterate on planning and building codes (to enhance the climate change integration in the next version)
 - Buildings to generate a portion of their own energy (this is Rwanda’s wishlist; could make buildings and communities more climate smart as well as climate resilient, by having decentralized and diversified energy sources that are harder to disrupt).
 - Expanding on building codes is important to increase structural resilience to weather events

- Upgrade of underserved and informal areas
 - This is already happening in Kigali, but there is a need to expand the pilot initiative. Informal or unplanned settlements are most vulnerable to climate impacts, and there is a large need to build adaptive capacity and resilience in such areas through improved service delivery and security (for water and sanitation, waste management, access to basic services, better construction etc.).
- Improved drainage and stormwater management in urban areas, especially with a view to protect residential and commercial properties and livelihoods
- Improved integrated waste management, including the need for guidelines.

C 3. INTERNAL TECHNICAL MISSION: 19 - 23 JUNE 2017

SPCR CONSULTANTS ON THE MISSION

International consultants Shravya Reddy and Nura Suleiman represented Pegasys Strategy and Development during the mission. National consultants Jean Pierre Hakizamana and Chrysostome Sehene also joined the mission.

In June, the SPCR team attended a workshop in the District of Musanze aimed at the integration of cross cutting issues in the development of the Sector/District strategies, EDPRS III and Vision 2050. In particular, participation at this workshop was aimed at how to integrate environment and climate change in key development sectors in Rwanda. To ensure consistency done well, each cross-cutting issue was asked to:

- Provide Appropriate and user-friendly tools that sectors and districts will use to integrate such cross-cutting issues;
- Provide mechanism for Institutional and intersectoral coordination on the cross-cutting issues; who does what and when?
- Provide mechanism for measuring their impacts at national level and be used as a tool for policy making and/or resources mobilization.

This event was key for participation outside of Kigali, and to further align the SPCR with national processes. In addition to the Musanze workshop, the SPCR benefitted from aligned with the GGCRS mid-term reporting, through meetings with MINIRENA's Timothy Kayumba.

During the June engagements in Rwanda, the SPCR team also reached out to sector experts for their inputs into the developing SPCR. Lastly, the SPCR team had multiple meetings with members from MINECOFIN to ensure that the SPCR process would be aligned to Rwanda's national budgeting.

C 4. MDB TECHNICAL MISSION: 28 - 31 AUGUST 2017

SPCR CONSULTANTS ON THE MISSION

Below is a summary of the joint technical mission for the SPCR team, and is intended to help support a planned briefing to the Principal Secretary, MINIRENA, on September 1, 2017.

International consultants Shravya Reddy and Nura Suleiman represented Pegasys Strategy and Development during the mission. National consultants Jean Pierre Hakizamana and Chrysostome Sehene also joined the mission.

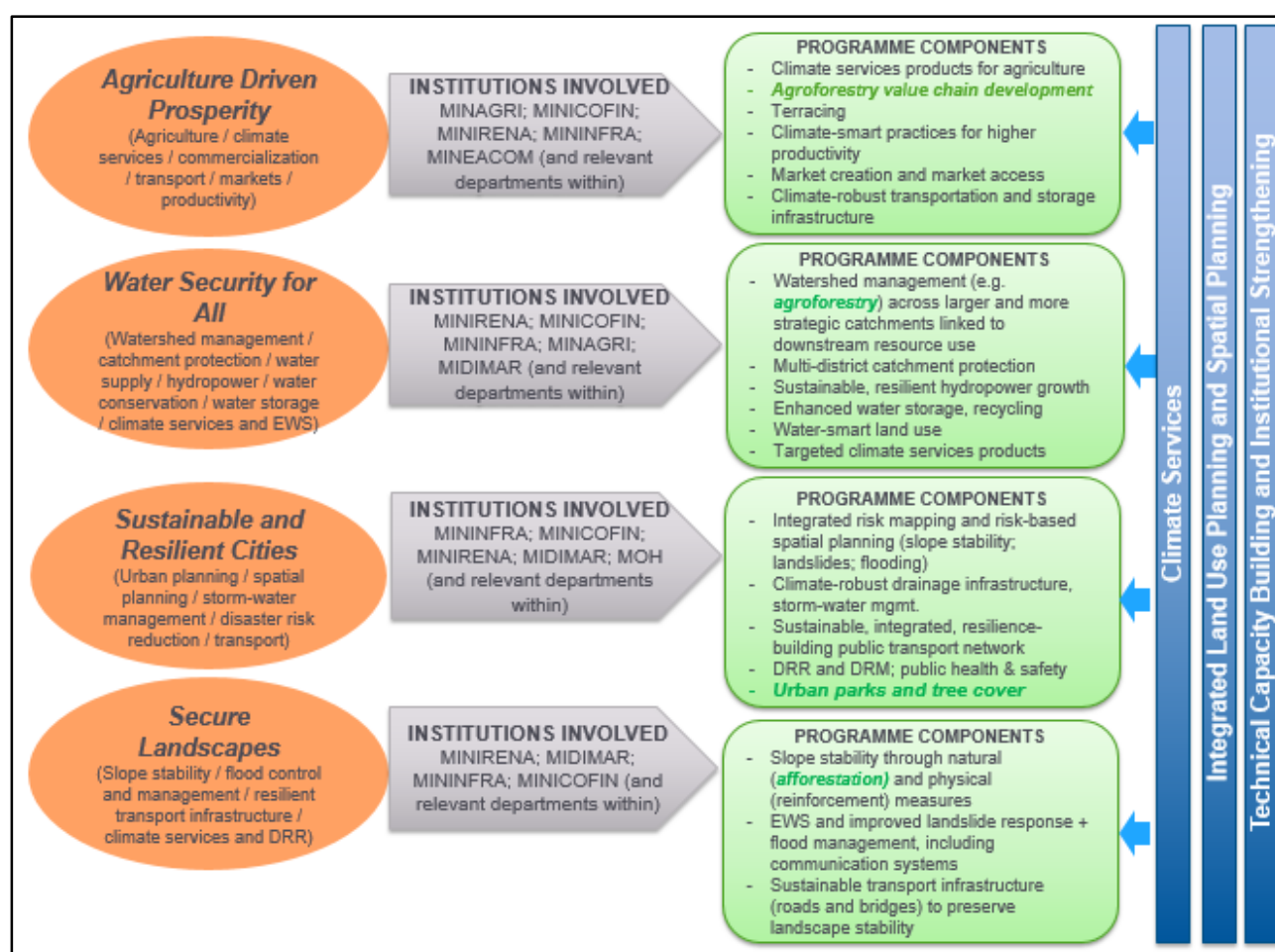
ACTIVITY SCHEDULE

The table below is a snapshot of meetings that the SPCR team undertook during the mission:

Day and Date	Time	Activity / Meeting	Key Outcome
Monday, August 28, 2017	9:00 am – 4:00 pm	Internal discussions on progress with MDBs, FONERWA, MINIRENA, FIP team	Developed plan to align with FIP team
Tuesday, August 29, 2017	9:00 am – 1:00 pm	Presentation on SPCR progress at ENR Sector Working Group meeting	Positive feedback on SPCR investment programmes; ideas on alignment with NST
Tuesday, August 29, 2017	2:00 pm – 4:30 pm	SPCR Technical Working Group on agriculture-themed investment programme	Validation of proposed programme; enrichment through stakeholder input
Wednesday, August 30, 2017	9:00 am – 12:00 noon	SPCR Technical Working Group on cities / settlements-themed investment programme	Validation of proposed programme; enrichment through stakeholder input
Wednesday, August 30, 2017	2:30 pm – 4:30 pm	SPCR Technical Working Group on landscapes-themed investment programme	Validation of proposed programme; enrichment through stakeholder input
Thursday, August 31, 2017	7:30 am – 8:30 am	SPCR and FIP consulting teams' coordination meeting to share progress	Further evolution of teams' approach to aligning the SPCR and FIP
Thursday, August 31, 2017	9:00 am – 12:00 noon	SPCR Technical Working Group on water resources-themed investment programme	Validation of proposed programme; enrichment through stakeholder input
Thursday, August 31, 2017	12:00 noon – 1:00 pm	Mission debriefing meeting with MDBs, FONERWA, MINIRENA, and FIP team	Endorsement of SPCR investment programmes with some suggested changes; clarity on specific issues; agreement on next steps and proposed timeline.
Thursday, August 31, 2017	5:00 pm – 7:00 pm	Mission debriefing meeting with World Bank (Michael Hammond)	Feedback; Identification of next steps and clarification of timeline
Thursday, August 31, 2017	7:00 pm – 8:00 pm	Meeting with MINECOFIN (Patrick Karera)	Secured commitment for MINECOFIN's support for the SPCR costing process

STATUS OF SPCR INVESTMENT PROGRAMME

The figure below provides an overview of SPCR investment programmes (potentially to be termed ‘pillars,’ TBD). Each investment programme (which represents a climate resilience objective for Rwanda) comprises multiple components that bring together different sectors. Each component will be implemented through a corresponding project (potentially to be termed ‘Activities,’ TBD). investment programmes are complemented by three cross-cutting priorities: climate services; integrated land use planning and spatial planning; and institutional capacity building. Reflecting the cross-sectoral nature of each investment programme and its constituent elements, it is envisioned that multiple institutions will be involved in implementing each investment programme through joint and coordinated efforts.



HIGHLIGHTS FROM THE TECHNICAL WORKING GROUPS

The consulting team convened and facilitated four Technical Working Group (TWG) discussions – one for each of the four proposed investment programmes. The objective of each TWG was to have relevant domain experts vet and validate the primary theme of the investment programme; deliberate on whether the components proposed are appropriate entry-points for climate resilient interventions in the given

investment programme and suggest alternate components that could have greater impact and strengthen the programme's cross-sectoral character; and to identify priority projects for implementation that could give concrete shape to each component.

The Technical Working Groups (TWGs) produced rich conversations about the investment programme they centred around. Some highlights from each of the TWGs are as follows:

Agriculture Driven Prosperity

- Concern that the SPCR does not explicitly have funding attached to it from the World Bank, and that – in the absence of identified World Bank / CIF funding for SPCR programmes – the investment plan would be merely duplicating work already taking place in the agriculture sector. It was noted that many of the components proposed in the SPCR are reflected in MINAGRI's PSTA 4 plan, and that funding for similar activities is already being sought through a GCF proposal currently in development. There was also concern that the World Bank's IDA 4 is providing support to Rwanda's ag sector to develop an investment framework or plan, and thus the World Bank may be duplicating its own efforts.
- The SPCR should not reflect business-as-usual efforts in the ag sector, which has a lot of climate change related activities and programmes underway already, but should focus on innovate, added-value projects in niche areas not being addressed by the government already.
- There is room for more innovation in the management of climate-related agricultural risk, such as the development of new insurance products that improve on ones SORAS has introduced.
- The SPCR should consider R&D investment in climate-resilient seeds and varieties.
- Livestock should receive adequate attention in the SPCR, since this is often ignored. A forage production project to increase climate-resilient feedstock should be considered, and designed keeping in mind sustainable land management practices ("climate compatible grazing").
- The AfDB highlighted the area that they habitually fund in SPCRs, i.e. Value Chain Development.
- Participants emphasized the need for more R&D and possible pilots on climate change related pest management, such as integrated pest management focused on climate change impacts on pests.
- Improved extension services to help farmers use available climate services and tools like ENACT.
- Need for more small-scale irrigation projects, and to better understand how irrigation can expand despite climate change impacts on water. A possible project is a climate resilient irrigation master plan that takes into account future climate projections and scenarios.

Sustainable and Resilient Cities

- Investment programme name could be modified and could include the word "settlements" so that it does not exclude rural areas, even if the focus is urban and peri-urban areas.

- Strong need for more rigorous, comprehensive, and advanced land use planning approaches and tools in Rwanda.
- The current land use master plan needs to be revised and must actively consider climate change during the revision process. The plans must consider the feasibility of city growth in the face of climate change.
- Many secondary cities have not yet undertaken a focused land use planning exercise, and do not have spatial development plans. This could be an important area of intervention.
- Storm-water management is a challenge and Rwanda's cities need improved drainage that factors in climate change. Observing the flooding of cities in America (Houston) and Asia (South Asia) it is imperative that Kigali's cities be prepared for greater volumes of rainfall due to climate change.
- Erosion control plans are needed.
- At present Rwanda has no district level climate risk and vulnerability maps. These should be produced.
- Cities also need waste management plans, guidelines, systems, infrastructure, and technical capacity and staff to implement waste management and recycling. Currently everything goes into landfills without much treatment and no recycling.
- Need for tools and systems that allow for community-led city planning or enable communities to give input to and influence development of secondary cities as well as their own neighbourhoods.
- Possible role for urban forestry and parks.

Secure Landscapes

- Meteo Rwanda has a significant need for more technical capacity and trained staff, in order to adequately meet its mandate. In particular, it is straitjacketed by not having more advanced equipment and analytical tools that allow the conversion of data into user-oriented, tailored climate products that meet the needs of specific audiences and allow for decision-relevant information dissemination.
- Rwanda is going to develop its National Framework for Climate Services, but it does not have the resources to implement it. Meteo needs support for the roll out of the NFCS, including the technical components needed, i.e. hydro-met infrastructure and information management systems, as well as the training required within Meteo and its collaborating agencies.
- Need for more modern observational systems (land and air based). Need for improved O&M.
- Need more sensors as well as a calibration centre for sensors.
- A national training programme would make an impact by training staff within Meteo to better understand and respond to other ministries' needs and to prepare tailored products, and training to relevant staff within other ministries to better understand, use, and integrate Meteo's products into their own decision-making and planning.
- Need for more automated weather stations that would increase automatic coverage.

- Floods remain an issue in the West and North of the country. LAFREC is working to address flood risk through more sustainable landscape management. More could be done / this could be expanded upon and scaled into other areas where there is need for flood management and control.
- Land use planning should take climate change into account.
- Potential project that focuses on forest management could also integrate a biomass related element and tie up with the FIP's wood supply chain and charcoal programme.

Water Security for All

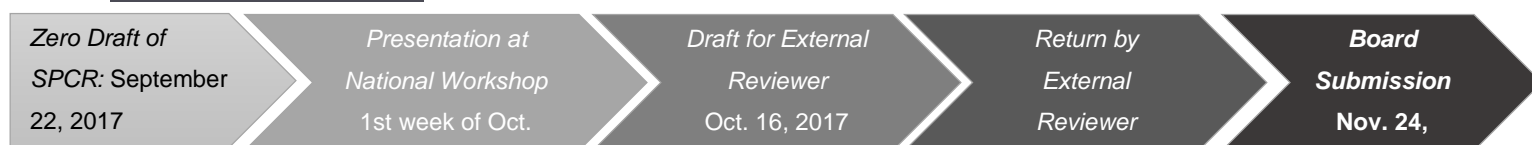
- Resource mobilization is a priority.
- Rwanda needs to be more proactive in its water resource management and not reactive.
- There are catchment management plans (including operational plans) being developed for four major catchments by the Water for Growth initiative. This could be scaled up / extended to other catchments.
- Water for Growth's experience suggests that in addition to what they are doing more is needed to ensure district level / multi-district coordination and joint planning and implementation.
- Rwanda has a national water resources master plan (overseen and implemented by MINIRENA) and a national water supply master plan (overseen and implemented by MININFRA). The two do not align very well, and neither has been developed taking future climate change into account. A joint planning process or even the development of a single water resources and supply master plan would be beneficial.
- There is a need for better understanding of the Water – Energy – Food nexus in Rwanda.
- Groundwater in Rwanda is not very well understood. More studies and mapping would allow a robust assessment of Rwanda's groundwater resources in different locations and how usable they may be.
- Water storage is a priority; Rwanda does not have adequate water storage yet and this is needed to better manage inter annual and intra-annual variability.
- Hydropower development should also be planned with climate change in mind, as well as to understand the system-wide impacts of hydropower development on different rivers and in different catchments. The combined impacts may not be very well understood.
- Hydropower development also needs to be coupled with better catchment protection to lessen erosion and sedimentation, which could increase with climate change.
- An advanced water balance monitoring framework coupled with water balance monitoring systems and instrumentation would be beneficial.

EVOLUTION OF SPCR PROGRAMMES DURING JOINT TECHNICAL MISSION: KEY TAKEAWAYS

- Each investment programme will have no more than 3 (in exceptional cases 4) components, and thus 3 projects.

- Programme names are likely to be refined. For instance, ‘Sustainable and resilient cities’ may be reframed as focused on settlements, not merely cities, to allow for rural population centres to be included. ‘Secure landscapes’ may be modified to ‘Stable landscapes’ to avoid confusion regarding political security issues.
- Climate services will be a cross-cutting theme and thus be integral to all investment programme, but will also be reflected in a core component under the secure landscapes.
- There is strong funding interest from the Nordic Development Fund (NDF) in a flood-management related component of ‘Secure / Stable landscapes’ and from the African Development Bank in climate-resilient or climate-smart agricultural value chain development under the ‘Agriculture Driven Prosperity’ programme.

NEXT STEPS - TIMELINE



C 5. MDB JOINT TECHNICAL MISSION: 2 - 6 OCTOBER 2017

A Joint Mission led by the African Development Bank (AfDB) and the World Bank (WB) visited Kigali, Rwanda from October 2nd through 6th, 2017. The mission was co-led by Mr. Pablo Benitez, Senior Economist (World Bank) and Mr. Laouali Garba, Chief Climate Change Officer (AfDB). The AfDB was also represented by Ms. Siham Mohamed Ahmed (Natural Resources and Environmental Expert). The mission was joined by members of the Pegasys Strategy and Development team who are developing the SPCR (Ms. Shravya Reddy and Ms. Nura Suleiman and the National Consultants), and members of AESA East Africa Consultants who are developing the FIP (Mr. Patrick Hardcastle and National Consultants).

The mission was received by Dr. Vincent Biruta (Hon'ble Minister, Ministry of Environment) and Mr. Alex Mulisa (FONERWA). The mission was also coordinated by Ms. Teddy Mugabo (FONERWA) on behalf of Mr. Bright Ntare (PPCR Focal Point, Fund for Environment and Climate Change – FONERWA) and Mr. Felix Rurangwa (FIP Focal Point, RWFA). In addition, the mission met with authorities and technical staff from FONERWA, the Ministry of Environment (MoE), the Rwanda Environmental Management Authority (REMA), the Ministry of Land and Forestry, and a range of key Ministries that attended a full-day national validation workshop for the SPCR and the FIP. Several Civil Society Organizations and Development Partners were also in attendance at the workshop.

MISSION ACTIVITIES

The team members from the World Bank, the AfDB, the PPCR and FIP consultant teams held a meeting with FONERWA and RWFA to outline the agenda for the week, and to agree on a common approach to promote coordination between the SPCR and FIP. The other objective of the team meeting at the outset of the mission was to determine an agenda for the National Validation Workshop, and assign roles and responsibilities. The MDBs also took the opportunity to highlight to the consulting teams a few important areas where the SPCR and FIP zero drafts (submitted at the end of August 2017) needed modification.

A full day was set aside for the National Validation Workshop for the SPCR and FIP, held at the Golden Tulip Hotel in Nyamata, Bugesera. At the workshop, the morning session was devoted to the SPCR, and an afternoon session was dedicated to the FIP. The workshop was well attended by representative from all major sectors of Rwanda's economy and governance landscape, including both policy experts and technical experts. The SPCR and FIP were discussed at length, and workshop participants had opportunities to provide general feedback as well as to contribute focused input through breakout group discussions.

Over the remainder of the mission, the SPCR and FIP consultants engaged with experts and stakeholders through additional discussions over email and one-on-one meetings. The team met each other at regular intervals through the process to share ideas and discuss progress. A full agenda of the mission is presented in Annex 1. A list of stakeholders engaged is presented in Annex 2.

The mission culminated in two crucial High Level Meetings – the first was an audience with Dr. Vincent Biruta, Hon'ble Minister of Environment in Rwanda, and the second was with., Hon'ble Minister of Land and Forestry in Rwanda. Dr. Biruta emphasized the need for the SPCR's investment programme on "Resilient Human Settlements" to be framed as "Climate Resilient Human Settlements," and to ensure that it would cover both urban and rural settlements. He impressed upon the consultants the importance of ensuring rainwater harvesting activities are included in the SPCR, not only with a focus on domestic rainwater harvesting but also rainwater harvesting for agricultural use. Dr. Biruta underscored the need to present the SPCR to the Principal Secretaries (PS) Forum, and urged FONERWA and the MDBs to support resource-mobilization for the SPCR at the earliest.

SUMMARY OF KEY ISSUES DISCUSSED DURING THE MISSION

PILOT PROGRAM FOR CLIMATE RESILIENCE

The single biggest issue that was discussed in relation to the SPCR was institutional arrangements. The SPCR needs to describe "global" institutional mechanisms for its coordination and implementation in Rwanda. The MDBs advised Pegasys that these high-level arrangements should be consistent with existing institutional structures in Rwanda. FONERWA provided further detail about decision-making and reporting architecture in Rwanda for climate change resilience and related environmental projects. The SPCR team

arrived at a consensus on how to depict the institutional arrangements, and modified the same from the Zero Draft to the latest version.

On the Monitoring and Evaluation (M&E) results framework, the team decided that the expert reviewers comments would provide the necessary guidance for edits, but otherwise the existing content was satisfactory since it was aligned with and reflected the PPCR Results Framework and M&E toolkit.

During the National Validation Workshop, Pegasys presented the four Investment Programmes to participating stakeholders, re-acquainting them with the evolution of the four Investment Programmes and the emergence of the specific projects from the Technical Working Group discussions during the last Joint Technical Mission. In addition, Pegasys facilitated four breakout group discussions with valuable assistance from group rapporteurs and moderators selected from amongst the attendees. Selected takeaways from each group are highlighted as follows:

Agriculture-Driven Prosperity

- The African Development Bank is interesting in being the lead MDB for this investment programme; as such, it is suggested that this entire programme be included in the Phase 1 rollout of the SPCR.
- In the Background and Rational section of this programme, ensure alignment with the NST with regard to modernizing and increasing agriculture and livestock productivity.
- Throughout the programme description, the language around building climate resilience needs to be stronger; each component should demonstrate how it contributes to climate resilience in agriculture.
- Given the prominence of agriculture in Rwanda and the number of activities, programmes and donors in this sector, it was suggested that the programme is further aligned with MINAGRI objectives and expectations to validate that components and activities are building on and scaling up relevant activities, rather than duplicating them.
- With regard to Component 1: Value Chains, it is suggested that this be relevant to (a) climate smart value chains, (b) include criteria that is relevant to building climate smart value chains (i.e. the programme should support the decision making process into picking climate proof value chains), (c) not be solely export focused as a critical need in Rwanda is contributing to food security, and (d) allow for further synergies between the FIP and SPCR by providing language around agroforestry value chains.
- In Activity 2 of Component 1, it is suggested that the activity be renamed to be “Unlocking Barriers to Export-Based Crops to Investment in Agriculture.” Given that most farmers in Rwandan are small scale, this activity could target SMEs and look into financing of micro-credit.
- It was also suggested that Activity 3 (Building Climate Smart Storage Facilities and Drying Ground), previously under component 2, be integrated into Component 1.

- With regard to Component 2 (Climate Smart Agriculture), it was suggested that this component be merged with Component 3 (Climate Smart Agroforestry) as this is fundamentally the same farming system. In Phase 1, Component 2 should be rolled out in the East (drought) and North-West (flooding) and then scaled up to a national level. It would also be important to see how the FFS could play a role in this component.
- Activity 1 (Climate Smart Index-Based Insurance) needs to be coordinated with the AFI/MINAGRI National Crop Insurance Pilot. This activity can only be viable if it is scaled to a national level and the budget required for this activity needs to be duly amended.
- Activity 2 (Linking Climate Smart Agriculture Research to Projects) needs to be amended with regard to the second activity proposed (terracing, as this is already being funded under a World Bank IDA grant). Given the imperative to include a community irrigation project dedicated to improving intensive crops, it is possible to replace the terracing component with an irrigation or pest management one.

Water Security for All

- Rwanda does not consider plans and strategies and studies a priority. These are soft investments and should not be prioritized in the SPCR. The SPCR should focus on hard infrastructure and activities that can be implemented on the ground and that include productive activities.
- Water for Growth has worked on Integrated Water Resources Management plans for four level one catchments (thus there are five remaining). However, the other five are not immediate priorities for Rwanda. Rwanda may develop plans for them at a later stage, but the focus should now be on implementing concrete activities that emerged as recommendations in the management plans for the four catchments already covered by plans. Thus, the same catchment areas should now have investments in on-the-ground actions.
- Similarly, groundwater mapping can also be a deferred priority, for a second phase of the SPCR.
- Strengthening Rwanda's hydrological network is also not viewed as a critical need for the immediate future, and can be a phase two project.
- Phase One should be focused on catchment restoration. This should not just be restoration through agriculture, but degraded catchments can be restored through a wide spectrum of activities including agriculture, tree-planting, physical reinforcements etc. All should be covered. The catchments that should be restored are Upper Nyabarongo, Lower Nyabarongo, and Kivu.
- The biggest emphasis in Phase One of the SPCR should be on climate resilient water infrastructure. This would include: (i) large scale water storage infrastructure (Muvumba dam); (ii) small scale water storage infrastructure (in Akagera Upper, Akagera Lower, Akanvaru, and Muvumba catchments); and (iii) Household rainwater harvesting (in Akagera Upper, Akagera

Lower, Akanvaru, and Muvumba Catchments). [NOTE: this will now be expanded to include agricultural rainwater harvesting, in response to comments from the Hon'ble Minister).

Resilient Human Settlements [to be renamed Climate Resilient Human Settlements, in response to comments from the Hon'ble Minister]

- Component 1: Mainstreaming Climate Resilience Through Urban Land Use and Spatial Planning
 - Separate National Land Use Master Plan from the City of Kigali and Six (6) Secondary Cities
 - Focus on City of Kigali and the Six official Secondary Cities
 - Estimated Budget is \$5M for Secondary Cities only
 - Priority should be the 6 Secondary Cities. National Land Use Master Plan should be shifted to landscape since the investment program is about settlement.
- Component 2: Climate Resilience Through Storm water and Drainage Management
 - The budget should be used from pre-feasibility (where applicable) to actual implementation and the amount of money should be distributed across these 6 cities. There are already feasibility studies in place that should be taken into account.
 - Geographic focus should be given to Musanze, Rubavu, Muhanga and Rusizi
- Component 3: Climate Resilience Through Improved Waste Management
 - One needs to know the type of waste being talked about here (solid or liquid) so that the SPCR can link with existing waste management initiatives in place (e.g. AfDB plans to support 4 Secondary Cities (fecal sludge treatment plants).
 - Focus on the 2 remaining Secondary Cities with no planned fecal sludge treatment plants.
 - Pilot on transforming waste into compost for increased agricultural productivity.
- Component 4: Sustainable, Climate-Resilient Roads and Bridges
 - The detailed technical study for Nyabarongo Bridge (Mageragere side) was completed and awaiting implementation.
 - For Rwanda's District Roads, focus and priority should be given to Districts prone to flooding and landslides (e.g Musanze, Rubavu, Gakenke Nyabihu, Ngororero, and Nyamagabe)

Stable and Sustainable Landscapes

- The document should consider a component of "landscape restoration in areas affected by mining and the support of the adoption of mining best practices for landscape protection";
- The current component 3 on "Landscape conservation in the context of fuel-wood production and collection for biomass use" should be moved to the FIP;
- The Eastern Province should be also benefit from landscape restoration and landscape conservation, actions as necessary;

- Update the report part on "institutions involved". Some institutions are no longer in existence (ie MINIRENA, RNRA, RWFA) and new ones have been established;
- Hydro meteorological equipment and services should also be included as part of the activities of Component 2.
- In terms of phasing and distributing projects between phases one and two of the SPCR: all components are very equally important. They can be implemented in the following order:
 - Components 1 and 2 first (one after another or at the same time); then
 - The suggested new Component 3 (on mining and restoration).

SPCR AND FIP ALIGNMENT

The SPCR and the FIP are being formulated in parallel as forestry and agroforestry are important channels for strengthening climate resilience. The teams from the consultants, the MDBs and GoR have emphasized the importance of finding projects that are complementary or even shared.

In the final stages of the development of the SPCR and the FIP, it has been agreed that both documents will reference the other and highlight linkages with the other wherever they may exist. In addition, two specific SPCR components and the projects they subsume will be moved in entirety into the FIP, and the SPCR will direct readers to examine those two specific projects under the FIP. These are: (i) Agroforestry (linked to the SPCR's "Agriculture-Driven Prosperity" Investment Programme); and (ii) Sustainable Fuelwood Production and Management (linked to the SPCR's "Stable and Sustainable Landscapes" Investment Programme).

Other areas of the SPCR also complement the FIP, and the documents will suggest that such projects be implemented in tandem or in close coordination with one another, possibly to be scoped and funded as a package. These include a tree planning element within the SPCR's catchment restoration project, and another afforestation element in the SPCR's integrated flood risk management project. In these cases, the majority of the project will be costed and implemented through the SPCR, but the specific tree-planting or afforestation element will be costed and included in the FIP.

SPCR AND FIP ALIGNMENT WITH NATIONAL STRATEGIES AND POLICIES

Rwanda already has a strong set of strategies and plans that are relevant across the development and climate resilience sector. These include the Green Growth and Climate Resilience Strategy (GGCRS), Vision 2050, the National Strategy for Transformation (to take the place of the third Economic Development and Poverty Reduction Strategy), the Plan for the Transformation of Agriculture (PSTA IV), the Draft Agroforestry Strategy, and others. It has been emphasized that the SPCR and the FIP should not seek to replace these strategies but to complement them. The two consultants (SPCR, FIP) have been taking account of the national plans, including the very latest developments under the still-evolving National

Strategy for Transformation, and are making every effort to ensure the SPCR and FIP reflect Rwanda's national priorities, whilst at the same time endeavoring to avoid duplication with national plans and budgets.

RESOURCE MOBILIZATION STRATEGY AND POLICY ALIGNMENT

FONERWA, the World Bank and Africa Development Bank agreed on developing a common, resource mobilization plan for the SPCR and IP investment plans. Key aspects of the resource mobilization strategy are:

- Alignment with ongoing policy processes and government plans, including Vision 2050, Rwanda's NDC and global SDGs.
- Each investment plan (SPCR, FIP) to develop a small number of project concept notes. It is expected that some of these concept notes would be submitted to the Green Climate Fund (GCF) and be approved to be developed into full GCF proposals.
- Rwanda and the MDBs should mobilize resources beyond GCF, including funding from MDBs, bilateral agencies and private sector.
- The SPCR document will be followed by a resource mobilization effort by the MDBs and FONERWA. They will organize consultations meeting with donors and private companies on the SPCR and FIP investment projects in anticipation of SPCR and FIP approval by the CIF.
- The World Bank will select SPCR projects that can be strongly linked to IDA 18 priorities, especially those with aspects of climate change resilience and adaptation.
- FONERWA will work closely with MINECOFIN in crafting a Resource Mobilization Strategy

The need to engage the private sector has emerged as a strong theme through the discussions that were held during the Mission. On the whole, climate change adaptation does not offer extremely attractive investment options for the private sector. However, both the SPCR and FIP are trying to identify projects that could leverage private sector finance. For instance, private sector initiatives could be linked to the development of value chains in agriculture and forestry.

MISSION CONCLUSIONS

The mission was a definitive step towards the completion of the SPCR and FIP resulting from the PPCR and FIP processes respectively. National level stakeholders provided positive feedback and validation for the SPCR and its four Investment Programmes (with some minor suggested changes), and also gave a green light for the FIP and its investment areas.

The GoR and relevant agencies are engaged, and provided constructive guidance that will support the completion of the SPCR and FIP. Both investment plans have significant potential to advance climate change resilience in Rwanda, mainstream resilience into government programmes and investments, and to mobilize new and additional financial resources.

C 6. GENDER MAINSTREAMING

Climate change is not gender neutral; therefore, women are disproportionately affected in Rwanda. Throughout the six months of preparation of the SPCR project, the design team had the opportunity to meet with numerous women in technical and administrative positions in various Ministries. Many of these women are at the forefront of gender empowerment work in their respective positions and represent women in high-ranking decision-making bodies. As the project design, implementation and monitoring phases continue, it will be vital to continue consultations on gender gap related to participation, leadership, land ownership, forest use, domestic work load, access to skills and technologies inputs, access to training, access to credits and markets, policy engagement at the national and community level. The work of the SPCR will support the NST, which specifically outlines opportunity for gender in two of the three pillars (Economic Transformation and Transformational Governance).

A detailed gender analysis will be conducted during each project's preparation and implementation. Following detailed analysis, design of gender responsive interventions will address the identified gender gaps for each of the interventions. In collaboration with the Ministry of Gender and Family Protections, and other key stakeholders (NGOs, CSO, private sectors, key gender working groups), technical backstopping will be provided throughout the project cycle. MDB E&S Safeguards and project-specific ESIA's will be undertaken in accordance with the Rwanda's environmental legislation.

This work will be led by the Ministry of Gender and Family Protections, but needs to be supported by each of the relevant sectors. Rwanda has worked closely with its sector Gender Mainstreaming Strategy and Checklists and will do well to align that the indicators and targets set out for each project to the relevant monitoring bodies.

APPENDIX D List of Participants during SPCR Consultation Process

This appendix contains a list of persons engaged during the stakeholder engagement sessions (as discussed in Chapter 5). Great efforts were made to make the consultation process gender inclusive and, as the previous section suggests, approaches are in place to ensure higher participation of women stakeholders. The total percentage of female representation during the engagement was approximately 17%.

Name	Title	Sector	Institution	Gender
Aimable Ntukanyagwe		International Sources of Finance/ IFIs and Multi-laterals /DP	IFAD (International Fund for Agricultural Development)	F
Aimee Marie Ange Mpambara	Agriculture Specialist	International Sources of Finance/ IFIs and Multi-laterals /DP	The World Bank	F
Alain Ntege	Director of Research and Mineral Exploration Unit	Government Organisations	RNRA	M
Alex Mulisa	Coordinator	Government Organisations	Rwanda Environment and Climate Change Fund	M
Annette Sylvie	LVEMP II National Project Coordinator	Government Organisations	REMA	F
Anthony Twahirwa	Division Manager, Weather, Climate Services and Application	Government Organisations	Meteo-Rwanda	M
Antje Illberg	Urbanization Advisor	Government Organisations	MININFRA	F
Augustin Kampayana	Head of Department	Government Organisations	Rwanda Housing Authority	M
Damascene Bizumuremyi	Head of Department, Transport Planning & Operations Department	Government Organisations	RTDA	M
Bright Ntare	Program Manager	Government Organisations	Rwanda Environment and Climate Change Fund	M
Bugingo Emmanuel	Head of LED Unit	Government Organisations	MINALOC	M
Busokeye Laititia	Director of Environmental Research and Planning	Government Organisations	REMA	F
Charles Murekezi	Director General of Agriculture Development	Government Organisations	MINAGRI	M
Charles Sindayigaya	Project Coordinator		REMA	M
Christof Griebenow		International Sources of Finance/ IFIs and Multi-laterals /DP	KfW	M
Christopher Ngabirano	M&E Specialist	Government Organisations	RTDA	M
Coletha U. Ruhamy	Director	Government Organisations	REMA	F
Cyprien Ndayisaba	Environmental Specialist	Government Organisations	Rwanda Transport Development Agency (RTDA)	M
David Niyonsenga	Division Manager	Government Organisations	MININFRA	M

David Toovey	Communications		RWANDA GREEN FUND	M
Desire Kagabo	Climate Services, CCAFS	International Sources of Finance/ IFIs and Multi-laterals /DP	CCAFS, CGIAR	M
Didier Sagashya	Director General	Government Organisations	Rwanda Housing Authority	M
Dusengumuremyi Jean de Dieu	Behalf of Director		RMPGB	M
Ebel Smidt	Team Leader	International Sources of Finance/ IFIs and Multi-laterals /DP	Water for Growth	M
Edward Kyazze	Urbanization and Housing Division Manager	Government Organisations	MINIFRA/Rwanda Housing Authority	M
Emmanuel Kabera		Government Organisations	REMA	M
Emmanuel Muligirwa	Environmental Specialist		WB	M
Emmanuel Uwizeye	DLEWF	Government Organisations	MINIRENA	M
Erwin de Wandel		International Sources of Finance/ IFIs and Multi-laterals /DP	BTC	M
Esther Mutamba	DG	Government Organisations	Rwanda Housing Authority	F
Evalde Mulindankaka	Industrial Infrastructure Policy Specialist	Government Organisations	MINICOM	M
Fatina Mukarubibi		Government Organisations	MINIRENA	F
Faustin Munyazikwiye		Government Organisations	REMA	M
Felix Rurangwa	Director of forest extension		RWFA	M
Francis Musoke	Program Manager	International Sources of Finance/ IFIs and Multi-laterals /DP	IVCN	M
Francois Xavier Tetero	Director, Water Regulations RNRA	Government Organisations	MINIRENA / RWFA	M
Fred Sabiti	TA	Government Organisations	MINECOFIN	M
Godfrey Kabera	DG Planning	Government Organisations	MINECOFIN	M
Guy Kalisa	DG	Government Organisations	Rwanda Transport Development Agency (RTDA)	M
Guy Pegram	MD		Pegasys	M
Hanane Hafraoui	Low Carbon / Climate Development Advisor	International Sources of Finance/ IFIs and Multi-laterals /DP	DFID	F
Hishamunda Alphonse	Risk Vulnerability Analysis	Government Organisations	MIDIMAR	M
Hypiro Steven	Public Weather Service Coordinator	Government Organisations	Meteo-Rwanda	M
Innocent Bisangwa M				M
Innocent Kabenga	Country Representative	International Sources of Finance/ IFIs and Multi-laterals /DP	Global Green Growth Institute (GGGI)	M
Innocent Musabyimana		Government Organisations	MINIRENA	M
Jacques Peeters	ITA	International Sources of Finance/ IFIs and Multi-laterals /DP	BTC-FMBC	M
Jan Rijpma	Tech.Specialist	International Sources of Finance/ IFIs and Multi-laterals /DP	UNDP/REMA	M
Jan Vlaar		International Sources of Finance/ IFIs and Multi-laterals /DP	Netherlands Embassy	M
Jean Baptiste Ndayisaba	Communications		RWANDA GREEN FUND	M

Jean Baptiste Nsengiyumva		Government Organisations	MIDIMAR	M
Jean Claude Mutabazi	Forest Specialist		MINILAF	M
Jean Claude Ndorimana	Advisor to the Minister	Government Organisations	MINAGRI	M
Jean Damascene Nyamwasa	USAID climate services	International Sources of Finance/ IFIs and Multi-laterals /DP	USAID climate services	M
Jean Nduwamungu	Consultant		AESA	M
Jean Pierre Hakizimana	National Consultant		Pegasys	M
Jean Pierre Munyeshyaka	Senior Associate; Green Urbanist	International Sources of Finance/ IFIs and Multi-laterals /DP	GGGI	M
Jerome Nsengiyaremye	Energy Transmission & Distribution Senior Engineer	Government Organisations	MININFRA	M
Jian Xie	Senior Environmental Specialist	International Sources of Finance/ IFIs and Multi-laterals /DP	The World Bank	M
John Ntaganda Semafara	Director General		Meteo Rwanda	M
Joseph Ananias Bizimana			FAO	M
Kabalisa Vincent de Paul	AOP	Government Organisations	RWFA	M
Karera Patrick	Planner	Government Organisations	MINECOFIN	M
Kevin Bulder	Consultant Environment and Climate Change	International Sources of Finance/ IFIs and Multi-laterals /DP	Water for Growth (funded by Netherlands Embassy, sit in MINIRENA)	M
Laouali Garba	Chief Climate Change Officer		AfDB	M
Lisette Buki	Urbanization Specialist	Government Organisations	MININFRA	F
Malick Haidara	USAID ag and CC	International Sources of Finance/ IFIs and Multi-laterals /DP	USAID	M
Marie Josée Mukanyamasa	Director of Rural Water and Sanitation Services		WASAC	F
Michael Hammond	Consultant		World Bank	M
Mihigo Augustin	DFIMU		RWFA	M
Murego Vianney John	Consultant		AfDB / FIP-Rwanda	M
Murererehe Sabin	Managing Director		EMS	M
Mutaganda Amin	Head of Forestry and Nature Conservation	Government Organisations	RMPGB	M
Mwengi Kinyanjui	REDD+ Expert		AESA	M
Nathan Kanyesigye	Water Harvesting Officer	Government Organisations	RWFA	M
Ndamage Jean	Conservation development strategic Advisor		ARCOS	M
Nicolas Ntare	Land use Plan Expert		AESA	M
Nick Leitner	Principal		Pegasys	M
Nura Suleiman	Consulting Manager		Pegasys	F
Okechukwu Daniel Ogbonnaya		International Sources of Finance/ IFIs and Multi-laterals /DP	GGGI	M
Pablo Benitez	Senior Economist		World Bank	M

Pat Hardcastle	Team Leader		AESA / FIP-Rwanda	M
Patrick Mugabo	Climate Change /Adaptation	Government Organisations	REMA	M
Paul Watkiss	Consultant			M
Peterson Mutabazi Twagira	Manager	Government Organisations	MININFRA transport team	M
Raphael Rurangwa	Independent Consultant			M
Razvan Sandru		International Sources of Finance/ IFIs and Multi-laterals /DP	GIZ	M
Rebecca Venton	Senior International Development Manager	International Sources of Finance/ IFIs and Multi-laterals /DP	Met Office	F
Rob Nieuwenhuis	Deputy Team Leader	International Sources of Finance/ IFIs and Multi-laterals /DP	Water for Growth	M
Robert T. Runazi	Senior Manager-Housing Investments	Government Organisations	Development Bank of Rwanda	M
Ronald Nkusi	Coordinator of External Finance	Government Organisations	MINECOFIN	M
Rurangwa Felix	FIP Focal Point		RWFA	M
Sam Biraro	Monitoring &Evaluation Specialist	Government Organisations	RNRA	M
Sehene Chrysostome	National Consultant		Pegasys	M
Serge Nsengimama	Consultant / Social Environment safe guards Expert		FIP-Rwanda /AESAs	M
Shravya Reddy	Principal Consultant		Pegasys	F
Siham	NRM Expert		AfDB	F
Mohamedahmed				
Simon Hughes	Director	Consulting Firm	Hatfield Consultants	M
Siyasanga Sauka	Engagement Manager		Pegasys	F
Stevenson Nzaramba	DG Planning	Government Organisations	MININFRA	M
Teddy Mugabo	Resource Mobilization		FONERWA	F
Telesphore Ngoga	Conservation	Finance Institution	RDB	M
Timothy Kayumba	Green Economy Specialist	Government Organisations	MINIRENA	M
Vincent Guinaudeau		International Sources of Finance/ IFIs and Multi-laterals /DP	GGGI	M
Vincent Nsabuwera		International Sources of Finance/ IFIs and Multi-laterals /DP	BTC	M

APPENDIX E Summary of Gap and Needs Analysis

Rwanda has made significant progress in its efforts to identify the country's climate change risks and vulnerabilities, and has put in place key policy and strategic instruments that provide guidance on climate change response – in terms of both mitigation and adaptation.

Chief amongst these is Rwanda's Green Growth and Climate Resilience Strategy (GGCRS). The GGCRS identifies climate change responses and recommended areas of intervention across fourteen different Programmes of Action, which collectively represent major sector of Rwanda's economy. Of the fourteen, a few Programmes of Action explicitly target climate change mitigation, but the vast majority focus on building adaptive capacity and strengthening climate change resilience.

Since the GGCRS came into effect, Rwanda has consistently integrated climate change adaptation responses in its Economic Development and Poverty Reduction Strategies (EDPRS), and aligned several GGCRS-recommended interventions with the targets and priorities under the EDPRS. This has given effect to the GGCRS to a certain degree. However, there is a recognition amongst government as well as non-governmental stakeholders that Rwanda needs to take additional concerted steps to realize GGCRS objectives and to translate the GGCRS into large-scale, on-the-ground implementation. To this end, Rwanda must draw a critical mass of funding support to enable strategic, high-impact, technically viable, and financially bankable climate resilient investments.

To ensure that new investment sought is directed at key gaps in Rwanda's existing efforts at climate resilience, and to channel climate finance towards additional interventions that address previously unattended needs, it is critical that Rwanda's forthcoming Strategic Programme for Climate Resilience (SPCR) be informed by a robust gaps and needs assessment.

This appendix is thus an effort to take stock of what Rwanda is already doing well, and where it needs to invest additional resources to further reduce climate change vulnerability. Since most of Rwanda's initiatives in the climate change space has been designed and implemented on a sectoral basis, and since the GGCRS is also organized broadly by sector, the framework for the gaps analysis is the eight GGCRS Programmes of Action that focus on climate change adaptation (with the exception of forestry-related activities, which are covered in a distinct and parallel process). Detailed information is provided in tables that follow.

Programme of Action and Focal Point Ministry Identified in the GGCRS as Responsible Agency	Potential Level of Need Identified by Nodal Ministry in Environment and Natural Resources and Climate Change (Rwandan Francs / USD)	Estimated Expenditure in the Relevant Sector (total of Ministry budget on ENR+CC in 2016-2017 period plus other recent large initiatives)	Other Ministries and Agencies with Linkages to the Programme of Action (Names of entities that could contribute to this adaptation area or Programme of Action)	Cross-Departmental and Inter-Sectoral Adaptation Activities and Programmes of Note (Name and – if available – budget of cross-sectoral effort involving multiple ministries)
<p>Sustainable Intensification of Small Scale Farming</p> <p><i>The lead agency identified by the GGCRS is MINAGRI</i></p>	<p>For the 2017-2018 budget, MINAGRI has proposed a budget of 172 billion RWF. In this budget, 40% (69 billion RWF) has been allocated to environment management and conservation, an increase of 55% from last year's budget.</p>	<p>Relevant projects in the agricultural sector, stemming largely from MINAGRI, NAEB and RAB's budgets for a total sum of 82,335,932,357 RWF. Costs represent blend of agency budget, GoR counterpart funds, external loans and grants.</p>	<p>Rwanda Agriculture Board (RAB)</p> <p>National Agricultural Export Development Board (NAEB)</p> <p>Rwanda Environment Management Authority (REMA)</p> <p>Ministry of Natural Resources (MINIRENA)/now MoE</p> <p>Ministry of Infrastructure (MININFRA)</p> <p>The GGCRS also identifies Municipal Authorities, ISAR, the private sector, and NGOs as responsible stakeholders</p>	<p>MINAGRI has 447,043,880 RWF specifically set aside for institutional development and agricultural cross-cutting issues.</p> <p>In the Strategic Plan for Transformation of Agriculture, there is a specific program dedicated to "institutional strengthening and cross-cutting issues."</p> <p>Within the agriculture sector, MININFRA is helping to transform agricultural infrastructures in order to create a conducive environment for investors, agriculture development, and for the country to have market access.</p>
<p>Agricultural Diversity of Markets</p> <p><i>The lead agency identified by the GGCRS is MINAGRI</i></p>	<p>Agriculture and Animal Resources Intensification: 66 billion RWF</p> <p>Value Chain Development and Private Sector Investment: 3 billion RWF</p>	<ul style="list-style-type: none"> • Buffet Project: 1,783,072 330 RWF available in 2016-2017 budget • National Strategic Food Reserve Project: 5,498,925,000 RWF available in 2016-2017 budget • Gako Integrated Beef Project: 1,248,508,000 RWF available in 2016-2017 budget • Climate Resilient Post-Harvest and Agribusiness Support Project (PASP): 5,389,538,137 RWF available in 2016-2017 budget • One cow per poor family program (GIRINKA): 701,408,225 RWF available in 2016-2017 budget • Post-harvest and Agribusiness Support Project (PASP): 200,000,000 RWF available in 2016-2017 budget • Project for Rural Income Through Exports (Price): 5,588,470,719 RWF available in 2016-2017 budget • Land Husbandry, Water Harvesting and Hillside Irrigation (LWH) project under the Rural Sector Support Program (RSSP): 6,507,160,932 RWF available in 2016-2017 budget • Rssp: Rural Sector Support Project (Phase II): 4,750,000 000 RWF available in 2016-2017 budget • Kwamp: Kirehe Watershed Management Project: 167,648,992 RWF available in 2016-2017 budget • Feeder Roads Development Project + Sector Policy Support Program (SPSP) for Rural Feeder Roads: 7,574,094,131 RWF available in 2016-2017 budget • Rural Community Support (Koica Funded Project): 1,698,791,567 RWF available in 2016-2017 budget • PAIRB: Projet D'Appui Aux Infrastructures Rurales De La Region Naturelle De Bugesera : 1465,618,229 RWF available in 2016-2017 budget • Improving Market Access Program: 1,426,776,999 RWF available in 2016-2017 budget • e-SOKO Project: 300,000,00 RWF available in 2016-2017 budget • Project: Immediate Action Irrigation Project (Gfi): 7 569,365,059 available in 2016-2017 budget • Export Targeted Modern Irrigated Agriculture Project(Eti): 460,000,000 RWF available in 2016-2017 budget • Small Scale Irrigation Technology(Ssit): 714,437,042 RWF available in 2016-2017 budget 		

		<ul style="list-style-type: none"> • The Project for Rehabilitation of Irrigation Scheme in Bugesera District: 179,348,526 RWF available in 2016-2017 budget • One Cup of Milk Per Child: 1,476,476,000 RWF available in 2016-2017 budget • Livestock Intensification Project: 2,228,612,729 RWF available in 2016-2017 budget • Safeguarding National Genetic Resources for Food Security and Sustainable Development: 60,135,803 RWF available in 2016-2017 budget • Promotion of The Use of Lime to Increase Agricultural Productivity in Acidic Soils of Congo-Nile Divide Ridge Region: 152,813,125 RWF available in 2016-2017 budget • Agricultural Mechanisation Programme: 668,885,072 RWF available in 2016-2017 budget • The Project for Valorization of Rurambi Irrigation Scheme In Bugesera District: 275,214,432 RWF available in 2016-2017 budget • Aquaculture and Fisheries Development Project: 266,106,020 RWF available in 2016-2017 budget • Priority Crop Intensification Project (including Fertilizer import): 12,683,583,973 RWF available in 2016-2017 budget • RAB Competitive Research Project: 3,152,970,465 RWF available in 2016-2017 budget • Development of market responsive plant varieties and seed systems to reduce Rwanda's dependency on seed importation project: 844,629,425 RWF available in 2016-2017 budget • Livestock Infrastructure Support Project (LISP): 782,012,040 RWF available in 2016-2017 budget • Improving Coffee Production, Productivity And Quality: 935,616,056 RWF available in 2016-2017 budget • Increasing Pyrethrum Production, Productivity And Quality: 14,276,783 RWF available in 2016-2017 budget • Tea Expansion Project: 2,880,987,025 RWF available in 2016-2017 budget • Commodity Chain Programme (Horticulture Intensification and Quality Management): 1,457,833,681 RWF available in 2016-2017 budget • Development Of New Agriculture Export Chain: 234,202,483 RWF available in 2016-2017 budget • Kigali Wholesales Market: 322,044,460 RWF available in 2016-2017 budget • Flower Park Construction: 331,196,025 RWF available in 2016-2017 budget • Sericulture project: 345,100,872 RWF available in 2016-2017 budget 		
Sustainable Land Use Management <i>The lead agency identified by the GGCRS is: Department of</i>	The ministries have estimated a need totalling RWF 16.230 billion for 2017/2018. Individual institutions have allocated RWF 3.882 billion (REMA), RWF 9.282 billion (Land	For 2016-2017, the total projected expenditure is RWF 23.414 billion. Institutions have estimated the following expenditure for each program: <ul style="list-style-type: none"> • MINIRENA: Environment and Natural Resource Policy Development and Coordination - RWF 13.923 billion • REMA: Environmental Management and Climate Change Resilience - RWF 4.448 billion 	Supporting agencies identified by the GGCRS include: Ministry of Natural Resources (MINIRENA), Land Commissions, Land Bureaux, Ministry of Agriculture and Animal Resources (MINAGRI), Ministry of	Decentralisation and Environment Management Project (DEMP) Phase II: USD 6 million (with MINIRENA/ REMA)

Lands and Mapping under the Rwanda Natural Resources Authority (RNRA)	Agency), RWF 0.581 billion (Forestry), and RWF 0.5 billion (FONERWA). It should be noted that MINIRENA did not submit any estimates.	<ul style="list-style-type: none"> • RNRA: Land Administration and Land Use Management - RWF 4.084 billion • MINALOC: Policy Development and Coordination - RWF 0.958 billion 	Local Government (MINALOC), Ministry of Health (MOH)	<p>Landscape Approach to Forest Restoration and Conservation (LAFREC) (with MINAGRI)</p> <p>Vulnerable ecosystem recovery programme towards climate change, which is being implemented by REMA. The total budget for this project is GBP 3 314 528.</p>
Integrated Water Resources Management <i>The lead agency identified by the GGCRS is: Rwanda Natural Resources Authority (RNRA)</i>	The ministries have estimated a need totalling RWF 16.230 billion for 2017/2018. Individual institutions have allocated RWF 3.882 billion (REMA), RWF 0.581 billion (METEO Rwanda), RWF 0.581 billion (Forestry), RWF 9.282 billion (Land Agency) and RWF 0.5 billion (FONERWA). It should be noted that MINIRENA did not submit any estimates.	<p>For 2016-2017, the total projected expenditure is RWF 46.939 billion. Institutions have estimated the following expenditure for each program:</p> <ul style="list-style-type: none"> • MINAGRI: Irrigation and Water Management - RWF 24.895 billion • MININFRA: Water and Sanitation Policy Development Monitoring and Evaluation - RWF 0.270 billion • MINIRENA: Environment and Natural Resource Policy Development and Coordination - RWF 13.923 billion • REMA: Environmental Management and Climate Change Resilience - RWF 4.448 billion • RNRA: Integrated Water Resource Management (Water Resource Monitoring) - RWF 1.366 billion • RNRA: Watershed Rehabilitation and Management - RWF 1.076 billion • MINALOC: Policy Development and Coordination - RWF 0.958 billion 	Supporting agencies identified by the GGCRS include: Ministry of Natural Resources (MINIRENA), Ministry of Infrastructure (MININFRA), Electricity, Water and Sanitation Authority (EWSA), Rwanda Environment Management Authority (REMA), Ministry of Local Government (MINALOC), Ministry of Health (MOH)	<p>Water for growth – Integrated Water Resources Management (IWRM) Programme: USD \$ 34.9 million (with MINIRENA)</p> <p>Nyandungu Urban Wetland Eco-Tourism Park. The total budget for this project is GBP 2 178 974, and the project is being implemented by the REMA.</p>
Disaster Management and Disease Prevention <i>The lead agencies identified by the GGCRS are: Ministry of Disaster Management and Refugee Affairs (MIDIMAR), Ministry of Local Government (MINALOC), Ministry of Health (MOH)</i>	The ministries have estimated a need totalling RWF 16.230 billion for 2017/2018. Individual institutions have allocated RWF 3.882 billion (REMA), RWF 0.581 billion (METEO Rwanda), RWF 9.282 billion (Land Agency), RWF 0.581 billion (Forestry) and RWF 0.5 billion (FONERWA). It should be noted that MINIRENA did not submit any estimates.	<p>For 2016-2017, the total projected expenditure is RWF 115.299 billion. Institutions have estimated the following expenditure for each program:</p> <ul style="list-style-type: none"> • MINIRENA: Environment and Natural Resource Policy Development and Coordination - RWF 13.923 billion • REMA: Environmental Management and Climate Change Resilience - RWF 4.448 billion • RNRA: Watershed Rehabilitation and Management - RWF 1.074 billion • RNRA: Terrestrial Ecosystems and Forest Resource Management - RWF 0.635 billion • METEO RWANDA: Meteorological Operations: Technology and Information Services - RWF 0.430 billion • MIDIMAR: Disaster Management – RWF 1.971 billion • MINISANTE (or MOH): <ul style="list-style-type: none"> ○ Health Sector Planning and Information - RWF 10.657 billion ○ Health Human Resources - RWF 13.071 billion ○ Financial and Geographical Health Accessibility - RWF 28.537 billion ○ Policy Development and Health Service Regulation - RWF 0.980 billion ○ Health Quality Improvement - RWF 27.112 billion ○ Disease Prevention and Control - RWF 11.498 billion <p>MINALOC: Policy Development and Coordination - RWF 0.958 billion</p>	Supporting agencies identified by the GGCRS include: Rwanda Meteorological Agency, District and Sub-District authorities, Ministry of Agriculture and Animal Resources (MINAGRI), Disaster Management Task Force	<p>Reducing Vulnerability to Climate Change by Establishing Early Warning and Disaster Preparedness Systems and Support for Integrated Watershed Management in Flood Prone Areas (LDCE): USD 15,913,000 (with REMA)</p> <p>Increasing the Capacity of Vulnerable Communities: USD 54.41 million (with Rwanda Energy Group Limited.)</p>

Resilient and Efficient Transport Systems <i>The Lead Agency identified by the GGCRS is MININFRA</i>	<p>For the 2017-2018 budget MININFRA proposed a budget of 302 billion RWF (304,242,897,354 Rwandan Francs) or US\$ 362.7 million for the Rwanda Transport Development Authority's Activities focused on environment, natural resources, and climate change.</p> <p>Similarly, it proposed 44 billion RWF (44,000,000,000 Rwandan Francs), i.e. US\$ 52 million for the Road Maintenance Fund's initiatives on environment, natural resources, and climate change.</p>	<ul style="list-style-type: none"> Developing Capacity for Climate Resilient Road Transport Infrastructure (AfDB and NDF): 21.43 million Euros Rwanda Feeder Road Development Project (World Bank): US \$ 45 million Rwanda Transport Sector Development Project (World Bank): 20.9 million <p>2016-2017 budget allocations on key, relevant projects (with some linkage to transport sector resilience and adaptation) – blend of agency allocation, Government of Rwanda counterpart funds, external loans, and external grants:</p> <ul style="list-style-type: none"> Kivu-Belt (24.5 Km) Lot 6 Rehabilitation-Rubengera-Gisiza Road: 9.1 billion RWF Urban Road Development For Secondary Cities: 3.5 billion RWF Detailed Study Of New Planned Roads: 2.3 billion RWF Upgrading Of Rubavu Urban Road: 4.5 billion RWF Base Butaro,Kidaho Road Upgrading Project (63 Km): 3.3 billion RWF Cyangugu-Ntendezi-Mwityazo Road (50km) Lot3: 5.5 billion RWF Dar Es Salaam-Isaka-Kigali/Keza-Musongati Railway: 359 million RWF Kigali Urban Road: 7.9 billion RWF Kivu-Belt (66 Km) Lot 4 &5 Rehabilitation- Mwityazo -Karongi Road: 202 million RWF Kivu-Belt (50 Km) Lot 7 Rehabilitation Rubavu-Gisiza Road: 15 billion RWF Cimerwa - Bugarama (10 Km) Road Upgrading: 191 million RWF Huye-Kitabi Road Rehabilitation(53km): 7.9 billion RWF Rehabilitation and Widening of Kagitumba-Kayonza-Susumo Road Project: 20 billion RWF 	<p>Supporting agencies identified by the GGCRS include the RTDA and Transport Operators. No other Ministry is identified.</p> <p>The Ministry of Agriculture (MINAGRI) and Ministry of Disaster Management and Refugee Affairs (MIDIMAR) and the Ministry of Natural Resources and Environment (MINIRENA) should be working in coordination with MININFRA on both increasing awareness of the science and technology related to climate resilience in transport, as well as on planning for climate resilient integrated multi-modal transport (urban and peri urban) that could strengthen resilience in other sectors.</p> <p>Critically, there should be strong coordination and joint planning even within MININFRA, such that RTDA should be working closely with RHA and the wider urban development team to ensure climate change resilience is planned for and implemented in a cohesive, cross-cutting manner in primary and secondary cities in Rwanda, including through resilient and efficient transport systems.</p>	<p>No information available to indicate that the transport sector (RTDA or RMF or other relevant transport divisions of MININFRA) are engaged in cross-cutting, multi-sectoral, inter-departmental projects focused on transport sector climate change resilience and adaptation.</p>
Low Carbon Urban Systems <i>The Lead Agency identified in the GGCRS is MININFRA</i>	<p>For the 2017-2018 budget MININFRA proposed a budget of 381 billion RWF (81,230,197,753 Rwandan Francs) or US\$ 96.3 million for the Rwanda Housing Authority's Activities focused on environment, natural resources, and climate change.</p> <p>Similarly, it proposed 136 billion RWF (136,960,951,204 Rwandan Francs), i.e. US\$ 162.4 million for the Water and Sanitation Corporation's</p>	<ul style="list-style-type: none"> Rwanda Urban Development Project (World Bank): US \$ 100 million Green Growth in Secondary Cities (GGGI): US \$ (unavailable) Consolidated Waste Management Project: US \$ 3.5 million <p>2016-2017 budget allocations on key, relevant projects (with some linkage to urban sector resilience and adaptation) – blend of agency allocation, Government of Rwanda counterpart funds, external loans, and external grants:</p> <ul style="list-style-type: none"> Rehabilitation of Parliament Building: 160 000 000 RWF Design and Construction of Public Buildings: 4 034 891 774 RWF 	<p>Supporting agencies identified by the GGCRS include Rwanda Housing Authority, Kigali City, real estate developers, and the private sector. No other Ministries are identified.</p> <p>The Ministry of Disaster Management and Refugee Affairs (MIDIMAR), the Ministry of Natural Resources and Environment (MINIRENA), and even the Ministry of Trade, Industry, and East African Affairs (MINEACOM) should be working in coordination with MININFRA on various elements of the GGCRS programme of action (urban planning, efficient buildings,</p>	<p>The Green Growth in Secondary Cities project initiated by GGGI has a strong cross-cutting and inter-sectoral character, as does the World Bank funded Rwanda Urban Development Project.</p> <p>However, there is scope for more cross-cutting, multi-sectoral, inter-departmental projects focused on urban sector climate change resilience and adaptation, especially those that are consciously planned and</p>

	initiatives on environment, natural resources, and climate change.	<ul style="list-style-type: none"> Plots acquired for 7,800 Affordable Housing Pilot Projects in the city of Kigali (Busanza, Ndera, Batsinda, Rugarama) serviced with basic infrastructure: 1 250 000 000 RWF Developing new IDP Model Villages in 24 Districts: 1 671 327 293 RWF Lake Victoria Water Supply and Sanitation Project Phase II (Lwatsan II): 1 120 561 961 RWF Water Sanitation and Hygiene: 580 000 000 RWF Rural Water Supply and Sanitation II (Prsc-Peamer): 3 405 470 671 RWF 	waste management, and integrated urban transport) and, more broadly, on building and strengthening climate change resilience in urban settings. Critically, there should be strong coordination and joint planning even within MININFRA, such that RHA and WASAC should be working closely with RTDA and the wider urban development team to ensure climate change resilience is planned for and implemented in a cohesive, cross-cutting manner in primary and secondary cities in Rwanda.	designed from the outset with adaptation linkages (synergies and trade-offs) in mind.
Climate Data and Projections <i>The lead agency identified by the GGCRS is: Rwanda Meteorological Agency (RMA)</i>	The ministries have estimated a need totalling RWF 16.230 billion for 2017/2018. Individual institutions have allocated RWF 3.882 billion (REMA), RWF 0.581 billion (METEO Rwanda) and RWF 0.5 billion (FONERWA). It should be noted that MINIRENA did not submit any estimates.	For 2016-2017, the total projected expenditure is RWF 19.760 billion. Institutions have estimated the following expenditure for each program: <ul style="list-style-type: none"> MINIRENA: Environment and Natural Resource Policy Development and Coordination - RWF 13.923 billion REMA: Environmental Management and Climate Change Resilience - RWF 4.448 billion METEO RWANDA: Meteorological Operations: Technology and Information Services - RWF 0.430 billion MINALOC: Policy Development and Coordination - RWF 0.958 billion 	Supporting agencies identified by the GGCRS include: Ministry of Disaster Management and Refugee Affairs (MIDIMAR), Ministry of Infrastructure (MININFRA), Ministry of Local Government (MINALOC), Ministry of Health (MOH), research organisations, District and Sub-District authorities	Strengthening Meteo Rwanda's Weather and Climate Services: RWF 1,645,740,200 (with MIDIMAR and RNRA) Climate mainstreaming pilot for the coffee and tea sectors. The total budget for this project is GBP 1 780 000, and the project is being implemented by MINAGRI.

The table above contains a very high-level overview of the eight program areas. To provide a more detailed overview of the status quo, tables for each of the eight program areas that were investigated are provided below.

Sustainable Intensification of Small Scale Farming

GGCRS Actions and Indicators (Adaptation) <i>(Established adaptation goal, indicator, and most recent target where available)</i>	Progress Made to Date on GGCRS Indicators <i>(Progress reported by GGCRS focal points and in official documentation)</i>	Major Initiatives Relevant to the GGCRS Objective (even if not directly linked to Action) <i>(Key programs responding to established goals)</i>	Assessment of Efforts to Date and Gaps <i>(Analysis of shortcomings in choice of action and/or indicator, and independent findings on actual performance)</i>	Key Areas of Climate Change Vulnerability Not Yet Strongly Addressed <i>(Areas of action to focus on moving forward)</i>
Action 1: Mainstreaming of agroecology (climate-smart agriculture)	Progress for indicator no. 1 (on-track): progress as of 2016, 65%	Buffet Project (modernize farming activities and improve livelihoods): 1,783,072 330 RWF available in 2016-2017 budget National Strategic Food Reserve Project: 5,498,925,000 RWF available in 2016-2017 budget	MINAGRI has scored well against the sector indicators (soil conservation and land husbandry, irrigation and water management, fertilized	For inclusive green growth in the Agriculture and Natural Resource sectors, under the "High Green Scenario" it estimated that

<ul style="list-style-type: none"> • Nitrogen-fixing by compost green manure, 2018 Target: 100% • % of farmers practicing crop rotation, 2018 Target: % of farmers practicing crop rotation • Mixed coffee systems, 2018 Target: Mixed coffee system 	<p>Progress for indicator no. 2 (on-track): progress as of 2016, 48 % farmers practice crop rotation (4,274 ha of drip irrigation installed, 95.1% of land rotated for Season 2017B)</p> <p>Progress for indicator no. 3 (on-watch): progress as of 2016, Mixed coffee (under research)</p>	<p>Gako Integrated Beef Project: 1,248,508,000 RWF available in 2016-2017 budget</p> <p>Climate Resilient Post-Harvest and Agribusiness Support Project (PASP): 5,389,538,137 RWF available in 2016-2017 budget</p> <p>One cow per poor family program (GIRINKA): 701,408,225 RWF available in 2016-2017 budget</p> <p>Post-harvest and Agribusiness Support Project (PASP): 200,000,000 RWF available in 2016-2017 budget</p> <p>Land Husbandry, Water Harvesting and Hillside Irrigation (LWH) project under the Rural Sector Support Program (RSSP): 6,507,160,932 RWF available in 2016-2017 budget</p>	<p>enriched compost, the development of new seed varieties, and infrastructure post-harvest management systems), but particularly low in EIA integration into subprograms, EMP annual reports submitted, and Strategic Environmental Assessment integration in policy, plans and programs.</p> <p>Activities tend to be reactive and not integrated into a planning and reporting system.</p> <p>Program set out to reduce dependency on inorganic fertilisers, when it seems to have done the opposite. Need to rethink more sustainable fertiliser practices.</p>	<p>the total investment required will be USD\$0.6 billion.</p> <p>Action areas:</p> <ul style="list-style-type: none"> • Need to make the shift from conventional/business as usual agriculture to conservation agriculture (work towards 30 innovation centres to support this) • Work on rehabilitation of progressive terraces and the planting of agroforestry trees (suggested 562,160 ha. Rehabilitation of progressive terraces 150,000,000 Agro forestry trees) • Look at moving away from marshland irrigation and working towards irrigation catered specifically to the farm's needs (suggested targets: 50,000 ha. Hill side irrigation, 20,000ha. Small scale irrigation, 30,000 ha. Rehabilitation of existing schemes, 15 Drip irrigation centers) • Focus on irrigation efficiency, linked with IWRM efforts • Look at integrated soil fertility management (suggested targets: 30 Production of organic fertilizers Units, 6 Construction of pilot comlizers, 30 Fertilizer Granules machines, 6 Fertilizer blending plant)
<p>Action 2: Resource Recovery and Reuse</p> <ul style="list-style-type: none"> • % of decentralized composting plants availed, 2018 Target: 75% of sites using quality compost • % of HH level using organic waste recycling, 2018 Target: 80% of HH using organic manure • Kigali landfill composting station in place, 2018 Target: Composting station established 	<p>Progress for indicator no. 1 (on-track): progress as of 2016, 62% sites using quality compost (146,652.8 MT of compost produced)</p> <p>Progress for indicator no. 2 (on-track): progress as of 2016, 70% HH using organic manure</p> <p>Progress for indicator no. 3 (on-watch): progress as of 2016, Looking for a PPP investor</p>	<p>Rssp: Rural Sector Support Project (Phase II): 4,750,000 000 RWF available in 2016-2017 budget</p> <p>Kwamp: Kirehe Watershed Management Project: 167,648,992 RWF available in 2016-2017 budget</p> <p>Rural Community Support (Koica Funded Project): 1,698,791,567 RWF available in 2016-2017 budget</p> <p>PAIRB: Projet D'Appui Aux Infrastructures Rurales De La Region Naturelle De Bugesera : 1465,618,229 RWF available in 2016-2017 budget</p> <p>Improving Market Access Program: 1,426,776,999 RWF available in 2016-2017 budget</p> <p>e-SOKO Project: 300,000,00 RWF available in 2016-2017 budget</p> <p>Project: Immediate Action Irrigation Project (Gfi): 7 569,365,059 available in 2016-2017 budget</p> <p>Small Scale Irrigation Technology(Ssit): 714,437,042 RWF available in 2016-2017 budget</p> <p>The Project for Rehabilitation of Irrigation Scheme in Bugesera District: 179,348,526 RWF available in 2016-2017 budget</p>		
<p>Action 3: Fertiliser Enriched Compost</p> <ul style="list-style-type: none"> • % of farms applying fertiliser rich compost, 2018 Target: 75% of 	<p>Progress for indicator: progress as of December 2015, Fertilizer Deep Placement (FDP) projects in rice, 70 cooperative demo</p>	<p>One Cup of Milk Per Child: 1,476,476,000 RWF available in 2016-2017 budget</p> <p>Livestock Intensification Project: 2,228,612,729 RWF available in 2016-2017 budget</p>		

chemical fertilizers	rice lots; Adoption on 202ha	Safeguarding National Genetic Resources for Food Security and Sustainable Development: 60,135,803 RWF available in 2016-2017 budget		
Action 4: Mainstreaming of “Push-Pull” Strategies (IPM) <ul style="list-style-type: none"> % of farms adopting “push-pull” strategies, 2018 Target: to be indicated by concerned sector 	Progress on indicator: 75 demo site plant clinics operational Push & Pull on-station research report available 197 plant extension doctors trained	Promotion of The Use of Lime to Increase Agricultural Productivity in Acidic Soils of Congo-Nile Divide Ridge Region: 152,813,125 RWF available in 2016-2017 budget Agricultural Mechanisation Programme: 668,885,072 RWF available in 2016-2017 budget The Project for Valorization of Rurambi Irrigation Scheme In Bugesera District: 275,214,432 RWF available in 2016-2017 budget Aquaculture and Fisheries Development Project: 266,106,020 RWF available in 2016-2017 budget Priority Crop Intensification Project (including Fertilizer import): 12,683,583,973 RWF available in 2016-2017 budget RAB Competitive Research Project: 3,152,970,465 RWF available in 2016-2017 budget Development of market responsive plant varieties and seed systems to reduce Rwanda's dependency on seed importation project: 844,629,425 RWF available in 2016-2017 budget Livestock Infrastructure Support Project (LISP): 782,012,040 RWF available in 2016-2017 budget		

Agricultural Diversity in Local and Export Markets

GGCRS Actions and Indicators (Adaptation) <i>(Established adaptation goal, indicator, and most recent target where available)</i>	Progress Made to Date on GGCRS Indicators <i>(Progress reported by GGCRS focal points and in official documentation)</i>	Major Initiatives Relevant to the GGCRS Objective (even if not directly linked to Action) <i>(Key programs responding to established goals)</i>	Assessment of Efforts to Date and Gaps <i>(Analysis of shortcomings in choice of action and/or indicator, and independent findings on actual performance)</i>	Key Areas of Climate Change Vulnerability Not Yet Strongly Addressed <i>(Areas of action to focus on moving forward)</i>
Action 1: Expansion of Crop Varieties <ul style="list-style-type: none"> Innovation centres for vanilla; apricot Macadamia, 2018 Target: Centre of Excellence at Mulindi operational Promotion of underutilized comfrey & 	Progress for indicator no. 1 (on-watch): progress as of 2016, Construction for facilities(greenhouses) is ongoing at Mulindi Progress for indicator no. 2 (on-track): progress as of 2016, Stress	Improving Coffee Production, Productivity And Quality: 935,616,056 RWF available in 2016-2017 budget Tea Expansion Project: 2,880,987,025 RWF available in 2016-2017 budget Commodity Chain Programme (Horticulture Intensification and Quality	Few women are involved in coffee and tea production activities and their value chains are highly gender divided—when indicators are not disaggregated by sector, appears that the entire country is doing well, when,	Activities in coffee/tea sector have not adequately taken into account current or future climate risks = major problems as new tea expansion zones are being planned in areas not be suitable under future climate change

<p>indigenous vegetables, 2018 Target: Stress tolerance varieties released: 6 rice; 6 wheat; 6 maize</p> <ul style="list-style-type: none"> % of farmers using improved seeds, 2018 Target: 70% farmers using improved seeds on consolidated land 	<p>tolerance demo trial varieties: 4 rice; 4 wheat; 8 maize</p> <p>Progress for indicator no. 3 (on-track): progress as of 2016, 41% farmers using improved seeds on consolidated land</p>	<p>Management): 1,457,833,681 RWF available in 2016-2017 budget</p> <p>Development of New Agriculture Export Chain: 234,202,483 RWF available in 2016-2017 budget</p> <p>Kigali Wholesales Market: 322,044,460 RWF available in 2016-2017 budget</p>	<p>in fact, men may be profiting more in the sector than women.</p> <p>Indicators do not take into account the risk associated with operating in an export-driven market. Could use risk transfer solutions, such as agricultural insurance and commodity price hedging.</p>	<p>Need to do a proper risk mapping, taking into account climate futures, of export crops before they are pushed.</p> <p>When introducing new export crops, farmers could be asked to give up their subsistence farming. Food security is critical in Rwanda, so if a switch is to export-driven markets, there needs to be a plan for how to feed the country.</p>
<p>Action 2: Expansion of Local Markets</p> <ul style="list-style-type: none"> % of covered market facilities, 2018 Target: 25% Kms of Road networks constructed or upgraded, 2018 Target: 2,550 km % Nutrition awareness public campaigns; prep of exotic & underutilized crops, 2018 Target: 70% male-headed HHs & 30 female-headed HH have kitchen gardens 	<p>Progress for indicator no. 1 (on-track): progress as of 2016, 21% of Agric production marketed</p> <p>Progress for indicator no. 2 (on-track): progress as of 2016, 1,178km</p> <p>Progress for indicator no. 3 (on-track): progress as of 2016, 76% households with kitchen gardens Farmers trained in Field Schools</p>	<p>Flower Park Construction: 331,196,025 RWF available in 2016-2017 budget</p> <p>Sericulture project: 345,100,872 RWF available in 2016-2017 budget</p> <p>National Strategic Food Reserve Project: 5,498,925,000 RWF available in 2016-2017 budget</p> <p>Project for Rural Income Through Exports (Price): 5,588,470,719 RWF available in 2016-2017 budget</p> <p>Export Targeted Modern Irrigated Agriculture Project(Eti): 460,000,000 RWF available in 2016-2017 budget</p>	<p>Driving toward the expansion of local markets, but the indicator only factors in the covered market facility. Crops must be processed if they are going to be stored, and local market indicator does not factor this into account.</p>	<p>Push to explore new markets can only be successful with serviceable road and efficient and equitable transport networks. Climate futures need to be taken into account when building these roads or floods will wash them away.</p>
<p>Action 3: Expansion of Manufactured Products</p> <ul style="list-style-type: none"> No of Cooperatives training in agro-processing technologies, 2018 Target: Training of 150 seri-culture farmers; 15 technicians; Fast track silk processing plant project Connection of MCC on Small-scale & off-grid energy plants, 2018 Target: 100 MCCs in all Provinces Decentralized village-based agricultural processing centres, 2018 Target: Setting community Processing Centers 	<p>Progress for indicator no. 1 (on-watch): progress as of 2016, 22 cooperative farmers trainings</p> <p>Progress for indicator no. 2 (on-watch): progress as of 2016, 96 MCCs connected to off-grid systems</p> <p>Progress for indicator no. 3 (on-watch): progress as of 2016, Ongoing: District master plans for developing a small unit decentralized</p>	<p>Feeder Roads Development Project + Sector Policy Support Program (SPSP) for Rural Feeder Roads: 7,574,094,131 RWF available in 2016-2017 budget</p>		<p>Droughts, pests and disease are major risks to coffee production,</p>

Action 4: Expansion of Exports <ul style="list-style-type: none"> % of agricultural production of niche export crops, 2018 Target:	Progress for indicator no. 1: progress as of December 2015, Export Tea 26,632MT			
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Integrated Water Resources Management

GGCRS Actions and Indicators (Adaptation) (Established adaptation goal, indicator, and most recent target where available)	Progress Made to Date on GGCRS Indicators (Progress reported by GGCRS focal points and in official documentation)	Major Initiatives Relevant to the GGCRS Objective (even if not directly linked to Action) (Key programs responding to established goals)	Assessment of Efforts to Date and Gaps (Analysis of shortcomings in choice of action and/or indicator, and independent findings on actual performance)	Key Areas of Climate Change Vulnerability Not Yet Strongly Addressed (Areas of action to focus on moving forward)
Action 1: Establish National Integrated Water Resource Management (IWRM) framework <ul style="list-style-type: none"> Indicator: IWRM Framework in place 	Water law under review; Ministerial order on water utilization revised; Inter-Ministerial Committee and Water Consultative Commission established; Several Regulations Strengthened, although framework not yet developed	<ul style="list-style-type: none"> Rwanda Integrated Water Security Programme (RIWSP): USD 8.95 million Water for growth – Integrated Water Resources Management (IWRM) Programme: USD \$ 34.9 million Lake Victoria Environmental Management Project (LVEMP) II Yanze Watershed Management Initiatives Decentralisation and Environment Management Project (DEMP) Phase II Rwanda's Rural Drinking Water Supply and Sanitation Sub-Program (PNEAR II) Muvumba Multipurpose Dam 	<p>As climate change continues to impact Rwanda, the spatial and seasonal variations in water resources will be increased. This variability of water resources means that long-term planning is critical for not only ensuring water security, but also promoting sustainable ecological flows as well as sufficient water for the economy of Rwanda.</p> <p>Accurate and relevant data is the cornerstone of effective water resource management. Rwanda is thus expanding its hydrological monitoring network, and ensuring that water balance studies are done for all its catchments. Although this has not been completed yet, significant progress has been made. Added to this, long-term climate projections and long-term changes in water resources are being investigated, and included in the catchment strategies that are currently being developed. To achieve this, equipment,</p>	<ul style="list-style-type: none"> Hydro-meteorological monitoring network and information sharing: Climate projections indicate that Rwanda will increasingly be exposed to droughts and floods. Therefore, increasing the existing hydro-meteorological monitoring network to all catchment of Rwanda will aid the government of Rwanda to monitor the changes in water resources. If coupled with climate projections, catchment managers will be able to plan for the future. In addition, this data should be easily available to other members of government and research institutions through information technology and other information sharing systems. Therefore, improving the collection, processing and sharing of water resource data should be a priority. Continue promoting catchment planning, IWRM and capacity building: Rwanda should continue promoting investments in IWRM and capacity building in the catchments that are not supported by the Water for Growth project. This will ensure that all the catchments in Rwanda are effectively managed and governed, based on the local context. In addition, IWRM will ensure that the water demands of the catchment are sustainably met, while also maintaining environmental flows. In addition, initiatives such as community water management committees or irrigation boards provide useful supporting governing structures for catchment management. Water intensive sectors need to that play an integral part in IWRM,
Action 2: District and Community Based Catchment Management under National IWRM Framework <ul style="list-style-type: none"> Indicator: community level task force on IWRM 	Establishment of Hydrographic basin committees in 30 Districts	<p>Below is a list of projects that are funded by FONERWA:</p> <ul style="list-style-type: none"> RNRA is implementing a three-year rain water harvesting (RWH) project . The total budget for this project is GBP 2 007 704. Integrated land, water resources and clean energy management toward poverty reduction project in Musanze District. The total budget for this project is 		
Action 3: Understanding the Water Balance: Monitoring, Modelling and Analysis,	Water-balance estimates available for all nine Level-1 catchments Water-balance studies for Muvumba,			

Information Management <ul style="list-style-type: none"> • Indicator: district and catchment water balances in place 	<p>Nyabarongo, Sebeya and Nyabugogo in progress</p> <p>Hydrological data network: river flows are being measures and monitored through 32 stations, but there is a need for further data acquisition.</p>	<p>GBP 624 300, and the project is being implemented by the Musanze District Authority.</p> <ul style="list-style-type: none"> • Akanyaru Watershed Protection Project. The total budget for this project is GBP 1 891 445, and the project is being implemented by the Gisagara District Authority. • Restoring Yanze River and watershed through scaling up agroforestry technologies for resilience to climate change. The total budget for this project is GBP 1 421 991, and the project is being implemented by Rulindo District Authority. • Congo Nile Ridge Foothills Integrated Environmental Management Project in Muhanga District. The total budget for this project is GBP 1 411 292, and the project is being implemented by the Muhanga District Authority and Caritas. • Sustainable Forest and Watershed Resources Management in Nyagatare District. The total budget for this project is GBP 562,903, and the project is being implemented by the Nyagatare District Authority. • Mwogo Watershed Protection. The total budget for this project is GBP 757 744, and the project is being implemented by the Nyamagabe District Authority. • Rain water harvesting and reuse in Kamonyi District. The total budget for this project is GBP 910 408, and the project is being implemented by the Kamonyi District Authority. • The Water Energy Food Security Nexus in the Akagera Watershed: The total budget for this project is GBP 411 968, and the project is being implemented by ARCOS. • Nyandungu Urban Wetland Eco-Tourism Park. The total budget for this project is GBP 2 178 974, and the project is being implemented by the REMA. 	<p>information technology and sufficient human resource capacity is required, which is not available. There is therefore key role for the private sector and/or funding agencies to play in achieving a complete hydrological monitoring network, and in ensuring that hydro-meteorological data is available.</p> <p>The policy and regulatory framework of Rwanda is generally strong. However, the successful implementation of these policies and laws is a concern. This is mainly due to the recently decentralised governance regime, the overlapping institutional mandate, as well as district and community based catchment management that still needs to be strengthened. This is particularly important as the competition for water resources in Rwanda will continue to increase, driven both by population growth and economic development. To continue providing water to all members of society, innovative water resource management is critical. This includes not only planning, but also engineering designs that serve multiple purpose (such as multi-purpose dams). Sustainable water supply hinders on sufficient blue and green water infrastructure, which is currently lacking – this refers to larger storage or upland small dams, as well as wetlands, respectively.</p>	<p>particularly considering the growing demands of a developing economy. It is therefore important to promote an integrate approach to water resources management and to promote coordination, which includes sectors such as energy, land-use, city planning and conservation. Catchment managers need to be adequately capacitated and should be equipped with sufficient resources to ensure successful implementation.</p> <ul style="list-style-type: none"> • Integrated approach to land use and water resource planning: As identified in the recently developed catchment plans, the existing planning by administrative and sectoral boundaries (PASB) will not prevent severe water shortages. However, integrated land use and water resource planning by catchment and city planners can achieve efficient and economic use of water resources. This approach combines principles of IWRM, water use efficiency and water productivity, and climate smart agriculture. In addition, growing cities as well as growing water demands needs to be adequately considered. • Promoting green infrastructure and multi-purpose dams: Promoting water storage in the eastern parts of Rwanda, which are often exposed to droughts, as well as for the rural population is key to building climate resilience. This includes expanding the pilot rainwater harvesting projects that have been implemented in the country, as well as promoting green infrastructure and multi-purpose dams. This will enable the country to improve water security in the country, and therefore achieve the objectives outlines in Vision 2020. • Promoting water security and poverty reduction: Opportunities exist for poverty reduction through the adoption of strategies that ensure that natural resources are utilized and managed productively in support of equitable and sustained national development.
Action 4: Water security through efficiency and conservation <ul style="list-style-type: none"> • Indicator: Water storage per capita 	<p>National Water Supply Policy in place (Dec 2016)</p> <p>2,3 m³ Per capita (23% of the 10 m³ target)</p>			

Integrated Approach to Sustainable Land Use Management

GGCRS Actions and Indicators (Adaptation) (Established adaptation goal, indicator, and most recent target where available)	Progress Made to Date on GGCRS Indicators (Progress reported by GGCRS focal points and in official documentation)	Major Initiatives Relevant to the GGCRS Objective (even if not directly linked to Action) (Key programs responding to established goals)	Assessment of Efforts to Date and Gaps (Analysis of shortcomings in choice of action and/or indicator, and independent findings on actual performance)	Key Areas of Climate Change Vulnerability Not Yet Strongly Addressed (Areas of action to focus on moving forward)
Action 1: Integrated Approach to Planning and Sustainable Land Use Management <ul style="list-style-type: none"> Indicator: Operational Inter-Ministerial Council and National Water Authority Updated Indicator: % land used according to Land Use Master Plan 	District Land Use Plans (DLUPs) approved 5 Districts audited for land use compliance	<ul style="list-style-type: none"> Land Tenure Regularization Support Programme (LTRSP): UK£31.41 million Decentralisation and Environment Management Project (DEMP) Phase II: USD 6 million MINIRENA/ REMA Climate Contribution by the Netherlands Embassy: EUR 47.227 million Early Implementation Projects EIPs under the Water for Growth Programme Landscape Approach to Forest Restoration and Conservation (LAFREC) Reducing Vulnerability to Climate Change by Establishing Early Warning and Disaster Preparedness Systems and Support for Integrated Watershed Management in Flood Prone Areas (LDCF) 	<p>The indicators provided in the GGCRIS were not aligned with the focus areas.</p> <p>In the future, Rwanda will be exposed increasing demand on its land resources. This will be exacerbated by climate related impacts, such as environmental degradation and deforestation. To mitigate against these impacts, the sector has implemented several initiatives in recent years that have strengthened climate resilience. In the policy environment, this includes high level policy and regulatory initiatives, as well as specific projects and programmes such the development of a national land policy and a land use master plan. Added to this, climate risk and vulnerability is a factor that's looked at during the land registration, land use planning and district identification process.</p>	<ul style="list-style-type: none"> Capacity building for using spatial information, GIS and ICT for land-use planning: As spatial information and ICT systems are integral to managing development challenges such as population growth, densely populated cities and urban sprawl, Rwanda needs to use it as a tool for sustainable land use management going forward. Investment should be targeted at building capacity in not only GIS, but also in using spatial information for planning purposes.
Action 2: Rwanda Spatial Data Infrastructure: National Land Information Management and Information Sharing and Access Policy <ul style="list-style-type: none"> Indicator: Organisational structure populated 	Land use portal online (2014) 179 COR-linked land survey tablets available	<ul style="list-style-type: none"> Land Husbandry, Water Harvesting and Hillside Irrigation (LWH) Project Sector Reform Contract (SRC) to promote climate-proof investments by farmers <p>Below is a list of projects that are funded by FONERWA:</p> <ul style="list-style-type: none"> Vulnerable ecosystem recovery programme towards climate change, which is being implemented by REMA. The total budget for this project is GBP 3 314 528. 	<p>Although Rwanda has fairly sophisticated GIS mapping</p>	<ul style="list-style-type: none"> Promoting integrated land use planning and land management: The government of Rwanda should promote the use of spatial planning instruments and approaches to integrated land use planning and land management. This will enable Rwanda to create spatial resilience by incorporating climate change considerations in land use planning. By using instruments such as a Spatial Data Guidelines or a Policies, cities will be able to use spatial information to integrate climate resilience in their planning processes. Added to this, once policies and/or guidelines have been implement, it is essential that successful

<ul style="list-style-type: none"> • Updated Indicator: Geospatial portal operational 		<ul style="list-style-type: none"> • Integrated land, water resources and clean energy management toward poverty reduction project in Musanze District. The total budget for this project is GBP 624 300, and the project is being implemented by the Musanze District Authority. • Sustainable biodiversity: mapping and domesticating the mycological riches of Rwanda's forests. The total budget for this project is GBP 36 332, and the project is being implemented by Kigali Farms. • Restoring Yanze River and watershed through scaling up agroforestry technologies for resilience to climate change. The total budget for this project is GBP 1,421,991, and the project is being implemented by Rulindo District Authority. • Congo Nile Ridge Foothills Integrated Environmental Management Project in Muhanga District. The total budget for this project is GBP 1,411,292, and the project is being implemented by the Muhanga District Authority and Caritas. • Environmental Protection in and around Refugee Camps. The total budget for this project is GBP 964 128, and the project is being implemented by MIDMAR. • Integrated project of Ecosystem rehabilitation and green Village Promotion. The total budget for this project is GBP 645 360, and the project is being implemented by the Nyamasheke District Authority. • Sustainable Forest and Watershed Resources Management in Nyagatare District. The total budget for this project is GBP 562,903, and the project is being implemented by the Nyagatare District Authority. • Mwogo Watershed Protection. The total budget for this project is GBP 757,744, and the project is being implemented by the Nyamagabe District Authority. • Nyandungu Urban Wetland Eco-Tourism Park. The total budget for this project is GBP 2,178,974, and the project is being implemented by the REMA. 	<p>facilities and ICT infrastructure, it appears that these are not used extensively for planning purposed by the various government agencies. Therefore, although various activities identified under this program area have been implemented, they have not contributed to the building of climate resilience. This is mainly due to limited technical capacity to use the GIS software, and to integrate it in planning processes, as well as limited skills on how to integrate the available tools in the planning process.</p>	<p>implementation is monitored and evaluated, and that approaches (and resources) for compliance enforcement are put in place.</p> <ul style="list-style-type: none"> • Incorporating the impacts of climate change on natural resources during land use planning: Climate resilience, as well as the connectivity between the natural resources such as land and energy, need to be the driving force when developing land use plans. This requires that land-use management is viewed in a holistic manner, instead of a purely cadastral process. For instance, there is a need for more integrated catchment management and restoration, that looks not only at present land use in the area but looks at spatial connectivity issues and future projections in land use, population and economic growth. Another example is promoting reforestation and terracing of hilly areas, which not only serves as an ecosystem function, but also prevents erosion and landslides.
<p>Action 3: GIS/ICT Innovation throughout Government, Districts and Implementing Agencies</p> <ul style="list-style-type: none"> • Indicator: Completed Water Balance at national and district levels • Updated Indicator: Land Admin Info Systems operational 	<p>Land Admin. Info. System (LAIS) accessible for all 30 district staff and financial institutions for mortgage registration Irembo e-land sale and transfer and subdivision service available Land Mobile App available</p>			

Efficient and Resilient Transport Systems

GGCRS Actions and Indicators (Adaptation) <i>(Established adaptation goal, indicator, and most recent target where available)</i>	Progress Made to Date on GGCRS Indicators <i>(Progress reported by GGCRS focal points and in official documentation)</i>	Major Initiatives Relevant to the GGCRS Objective (even if not directly linked to Action) <i>(Key programs responding to established goals)</i>	Assessment of Efforts to Date and Gaps <i>(Analysis of shortcomings in choice of action and/or indicator, and independent findings on actual performance)</i>	Key Areas of Climate Change Vulnerability Not Yet Strongly Addressed <i>(Areas of action to focus on moving forward)</i>
Action: Awareness of New Technology	A study has been commissioned to explore the possibility of a Bus	Government of Rwanda's ongoing effort through MININFRA on transport policy development monitoring and evaluation	Apparent lack of studies and research in the transport sector in Rwanda that builds a knowledge-base about climate change	<ul style="list-style-type: none"> • Technical capacity within the transport sector to

<ul style="list-style-type: none"> Indicator: Action flags (milestones and action items) from studies and research <p>Not captured or reflected in EDPRS II</p>	<p>Rapid Transit (BRT) system; The Dar-Kigali railway line has been completed, and a study of the Kampala-Kigali line is nearing completion;</p>	<p>Introduction of Environmental Impact Assessments for transport sector projects (21 projects conducted EIAs in 2015-2017).</p>	<p>impacts and adaptation responses by the transport sector.</p> <p>The GGCRS indicator could be refined and strengthened to ensure a focus on awareness of new science and technology that pertains to climate change resilience in the transport sector.</p>	<p>integrate climate change adaptation considerations into transport sector planning, design, and operations.</p> <ul style="list-style-type: none"> Coordinated mechanisms between transport sector and other key interlinked sectors (such as agriculture, and disaster risk reduction) to identify ways in which transport systems and infrastructure could strengthen climate change resilience in other sectors, and how transport can reduce climate change risks in other sectors.
<p>Action: Investment in Multimodal Transport Infrastructure</p> <ul style="list-style-type: none"> Indicator: Increase in % of kilometres per transport mode <p>Reflected in EDPRS II: Target for MININFRA: Promote Integrated Multi Modal Urban Transport (indicator: number of kilometres of integrated roads created)</p>	<p>Construction of the new airport at Bugesera has started; Studies for ports at Rubavu, Rusizi, and Karongi have been completed and Rubavu port construction procurement processes have begun; Non Motorized Transport infrastructure (sidewalks) have been constructed and continue to be extended.</p>	<p>Developing Capacity for Climate Resilient Road Transport Infrastructure (AfDB, NDF)</p> <p>Rwanda Feeder Road Development Project (World Bank)</p> <p>Rwanda Transport Sector Development Project (World Bank)</p> <p>Government of Rwanda's ongoing transport infrastructure development and maintenance programme</p> <p>Upcoming: proposed BRT in Kigali</p>	<p>Rwanda's emphasis has largely been on the roads sector and less so historically on other modes of transport such as rail, inland waterways, and air.</p> <p>Even within the roads sector, the focus has been on road construction and maintenance, with relatively less emphasis on non-motorized transport and integrated public transport systems.</p> <p>What's also needs to be strengthened is a deliberate and explicit integration of climate change adaptation planning, to factor future climate impacts into system design and operations.</p>	

Low Carbon Urban Systems

GGCRS Actions and Indicators (Adaptation) <i>(Established adaptation goal, indicator, and most recent target where available)</i>	Progress Made to Date on GGCRS Indicators <i>(Progress reported by GGCRS focal points and in official documentation)</i>	Major Initiatives Relevant to the GGCRS Objective (even if not directly linked to Action) <i>(Key programs responding to established goals)</i>	Assessment of Efforts to Date and Gaps <i>(Analysis of shortcomings in choice of action and/or indicator, and independent findings on actual performance)</i>	Key Areas of Climate Change Vulnerability Not Yet Strongly Addressed <i>(Areas of action to focus on moving forward)</i>
<p>Action: Integrated Multi Modal Urban Transport</p> <ul style="list-style-type: none"> Indicator: Improvement in bus transport efficiency <p>Reflected in EDPRS II: Target for MININFRA: Promote Integrated Multi Modal Urban Transport (indicator: number of kilometres of integrated roads created)</p>	<p>Bus transport efficiency has improved; 54 kilometres of new road are being constructed in and around Kigali to reduce congestion; A feasibility study is being conducted to evaluate the Kigali ring road project; 148 large buses have been introduced</p>	<p>Developing Capacity for Climate Resilient Road Transport Infrastructure (AfDB, NDF)</p> <p>Rwanda Feeder Road Development Project (World Bank)</p> <p>Rwanda Transport Sector Development Project (World Bank)</p> <p>Government of Rwanda's ongoing transport infrastructure development and maintenance programme</p>	<p>Rwanda's emphasis has largely been on the roads sector and less so historically on other modes of transport such as rail, inland waterways, and air.</p> <p>Even within the roads sector, the focus has been on road construction and maintenance, with relatively less emphasis on non-motorized transport and integrated public transport systems.</p> <p>What's also needs to be strengthened is a deliberate and explicit integration of climate change adaptation planning, to factor future climate impacts into system design and operations.</p>	<ul style="list-style-type: none"> Technical capacity within the urban planning sector to integrate climate change adaptation considerations into urban sector planning (especially spatial planning), design, and management. More training on climate change and decision-support tools and guidance are needed. Urban drainage and storm-water systems to cope with current climate variability are inadequate. Investment in modern, adaptive, investment in modern, adaptive,

<p>Action: Urban Planning</p> <ul style="list-style-type: none"> Indicator: Increase in percentage of population in urban areas <p>Reflected in EDPRS II: Targets for MININFRA: Promote Green Urbanization; Develop Standards for Basic Housing (indicator: number of EIA studies conducted for administrative complexes); Improve Efficiency in Management of Government Assets and Work Space (indicator: number of central government buildings inspected for fire safety, resource efficiency, and environmental management plans)</p>	<p>18% population already lives in urban areas;</p> <p>National urbanisation and housing policies are in place;</p> <p>The country has adopted a Green City Framework;</p>	<p>Rwanda Urban Development Project (World Bank)</p> <p>Green Growth in Rwandan Secondary Cities (GGGI)</p>	<p>The GGCRS indicator chosen focuses on bringing more people into cities and urban environments. However, this is not an indicator that allows for assessment of actual adaptive capacity and climate resilience.</p> <p>Even the indicators chosen for closely linked EDPRS targets (outcomes) do not have a close nexus to climate change adaptive capacity, and are more generic in their support of overall environmental sustainability and environmental safety.</p> <p>Climate change considerations have not yet been treated as primary factors or drivers of any major cities-focused projects. National or city planners have not been trained adequately to respond to future climate change scenarios in order to proactively modify urban design or construction to be more climate-robust.</p> <p>Municipal infrastructure is not designed to withstand future climate change shocks and stresses. Climate-readiness programmes have not yet been integrated into municipal planning and governance.</p>	<p>and climate-robust drainage and storm-water management systems could enhance adaptive capacity and reduce vulnerability markedly.</p> <ul style="list-style-type: none"> Municipal service delivery, particularly in terms of water supply for domestic and commercial use in cities, needs to be more climate robust and resilient. Water supply should be, in fact, a key action area for the GGCRS but it is conspicuous by its absence in the strategy's actions and indicators. Investment to assure adequate water storage and supply for Rwanda's growing urban populations, despite climatic fluctuations, will considerably enhance economic security and overall climate change resilience. Coordination mechanisms should be strengthened between the urban sector and other key interlinked sectors (such as transport, water, integrated land use planning, and disaster risk reduction) to identify ways in which urban systems and infrastructure could be made more climate change resilient, and how resilience efforts in cities can be linked to other sectors to enhance economy-wide, cross-cutting climate resilience. There is need for improved waste management and sanitation in unplanned settlements in Kigali and secondary cities. Resettlement of households away from environmentally risky locations to more stable and sustainable regions.
<p>Action: Utilisation of Waste Stream</p> <ul style="list-style-type: none"> Indicator: Establishment of centralised waste treatment infrastructure <p>Reflected in EDPRS II: Target for MININFRA: Increased Access to Basic Sanitation Services (indicator: number of landfills constructed)</p>	<p>Feasibility studies for centralised waste treatment infrastructure have been conducted;</p> <p>The EIA for the new facility proposed by the UNDP project is under review and awaiting approval between REMA and WASAC;</p> <p>Fund negotiation has begun between the European Investment Bank and the Government of Rwanda for support of the waste management facility.</p>	<p>Consolidated Waste Management Project (UNDP)</p>	<p>There appear to be significant delays on implementation of the landfill project that was designed and recommended by UNDP, and for which an EIA was conducted. In May 2016, the Office of the Auditor General of State Finances in Rwanda noted with concern that the recommended project design had not yet been implemented.</p> <p>While demographic trends have been taken into account in planning for landfills in Rwanda, it is unclear if climate change trends have been factored into possible siting and risks (flooding, fire hazards etc.)</p>	

Disaster Management and Disease Prevention

GGCRS Actions and Indicators (Adaptation) (Established adaptation goal, indicator, and most recent target where available)	Progress Made to Date on GGCRS Indicators (Progress reported by GGCRS focal points and in official documentation)	Major Initiatives Relevant to the GGCRS Objective (even if not directly linked to Action) (Key programs responding to established goals)	Assessment of Efforts to Date and Gaps (Analysis of shortcomings in choice of action and/or indicator, and independent findings on actual performance)	Key Areas of Climate Change Vulnerability Not Yet Strongly Addressed (Areas of action to focus on moving forward)
Action 1: Risk Assessment and Vulnerability Mapping <ul style="list-style-type: none"> Indicator: Number of produced risk and vulnerability maps/reports 	Rwanda Risk Atlas 2015; Disaster Risk and Vulnerability reports (Musanze, Burera, Nyabihu and Rubavu); Lightning vulnerability sites report 2013; Hazard prone areas mapped and gazetted;	<ul style="list-style-type: none"> Reducing Vulnerability to Climate Change by Establishing Early Warning and Disaster Preparedness Systems and Support for Integrated Watershed Management in Flood Prone Areas (LDCF): USD 15,913,000 Increasing the Capacity of Vulnerable Communities: USD 54.41 million 	<p>Rwanda is particularly vulnerable to extreme events, such as floods and droughts. Therefore, to recognise and manage these risks, Rwanda has developed several disaster management plans, contingency plans for various hazards, as well as a national risk atlas. In terms of the risk atlas, although it was a good starting point, the completeness of the spatial data and hazards profiles are a major concern.</p> <p>Successful planning and implementation hinges on accurate and timely data on disasters, as well as climate projections (that specify climate related hazards). Plans for disaster reduction and management are in place, but without adequate capacity, resources and technology in place, they cannot be implemented adequately. Added to this, the implementation of policies and plans is a major concern. Several pilot programs have been implemented in Rwanda with the aim of fostering the implementation of strategies and plans, however, there is room for improvement. For example, projects focused on Early Warning Systems (EWS) need to be expanded to reach a wider population, particularly those located in high-risk areas. In addition, projects focused on health and disease prevention, particularly due to climate impacts, seem to be a major gap for the governing agencies.</p> <p>The mainstreaming of disaster risk reduction into other sectors (such as water, infrastructure, city planning) is a priority for the Government of Rwanda. As a result, collaboration between various has been improving, and personnel from different</p>	<ul style="list-style-type: none"> Promoting risk and hazard information understanding and communication: Effective disaster risk assessment and management hinges on accurate and timely data. Therefore, firstly, an operational and complete hydro-meteorological network, which is automated, is key for understanding current and future risks and for managing them effectively – this also hinders on effective collaboration with Meteo Rwanda. Secondly, disaster management officials should have the required human capacity, resources and technical capacity to be able to understand information and the associated sector based impacts. Thirdly, information should also be shared (and tailored) to all relevant audience in a timely manner. Ensuring completeness and accurateness of the Risk Atlas at a high resolution: Effective management of disasters requires an understanding of hazards. Therefore, the Risk Atlas needs to be updated, and should cover all areas of Rwanda, at a high level and local lens, and high-risk locations should be complete and accurate. In addition, the methodology that is used for the risk atlas should be updated and improved particularly focusing on previously identified risks, and all risk drivers should be included in the analysis. Promoting integrated approaches to disaster risk and disease management: Health and disease management,
Action 2: Integrated Early-Warning System <ul style="list-style-type: none"> Indicator: % coverage by early warning system 	Disaster portal online; Disaster comm. system and EWS merged; EWS implemented for 57% of disasters; EWS protocols; EWS training (Rubavu, Nyabihu, Ngororero, Rutsiro) Fire safety inspection and training on-going	<ul style="list-style-type: none"> EWS Systems for Heavy Rainfall in Four Districts National Integrated Disease Surveillance and Response “eIDSR” Strengthen Human Security by Enhancing Resilience to Natural Disasters and Climate-Related Threats in Ngororero District 		
Action 3: Disaster Mitigation, Preparedness and Response Planning <ul style="list-style-type: none"> Indicator: % District trained in emergency management; % District with disaster management plans 	100% Districts trained on emergency plans 70% Districts have DDMP; 60% Districts have contingency plans National Contingency Plans available (floods, landslides, earthquakes, epidemics, droughts) Guidelines for mainstreaming DRM available;	<ul style="list-style-type: none"> Landscape Approach to Forest Restoration and Conservation Project (LAFREC) - EWS <p>Below is a list of projects that are funded by FONERWA:</p> <ul style="list-style-type: none"> Supporting sustainable, climate resilient livelihoods for poor farming households in Bugesera. The total budget for this project is GBP 379 524, and the project is being implemented 		

Action 4: Community-Based Disaster Risk Reduction <ul style="list-style-type: none"> • Indicator: Number local government units constituted 	85% households relocated from high-risk zones; 11 DRR groups established; 2 Persons per Sector trained as fast responders; DRM awareness carried out in media, Umuganda; DRR Secondary School course introduced	by AVVAIS and the Bugesera District Authority. <ul style="list-style-type: none"> • The Water Energy Food Security Nexus in the Akagera Watershed: Linking evidence collection, local action and stakeholder dialogue for sustainable development and climate change resilience. The total budget for this project is GBP 411 968, and the project is being implemented by ARCOS. 	sectors are being trained on DRR. For example, an initiative focused on the relocation of people from high -risk zones shows successful collaboration between DRR, land-use and the spatial planning departments. In addition, the LCDF project required collaboration between several sectors, such as water, spatial planning, health and forestry. It should also be noted, however, that the collaboration between the ministries of health and disaster management at an institutional level, focused on health and disease prevention, is a major concern.	particularly due to climate impacts, needs to be a focus area for the Government of Rwanda. This requires continued collaboration between different stakeholders, as well as sufficient financing. Studies and strategies that explore the nature of climate related diseases in Rwanda, particularly at a local level, and also promote a more integrated approach to health and disease management, need to be promoted. In addition, it is important that the implemented strategies/projects (such as EWS) are effectively monitored and evaluated.
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Climate Data and Projections

GGCRS Actions and Indicators (Adaptation) <i>(Established adaptation goal, indicator, and most recent target where available)</i>	Progress Made to Date on GGCRS Indicators <i>(Progress reported by GGCRS focal points and in official documentation)</i>	Major Initiatives Relevant to the GGCRS Objective (even if not directly linked to Action) <i>(Key programs responding to established goals)</i>	Assessment of Efforts to Date and Gaps <i>(Analysis of shortcomings in choice of action and/or indicator, and independent findings on actual performance)</i>	Key Areas of Climate Change Vulnerability Not Yet Strongly Addressed <i>(Areas of action to focus on moving forward)</i>
Action 1: Enhancing Climate Data Collection <ul style="list-style-type: none"> • Indicator: % weather stations operational; % data digitized 	85% of all stations operational; 40% data in digital format	<ul style="list-style-type: none"> • Capacity Building on Climate Prediction Analysis Systems at Meteo Rwanda: USD 150 000 • Strengthening Meteo Rwanda's Weather and Climate Services: RWF 1,645,740,200 • Reducing Vulnerability to Climate Change by Establishing Early Warning and Disaster Preparedness Systems and Support for Integrated Watershed Management in Flood Prone Areas (LDCF) • Enhancing National Climate Services 	The quantity and quality of observed data for Rwanda limits the capacity to draw firm conclusions about its climate trajectory over the next decades, especially at fine spatial scales relevant for socio-economic needs. Complete and reliable records are lacking for all variables, including such fundamental measures as mean temperature and precipitation. The ENATCS project has significantly filled the data gaps. This is a major barrier to building resilience in Rwanda, especially because high topographic variation creates a need for finer scale climate information to permit the planning of adaptation responses. Considering that Rwanda is highly exposed to climate variability, such as droughts and floods, the absence of climate data hinders the ability to predict climate impacts with required reliability at appropriate spatial scales.	<ul style="list-style-type: none"> • Developing accurate and high-level climate data and projections: Robust observed climate data and climate projections for Rwanda are crucial to understanding current and future impacts of climate change and developing scenarios to assess potential adaptation strategies for Rwanda. A focus on better understanding multi-year and decadal scale variability, as well as the uncertainty associated with climate projections, would be of great value for adaptation planning. Therefore, expansion of the climate data network needs to be promoted, at a national and local level. This includes both climate data and hydrological data. These data should also be made available to different sectors of society. • Building capacity for analysing climate data and developing climate projections: Building capacity in Meteo Rwanda and MIDIMAR is crucial for analyzing data, as well as developing climate projections. This analysis should not only draw on reports that have been published at a continental level, but should also be based on raw data that is collected from the meteorological and hydrological stations in the country.
Action 2: Production of Climate Change Projections for Rwanda <ul style="list-style-type: none"> • Indicator: quarterly projections reports for Rwanda 	Key stakeholders have been identified for climate projections team and reports; Climate analysis software available			
Action 3: Coordinating	2 modelling staff dedicated to climate modelling;			

Capacity Building in Climate Science <ul style="list-style-type: none"> • Indicator: Completed needs assessment; Programmes at Univ of Rwanda 	4 high-capacity computers available MoU signed and meetings have been held to identify areas of intervention	(ENACTS) program of Meteo Rwanda <ul style="list-style-type: none"> • Climate Services for Agriculture Project <p>Below is a list of projects that are funded by FONERWA:</p> <ul style="list-style-type: none"> • Climate mainstreaming pilot for the coffee and tea sectors. The total budget for this project is GBP 1 780 000, and the project is being implemented by MINAGRI. • A capacity building project that aims to train staff (around 7 are currently doing MSc studies in Nairobi, which has the short-term effect of limiting capacity within Meteo Rwanda). However, it appears that the progress is significantly delayed. 	<p>An immediate benefit would also flow from a better ability to project multi-year and decadal patterns for above- and below-average rainfall. Over the next few decades, variability at these time scales are likely to exert important impacts on socio-economic activity in Rwanda, and an improved ability to anticipate this variability would permit policy makers and planners to provide the appropriate guidance to stakeholders.</p> <p>In terms of technical capacity, Rwanda is recognizing the needs to build capacity within their institutions. In addition, working groups have also been developed, in order to promote the sharing of information. However, it is evident that a lot of progress still needs to be made to ensure that Rwanda is able to use accurate climate and hydrological information to be able to build climate resilience.</p>	<p>Increasing the capacity for high-resolution climate maps that can account for spatial variation due to topographic effects is a high priority, together with better capacity in projecting multi-year and decadal scale rainfall and hydrological variability.</p> <ul style="list-style-type: none"> • Improving the sharing of climate information to targeted audiences: Climate information should be shared in a language that is targeted to the audience. Therefore, as much as Rwanda needs good climate data, it also needs to be able to translate the data and ensure that it is relevant to different sectors and/or decision makers across Rwanda. This will enable sectors to be able to understand climate related risks and vulnerabilities, which will enable them to respond appropriately. An effectively implemented National Framework for Climate Services is integral to ensuring that this is achieved. The CCKD is intended to improve climate data and projections and translate them into response and/or policy options for decision makers, and to ultimately guide the country onto a climate resilient development path. Therefore, ensuring that the centre is operational and functional should be a key priority.
Action 4: Enhance the Use of Climate Data in Disease Prevention and Mitigation Programmes <ul style="list-style-type: none"> • Indicator: Climate disease research reports 	Working with MoH to identify areas of intervention; Climate Change - Crop diseases research ongoing			

APPENDIX F Sector Specific Policies and the Linkages to Climate and Climate Change

This appendix contains a sector-level overview of the policies and legislation that have climate implications.

F 1. AGRICULTURE

The Government of Rwanda (GoR) has made agricultural development a priority and allocated significant resources to improving productivity, expanding the livestock sector, promoting sustainable land management, and developing supply chains and value-added activities. Agricultural development features prominently in Rwanda's Vision 2020, National Agricultural Policy (NAP), National Extension Strategy (NAES), the Economic Development and Poverty Reduction Strategy (EDPRS) and MINAGRI's Strategic Plan for the Transformation of Agriculture in Rwanda – Phase II (SPAT-I, II, and III), among others.

The Government of Rwanda has 16 Sector Working Groups (SWGs), technical working forums through which the GoR and stakeholders meet to discuss sector and cross-sector planning. The Agriculture SWG includes key development partners such as the EU, WB, DFID, FAO, IFAD, the United States Agency for International Development (USAID), the Japanese International Cooperation Agency (JICA) and the World Food Program.

National Agencies Supporting the Agricultural Sector

Ministry of Agriculture and Animal Resources (MINAGRI): MINAGRI looks to increase animal production, modernize farming, reduce poverty, ensure food security and have surplus for the market. They are responsible for initiating, developing and managing all suitable programs of transformation and modernization of agriculture and livestock. In particular, they seek to transform agriculture in Rwanda from subsistence farming to a productive, high value, market-oriented farming, while keeping it environmentally friendly.

Ministry of Infrastructure (MININFRA): MININFRA's focus is the sustainable development of infrastructure with a mind-set for economic growth. Their role with regard to agriculture looks at transforming agricultural infrastructure to create a more conducive enabling environment for investors, agriculture development and market access.

Ministry of Environment of Rwanda (MOE): The goal of MoE is to provide solutions to the environmental and resource challenges faced, including the imbalance between population and natural resources that has serious impacts on sectors such as agriculture, energy, infrastructure, land, water resources and forestry, in achieving national long-term sustainable development. MOE is also the Green Climate Fund national

entity, specifically a public sector ministry, which is responsible for environment, climate change management at the local and national levels.

Ministry of Local Government (MINALOC): The Ministry of Local Government ensures the coordination of good governance and high quality territorial administration programs that promote economic, social and political development throughout the nation. The recent decentralization process has placed agricultural extension activities with MINALOC, aiming at addressing efficiently specific needs of farm households within each district.

Ministry of Trade Industry & East African Affairs (MINEACOM): MINEACOM centres its involvement on accelerating economic growth in the country and harnessing the power of the private sector. Within the agricultural sector, MINEACOM looks to support private sector players and their contribution to the national economy and the transformation of the agricultural sector. In particular, they are involved in the implementation of special economic zones and help to facilitate laws and regulations that improve the business environment.

Rwanda Environment Management Authority (REMA): REMA works to promote and ensure the protection of the environment and sustainable management of natural resources.

The Rwanda Agriculture and Animal Resources Board (RAB) was established in 2010 from a merger of the Rwanda Agricultural Research Institute (ISAR), Rural Agricultural Development Authority (RADA), and the Rwanda Animal Resources Development Authority (RARDA). Its mission includes the development of agriculture and animal resources through research, agricultural and animal resources extension in order to increase agricultural and animal productivity as well as their derivatives.

National Agriculture Export Development Board (NAEB): NAEB assists with all agricultural export development and marketing. In particular, NAEB works at creating a globally competitive coffee, tea, fruits, vegetable and flower industry so that Rwanda can increase macro-economic stability and reduce poverty. NAEB also provides input to the policy and strategy formation in export-specific sectors, and assists ministries with the monitoring of export products.

Districts: The district role has been increasing over the past years with the decentralization agenda, and likely to increase in the next years.

Municipal Authorities, Private Sector, and NGOs.

In Vision 2020, Rwanda sets the goal of transforming to a middle-income country by the year 2020 and shifting from an agricultural-based economy to a knowledge-based, service-oriented economy. Vision 2020 includes the modernisation of agriculture and animal husbandry as one of its six pillars for building a diversified, integrated, competitive and dynamic economy.¹⁷⁷

In the Second Economic Development and Poverty Reduction Strategy (EDPRS 2), the high-level targets set for the agricultural sector are:

- agriculture growth of 8.5% per annum;
- the share of agriculture gross domestic product (GDP) reduced to 25%; and
- the number of households with household food security increased to 90%.

The Strategic Vision for the Transformation of Rwandan Agriculture from 2013-2017 (PSTA III), a MINAGRI supported plan, preceded by PSTA I and PSTA II, aims to intensify and commercialise agriculture, setting the target for an annual agricultural growth of 8.5 %, annual export growth of 28 % and 40 % of land under modern agriculture by 2017/2018. At its core, PSTA III seeks to increase rural household incomes and to provide incomes from diversified sources and increase food security.

PSTA 3 is a five-year program covering the period 2013-14 to 2017-18. Its strategic objectives are to: (i) intensify, commercialize, and transform the Rwandan agriculture sector to enhance food security and nutrition, reduce poverty, and drive rapid economic growth; and (ii) accelerate sustainable increases and an expanded private sector role in production, processing, and value addition and commercialization of staple crops, export commodities, and livestock products. The PSTA 3 comprises four strategic program areas and 24 component subprograms (SPs). The strategic program areas and their outcomes are: agriculture and animal resource intensification; research, technology transfer, and organization of farmers; private sector-driven value chain development and expanded investments; and institutional results-focused development and agricultural cross-cutting issues.

The National Agricultural Policy (NAP), focuses on turning agriculture into a professional, profitable, and non-seasonal income generating project. The 2004 agriculture policy was revised in 2016 in order to optimise production in the agriculture and livestock sectors, while ensuring the sustainable utilisation of natural resources .¹⁷⁸ The policy underscores, among other topics, the need for effective management of water resources in both the domestic and commercial crop contexts, access to affordable seeds and markets, increased use of ICT in agriculture, agriculture and livestock insurance, and the adoption of crop and livestock varieties resistant to climate change. The National Extension Strategy (NAES) emphasises the importance of a good agricultural knowledge information system, and technology transfer.

F 2. INTEGRATED WATER RESOURCES MANAGEMENT AND PLANNING

According to **Vision 2020**, the country is endowed with reserves that could provide enough water for both consumption and agricultural purposes. These include substantial rainfall (between 900 & 1500 mm per year) and the abundance of lakes, streams and watercourses. Therefore, Rwanda will continue to invest in

protection and efficient management of water resources, as well as water infrastructure development to ensure that by 2020 all Rwandans have access to clean water.

This is supported by the **Economic Development and Poverty Reduction Strategy 2 (2013 – 2018)**, which prioritises connecting rural communities to economic opportunity through improved infrastructure, such as full coverage of quality water and sanitation so as to increase access to safe drinking water and sanitation.

The **Water Law of 2008** puts in place regulations for the use, conservation, protection and management of water resources. The Water Law provides a clear framework for the principles of integrated water resources management, including the principle of users' associations for the administrative management of water.

The **Water Resources Management Sub-Sector Strategic Plan (2011 – 2015)** states that in the next 5 years, Rwanda's main WRM challenge will be meeting the increasing multiple water demand for internal use and transboundary needs, with limited capacity and in the face of declining water availability due to ecosystems degradation, pollution and climate change. Therefore, one of the critical actions identified in the strategy is to develop an and implement an effective framework for water-related disaster management, climate change mitigation and adaptation. (Changes in water availability, quality and water-related disasters (drought, floods, epidemics, destructive rains, etc.) are some of the key indicators of climate change).¹⁷⁹

The **National Water Resources Management Policy (2011)** states that the Government shall establish systems and technology to monitor and observe water resources, to understand the water balance and perform water accounting, improve meteorological services, and observe and respond to climate variance and long-term impacts of climate change. For this purpose, the Government shall:

- Establish meteorological services to water users, agriculture, industry, and communities to include Early Warning Systems and dynamic information networks;
- Establish a climate centre of excellence to contribute to water observation and monitoring, and water resource management, planning and decision-making;
- Prepare water and climate impact risk assessment and hazard mapping as part of District planning and watershed management;
- Establish a water information management and custodial framework linking meteorological and climate services, agro-meteorology, water balance monitoring, groundwater, supply and abstraction demand.

A **National Water Resources Management Plan (NWRMP)** was adopted in 2015 and is an important step on the road to integrated water resources management. The NWRMP has identified nine national

catchments, available water resources and water-needs projections as well as specific issues facing the sector.

The **National Water Supply Policy (2016)** recognises that the WASH sector is affected by weather and climate events (such as variability, seasonality and extreme events), which translates into negative impacts on drinking-water availability and quality. Future climate change will put an additional stress on delivering and sustaining outcomes related to health and well-being. The policy states that increasing climate resilience and effective disaster risk reduction strategies require a focus on:

- A reduction in the likelihood that individuals feel the effects of climate change and related shocks. This can be achieved through programming that seeks to both understand the determinants of climate risk exposure to WASH services and act on them to minimize the exposure of individuals. The concept of risk-informed planning, more priority to water resource conservation/protection, and water safety planning as a tool of risk-informed planning needs to become a mandatory requirement.
- Strengthening the reliability of WASH services.
- Strengthening capacities of government agencies and communities to increase climate resilience over time.
- Along with food and shelter, safe water and sanitation are the highest priority interventions in emergency situations. Readiness is of critical importance when disaster strikes in and emergency preparedness planning is an essential part of disaster risk reduction activities.¹⁸⁰

F 3. INTEGRATED APPROACH TO SUSTAINABLE LAND USE PLANNING AND MANAGEMENT

According to **Vision 2020**, the land use management is a fundamental tool in development as Rwanda is characterized by acute land shortage. Rwanda will continue to pursue a harmonious policy of organized grouped settlements (umudugudization). Rural settlements organized into active development centres will be further equipped with basic infrastructure and services. While this system of settlement will continue to serve as an entry point into the development of non-agricultural income generating activities, land consolidation will be emphasized so as to create adequate space for modern and viable farming.

This is supported by the **Economic Development and Poverty Reduction Strategy 2 (2013 – 2018)**, which highlights Integrated Approach to Land Use and Human Settlements as one of its priorities. Given land scarcity, land allocation for agriculture, industry and settlements will be a key factor in determining growth in rural areas in EDPRS 2. The challenge is how to manage and administer a range of land use issues, from dealing with land allocation to dealing with land disputes amongst smallholders. The more

efficient the system, the more investment and income generation that is likely to occur. Therefore, there is a need to strengthen two functions: firstly, overall land use allocation for development, and secondly the decentralized process of land allocation and management. Growth in quality human settlements will depend on effective land management and the pull framework of infrastructure and services in rural areas.

The **National Land Use Development Master Plan (NLUDMP)** is a document that provides a general framework and guidance on land use planning in Rwanda. It sets out clear guidelines to be followed in the development of detailed district land use plans and thematic plans. The LUDMP has focused on the inventory of existing data and situations, specific in-depth studies, baseline studies, need assessment and risk analysis which all culminated in the development of different land use planning scenarios that could be used depending on their pros and cons. The land use planning guidelines provided for by the plan are very critical and must be fully implemented for rational use of land, a key factor for the country's sustainable development. In terms of climate risk, the plan clearly sets out areas that are prone to flooding or erosion.

During the **Seven Year Government Programme 2010-2017** is a program that addresses the following issues: Amendment of the Organic Land Law and secondary legislations to accommodate current demand and fit the business climate, increase of land use consolidation for agriculture land and establish strategies for erosion control at 100%, finalise demarcation and adjudication of all land through land tenure regularisation by June 2012 and put in place strategies for implementation of the National Land Use and Development Master plan and elaboration of District Land Use Plans..¹⁸¹

The **Five Year Strategic Plan for the Environment and Natural Resources Sector (2014 - 2018)** aims to ensure that environment and natural resources are utilized and managed productively in support of equitable and sustained national development and poverty reduction. This will be realized in 5 specific objectives; (1) To increase and sustainably manage ecosystems and forest resources to optimize their economic as well as ecological functions; (2) To put in place and operationalise an efficient system of land administration and land management that secure land ownership, promote investment in land for socio-economic development and poverty reduction; (3) To ensure that development in Rwanda is undertaken in a manner that inflicts minimal damage to the environment, and building resilience to threats posed by climate change for the sustained support to economic, social and cultural development of Rwanda. (4) To secure and provide water of adequate quantity and quality for all social and economic needs of the present and future generations with the full participation of all stakeholders in decisions affecting its management; (5) To improve the Geology and Mines sub-sector to contribute optimally and sustainably to the national income and to the social economic welfare of the community.

Rwanda's constitution of 2003 amended in 2015 states a right to a clean environment in article 22: "Everyone has the right to live in a clean and healthy environment". However, the legislation does not

explicitly expound on the principles of adopting IWRM as a means to secure universal water rights. It is anticipated that the new water law will make such express provisions. With regard to land management, under the ministerial order No 14/11.30 of 21/12/2010, the land consolidation is designed to enable farmers to consolidate multiple parcels under one crop management program and optimize agricultural productivity as well as strengthen connection between buyers and farmers. However, there is no single clause on managing land, water and other terrestrial land and marine resources in integrated way. Furthermore, the order does not provide for the active participation of local people in land management and consolidation.¹⁸²

Agencies supporting sustainable land-use management:

- The lead agency is: Department of Lands and Mapping under the Rwanda Natural Resources Authority (RNRA)
- Supporting agencies include: Ministry of Lands and Forestry (MINILAF), Land Commissions, Land Bureaux, Ministry of Agriculture and Animal Resources (MINAGRI), Ministry of Local Government (MINALOC), Ministry of Health (MOH)

F 4. RESILIENT TRANSPORT SYSTEMS AND INFRASTRUCTURE

Rwanda's National Transport Policy of 2008 is the primary source of guidance for the sector. The policy aims to help Rwanda achieve "modern infrastructure and cost-effective and quality services with due regard to safety and environmental concerns," and to ensure "that the infrastructure should be developed in a sustainable manner to support economic growth of the country, mobility of the population and serve as a pivot for exchange of goods and services at national and regional level. The policy also states that its mission is "to reduce constraints to transport in order to promote sustainable economic growth and contribute to poverty reduction."¹⁸³ It does not specifically mention climate change resilience, but the commitment to sustainability may be interpreted broadly enough to include sustainability in the face of climate change.

Other sector policies and strategies are similarly silent on climate change; it should be noted that climate resilient transport or even climate change are not referenced in the Rwanda Transport Development Agency's (RTDA's) Strategic Transport Master Plan for Rwanda,¹⁸⁴ nor MININFRA's Transport Sector Strategic Plan for EDPRS II.¹⁸⁵

The Rwanda Environment Management Authority's (REMA's) Guidelines to Mainstream Climate Change Adaptation and Mitigation in the Energy and Infrastructure Sector identify a few transport sector vulnerabilities to climate change, but the suggested interventions appear to focus predominantly on climate change mitigation as opposed to climate change adaptation. In terms of adaptation, the guidelines

recommend the setting of new standards for roads and bridges in order for them to withstand the challenge of climate change.¹⁸⁶

Fortunately, MININFRA's Public Transport Policy and Strategy for Rwanda highlights in greater detail the need to address climate change and notes that Rwanda should develop an efficient inclusive integrated transport system that is fully energy secure and resilient to both climate change and increasing demand.¹⁸⁷ It identifies the need for the transport sector in Rwanda to:

Promote a fully sustainable multi-modal transport system that is based on efficient technology and operational systems;

- Ensure a low cost to entry as possible;
- Secure a fully domestic energy supply;
- Ensure socially inclusive transport system encompassing the majority of the Rwandan nation;
- Ensure a robust transport system in terms of adaptation to climate change and future demand;
- Ensure a regionally competitive domestic transportation industry supporting the national economy; and
- Ensure sufficient access to capacity, in terms of finance, knowledge and governance.

F 5. LOW CARBON URBAN SYSTEMS

Seven key policy initiatives are relevant to the Rwanda government's capacity to address urban adaptation to climate change, each of which is described briefly below.

Rwanda's National Urbanization Policy, 2015

This policy identifies four principal pillars for urban development in the country:

1. Coordination: enhancing institutional capacities to manage urban development in a coordinated manner at all levels of governance;
2. Densification: integrating urban planning in order to achieve resource-efficient and compact growth;
3. Conviviality: supporting quality of life and equity in urban settlements; and
4. Economic Growth: facilitating employment creation and off-farm productivity for local subsistence and regional competitiveness.

The policy acknowledges the need for climate-resilient urban development by discussing disaster risk reduction (particularly floor risk management and drainage interventions) under the conviviality pillar. It also references the importance of green economic growth (including growth that mitigates the *effects* of climate change) under the economic growth pillar.¹⁸⁸

The Urbanization and Rural Settlement Sector Strategic Plan (2013-2018)¹⁸⁹

This plan aligns with the government's goal of 35% urbanization by 2020 (up from 17% in 2015). The plan is supported and complemented by other instruments, which include a national urban housing policy of 2008, a national human settlement policy of 2009, a national construction industry policy of 2010, the National Land Use and Development Master Plan of 2011 (which contains directives for sustainable land use planning up till 2020), and a Ministerial Order of 2015 Determining Urban Planning and Building Regulations.¹⁹⁰

The National Roadmap for Green Secondary Cities Development

This recent, 2016, roadmap is the starting point for Rwanda's green secondary city pilot project by the Global Green Growth Institute.¹⁹¹

Beyond those noted above, there are a host of instruments that do not pertain directly to urban development and city planning, but are linked to priority action areas identified by Rwanda's Green Growth and Climate Resilience Strategy for this sector. These areas of action include energy efficiency and waste management (for the purposes of this report, urban transportation issues are discussed in the preceding section on resilient transport systems and infrastructure).

The National Building Control Regulations

In relation to energy usage in the built environment, in 2012 MININFRA and the Rwanda Housing Authority issued Building Control Regulations that contain dedicated provisions related to energy efficiency, including guidance on heating, cooling, ventilation, natural light etc. The regulations are less relevant for adaptation and are more closely linked to climate mitigation, so are not central to the inquiry at hand.

The National Energy Policy

The 2015 Energy Policy addresses the need for greater energy efficiency in Rwanda, and directs that the country promote energy efficiency and demand side management (DSM) by:

- Incentivizing demand side management through changes in the electricity tariff methodology;
- Mandatory regulations, such as new codes and standards;
- Introduction of economic incentives, such as subsidies for installation of solar water heaters and for industrial end-users to undertake energy efficiency audits;
- Barrier removal Programmes, for example, examining systemic disincentives or reducing split incentives for energy-efficient technologies in buildings;
- Pursuit of bulk procurement strategies, for example, importation of LED and CFL lamps; and

- Other measures to promote alternative sources of energy for cooking, water heating and purification, heating, cooling, and lighting.

The energy policy identifies a number of priority measures to support and enable the above approaches:

- Adopting new laws, regulations, and codes that mandate energy efficiency measures;
- Restructuring the electricity tariff methodology to incentivize efficiency;
- Establishing a DSM Programme within the utility;
- Encouraging and incentivizing energy audits among industrial end-users;
- Developing regional standards and a labelling scheme for common appliances;
- Promoting and removing barriers to the implementation of priority efficient lighting initiatives;
- Devising and implementing green procurement guidelines and strategies.

The policy is less relevant for adaptation and are more closely linked to climate mitigation, so is not central to the inquiry at hand.

Waste Management Policy initiative

While there is not yet a national integrated waste management policy or strategy, there has been recent talk about developing such a guiding document. The Water and Sanitation Corporation (WASAC) is presently preparing a sanitation master plan for Secondary Cities; it was completed for Huye and Muhanga, as well as Rwamagana (although not an official secondary city); and the rest is expected to be completed by end-2017.

F 6. DISASTER MANAGEMENT AND DISEASE PREVENTION

According to **Vision 2020**, climate change is widely recognized as the major environmental problem facing the globe that is becoming inextricably linked to development. Rwanda is increasingly facing global climate change consequences including; flooding, resulting in disasters such as landslides that cost lives and resources, and droughts that adversely affect agricultural output. Other threats to the environment take the form of depletion of bio-diversity, degradation of ecosystems such as swamps and wetlands and pollution of waterways. Rwanda will continue to put in place strategies to mitigate the impact of climate change by focusing on developing eco-friendly policies and strategies in all sectors of the economy and by promoting green growth.

The **Economic Development and Poverty Reduction Strategy 2 (2013 – 2018)** states that Disaster Risk Reduction (DRR) and Disaster Management is a complex development issue which requires political and legal commitment, public understanding, scientific knowledge, careful development planning, responsible enforcement of policies and legislation, people-centred early warning systems, and effective disaster

preparedness and response mechanisms. Multi-stakeholder and effective DRR will help in providing and mobilising knowledge, skills and resources required for mainstreaming DRR into development programmes. Therefore, a priority of the EDPRS 2 is for DRR and Disaster Management to touch all priority areas and to be mainstreamed in all priority sectors.

The **National Disaster Risk Reduction and Management Bill (2016)** provides for the setting up of a National Disaster Risk Reduction and Management Council, which shall, inter alia, oversee the implementation of the National Disaster Risk Reduction and Management Policy, National Disaster Risk Reduction and Management Strategic Framework and National Disaster Risk Reduction and Management Plan. In addition, the Bill promotes the establishment of a National Disaster Risk Reduction and Management Centre, which shall, under the guidance and supervision of the National Council, act as the main institution for coordinating and monitoring the implementation of disaster risk reduction and management activities as per the National Strategic Framework and National Plan.

The **National Disaster Management Policy (2012)** seeks to establish the guiding principles and architecture for disaster risk management (DRM) in Rwanda by presenting the institutional structures, roles, responsibilities, authorities and key processes, with the ultimate goal being to increase the resilience of vulnerable groups to disasters (the main natural hazards in Rwanda identified by the policy are floods, landslides and mudflows, volcanic activity, drought, food security, earthquakes, fires, and epidemics). In particular the policy aims to:

- strengthen the legal and institutional framework for the management of disasters, including the promotion of a culture of disaster awareness and for building the capacity for DRM at all levels;
- ensure that institutions and DRM activities are coordinated and are focused to foster participatory partnerships between the government and other stakeholders, at all levels, including international, regional, sub-regional Eastern African, national and sub-national bodies;
- promote linkages between DRM and sustainable development for the reduction of vulnerability to hazards and disasters.¹⁹²

The **National Disaster Management Framework** was designed to ensure coherence between all documents in the Ministry of Disaster Management and Refugee Affairs and other national documents directly related to Disaster Management. The **National Disaster Management Plan (2013)** aims to further develop the disaster risk reduction framework developed as espoused by the National Disaster Management Policy (2012). The plan was prepared by the Ministry of Disaster Management and Refugee Affairs in partnership with its stakeholders from both government institutions and non-government partners. It outlines the activities that have to be carried out by various stakeholder agencies to ensure effective disaster management in Rwanda. The NDRMP specifies the tasks to be performed by

organizations/institutions and individuals to deal with identified disaster types.¹⁹³ For the management of specific hazards, Rwanda has also developed a National Contingency Plan for Floods and Landslides (2014).

From 2013, the contingency plans were developed and validated (so far earthquake, fire incidents, floods and landslides, human epidemics, mass movement and population influx and droughts have been developed). From 2014-2015, other different contingency plans were developed to operationalize response mechanisms and coordination during the events of disaster occurrence. The said contingency plans are technological and industrial disasters, crops, animal disease and famine, volcanic eruption, terrorism effects, and storms contingency plans.¹⁹⁴

The **Water Resources Management Sub-Sector Strategic Plan (2011 – 2015)** promotes an effective framework for water-related disaster management, climate change mitigation and adaptation in place and implemented; Changes in water availability, quality and water-related disasters (drought, floods, epidemics, destructive rains, etc) are some of the key indicators of climate change. Five strategic outputs will be achieved, all relating to planning, capacity building and information generation and preparedness. The plan also prioritises basic capacities installed and effective framework for sustained WRM capacity development and knowledge management developed: Under this outcome,

- Climate change resilience and vulnerability status will be established and regularly updated;
- Early warning systems on extreme weather conditions; National Water Balance and Water Security Plan in place and implemented;
- Operational safety plans for water ways and water infrastructure installations; and effective National Disaster Management Plan that reflects and prioritizes water-related disasters in place and implemented.

To effectively prevent and manage climate related diseases, the **Health Sector Policy (2015)** is promoting health programs that improve demand, access and quality of essential (primary) health services, so as to reduce the burden of disease in Rwanda. Both prevention and treatment and care services are included in these programs, as well as interventions aiming at improving important health determining factors, such as behaviour change communication, promotion of adequate nutrition, environmental health and sanitation and access to safe water.

This is supported by the **National Community Health Policy (2008)**, which promotes environmental health, and states that low access to safe water, poor disposal of waste and poor hygiene predispose individuals, families and communities to water and food borne diseases such as diarrhoea, cholera and typhoid. Changing individual and community behaviour is key to all preventable diseases and conditions, and community health can improve the knowledge of communities on prevention of food and water borne

diseases. Strengthening the knowledge base of communities can be done by enabling community health workers to undertake community education and through partnership with the media for a wider circulation of information.

Agencies supporting disaster risk reduction, human safety and health:

The lead agencies are: Ministry of Disaster Management and Refugee Affairs (MIDIMAR), Ministry of Local Government (MINALOC), Ministry of Health (MOH)

Supporting agencies include: Rwanda Meteorological Agency, District and Sub-District authorities, Ministry of Agriculture and Animal Resources (MINAGRI), Disaster Management Task Force

F 7. CLIMATE DATA AND PROJECTIONS

The **Draft Rwanda Climate Data Policy** is intended to be a guide for good data management and good data treatment practices to be observed by both the producers of weather and climate data, the users of data and Meteo Rwanda clients in general. Rwanda climate data is valuable resource that should be guarded responsibly by all interested parties.

The **National Meteorology Policy (2010)** gives guidance in providing sufficient, effective and harmonized Meteorological services to the public and to other sectors in a coordinated manner. The policy also ensures compliance with the national, regional and international commitments regarding weather and climate issues aims to achieve the following objectives:

- Provision of quality, adequate and Meteorological services to other sectors;
- Improving Meteorological infrastructure that will ensure availability of meteorological data and information for weather and climate advisories and warnings to the public for their safety. Also ensuring timely availability of weather information to farmers in rural areas;
- Ensuring a sound meteorological institutional framework;
- Ensuring meteorological services and activities are properly coordinated and harmonized and ensure that national and international standards, procedures and practices are adhered to;
- Increasing awareness on weather and climate issues so that national economic sectors factor - in weather and climate information in planning economic activities;
- Meeting regional and international commitments regarding weather and climate issues;
- Ensuring that meteorological records are processed and archived for current and future use; and
- Acquiring competent, qualified and motivated workforce for sustainable, adequate and effective meteorological services.

In order to ensure the successful implementation of the above listed policies, the **Vision 2020** states that Rwanda will continue to invest in developing adequate, highly skilled scientists and technicians to satisfy the needs of the transition to knowledge-based economy.

Agencies responsible for climate data/science:

The lead agencies are: Rwanda Meteorological Agency (RMA)

Supporting agencies include: Ministry of Disaster Management and Refugee Affairs (MIDIMAR), Ministry of Infrastructure (MININFRA), Ministry of Local Government (MINALOC), Ministry of Health (MOH), research organisations, District and Sub-District authorities

APPENDIX G Component and Project Descriptions

This appendix contains a detailed description of the investment programmes (as provided in Chapter 8). Total SPCR cost is estimated at \$534 million.

G 1. INVESTMENT PROGRAMME 1: AGRICULTURE DRIVEN PROSPERITY

G 1.1. Objective

Objective: To improve Rwanda’s adaptive capacity against climatic risks and hazards by improving the productivity of agriculture and livelihood subsistence farming. To ensure inclusivity (gender inclusion, vulnerable groups and the youth) and build resilience in the selected value chains.

This investment programme is focused on (1) Climate Resilient Value Chain Development; and (2) Climate Smart Agriculture and Agroforestry.

G 1.2. Components and Projects

Components and projects will be identified during detailed project design, with framework suggestions provided in this section. It is recommended that during the design stage of each activity, a comprehensive planning process be conducted that finds ways to include gender, youth and other vulnerable groups in the entire project lifecycle. Moreover, it will be critical to look at ways to improve knowledge and lessons learned through the generation and dissemination of knowledge products during the project, as well as continuous opportunities for capacity building.

Additionally, FONERWA is developing an agriculture decision support tool, which may be a good guide in the development of this investment programme.⁷

Indicatively, investment programme one’s components and projects are as follows:

COMPONENT 1: CLIMATE RESILIENT VALUE CHAIN DEVELOPMENT

This component’s objective is linked to the NST’s Economic Transformation Pillar, and objective to “Establish Rwanda as a Globally Competitive Knowledge-based Economy,” and “Promote industrialization and attain a structural shift in the export base to high-value goods and services with the aim of growing exports by 17% annually.”

⁷ For more information on this tool, please visit: <http://www.futureclimateafrica.org/news/blog-integrating-climate-information-into-green-growth-finance-in-rwanda/>

This component's objectives are also aligned with Priority Area 2 from the Draft PSTA, Productive, Inclusive Markets and Value Addition, specifically Output 2.1: Strengthened partnership in the commercialisation of agricultural sector value chains products, as well as Outcome 2: Increased competitiveness, value addition and private sector involvement of diversified agricultural commodities for domestic, regional, and international markets.

This component supports the development of Rwanda's work in value chain development. Critical to this component, however, is the emphasis on *climate resilient* value chain development. Thus, as this component builds its projects, it will be crucial to make the link to climate change adaptation, gender integration, and private sector engagement that improves opportunities for rural communities to increase their ability to manage risks and improve livelihoods through better access to the markets.

As Rwanda seeks to invest in the development of new crops, integral to their development of higher value market cash crops is the consideration of climate on these crops. Projects like MINAGRI's Climate Mainstreaming Pilot for the Coffee and Tea Sectors have made the critical link between climate futures and cash crop development.⁸ Many export crops, in particular coffee and tea, have been affected by high climate sensitivity, changing climatic zones, rainfall variability, and changes in pests and diseases.¹⁹⁵ This component will focus on the climate smart development of new climate resilient value chain crops.

Value chain development allows for improved competitiveness and income distribution, and more specifically, supports the desired outcomes of higher income earnings for poor and vulnerable groups, as well as the active participation of women and youth. Suggested principles for value chain development to achieve sustainable and pro-poor growth include: sustainability, equitability, do-no-harm, and valuing traditional knowledge.¹⁹⁶

Project 1: Providing Investment to New Climate Resilient Value Chains

As identified in the FONERWA supported coffee and tea pilot project, it is critical to link climate resilient feasibility studies to actual implementation. The first phase of this project will develop an enhanced risk and vulnerability analysis, climate risks screening and mapping, and the development of a pest-monitoring programme for two to three crops in the above list. The analysis will also look at the other land-use patterns in suitable areas, to ensure there are no conflicts with biodiversity or ecosystem services, but also an opportunity to explore synergies and complementarity.

⁸ For more information on this project, please consult the full project document: Climate Mainstreaming Pilot for the Coffee and Tea Sectors (MINAGRI).

This project will use the defining criteria from PSTA 4 (agronomic and climatic factors, market and growth opportunities, social and development opportunities, and political and strategic factors) as well as climate resilient criteria to examine the viability of new export commodities and crops with investment potential.⁹

The primary purpose of much agroforestry is to stabilise soil and to improve and maintain fertility. By careful species selection, however, it is possible to include agroforestry tree species, and thus agroforestry related value chains, that deliver additional benefits. These may be direct products, such as firewood, stakes and poles, fodder, fruits and products such as honey. While much of the produce from agroforestry, especially from small land holding, will be directly consumed by the household or exchanged with neighbours, there is potential for some products to enter into a value chain. Honey and related products are a good example where individuals or preferably groups of individuals can supply products for which there is a high value market and which do not degrade rapidly.

Where possible, the project will employ the use of higher resolution data (and possibly satellite information) to enhance the accuracy of the existing scoping analysis. As much as possible, coordination with Meteo Rwanda will be key for engaging meteorological station data, and providing detailed spatial expansion maps and areas of suitability to provide a ranked analysis and identify low and high-risk areas.

The findings of this scoping analysis will then be linked to plots for the selected crops, supported by a grant.

Project 2: Unlocking Barriers to Investment in Agriculture

In order to help the most vulnerable communities become more resilient to the effects of climate change, financial institutions should support small and medium-size enterprises. When an SME builds up its own climate resilience, it can have cascading effects in the community around it. According to recent findings from Access to Finance Rwanda, only 14% of subsistence farmers and 17% of commercial farmers have access to formal credit, and as such mainly rely on informal groups as well as friends and family.¹⁹⁷

Given that MINAGRI and related agencies, as stipulated in the *Draft PSTA 4*, have the directive to look at ways to facilitate and support the promotion of private sector investment in priority value chains, there is an opportunity to align this investment with the promotion of SMEs. This activity will be catered to ways to increase domestic private sector investment, particularly for SMEs, and to address investment constraints, such as limited access to land and information on investment opportunities.

⁹ The PSTA 4 identifies horticulture (including vegetables, fruit, macadamia / ground nuts and cut flowers), stevia, hides and skins, meat (beef, poultry, goats and sheep, pigs, rabbits), fish, milk, honey, essential oils, spices, silk, medicinal plants, mushrooms, eggs, as non-traditional export commodities/niche markets for exploration.

The role of microfinance in boosting SMEs' climate-change resilience can enabled SMEs to invest in drought-resistant crops, build better irrigation systems, and purchase climate insurance to protect incomes when crops fail because of too much – or too little – rainfall.¹⁹⁸

This project may include supporting the investment process through improved coordination of the relevant actors, improved information for agro-investors, provision of before and after-care services and incentives, which includes access and provision to land, registration of agribusinesses, technical capacity building, and linkages to relevant value chain actors.

Project 3: Building Climate Resilient Post-Harvest Facilities and Infrastructure

Post-harvest losses in Rwanda are significant and often as high as 30%. This is due to a combination of limited infrastructure as well as imperfect transaction processes from small-holder farmers toward forward linkages. This results in sub-optimal outcomes for farmers, traders, agro-processors, and consumers. Losses could be minimised by introducing new technologies and constructing additional post-harvest infrastructure.

This multi-pronged project will focus on the construction of climate smart storage facilities and drying floors. The emphasis will be on attracting private sector investment as well as establishing public-private partnerships (PPP) to co-finance storage units. It will include three elements:

- RAB supported research into best practices of climate smart storage facilities in the region, which will in-turn inform research on how to upgrade existing facilities to ensure that they can withstand climate futures. It may be necessary to carry out a mapping exercise into existing storage facilities and drying floors. The second phase of the research will support the design of replicable and scalable climate smart storage facilities and drying floors suitable to needs in two differing climates (one in the East province and one in the North and West).
- Using this research, the project will support the upgrading of existing facilities, based on best practice design.
- The project will support the construction new climate smart storage facilities and drying grounds, catering to the different climate needs.

COMPONENT 2: CLIMATE SMART AGRICULTURE AND AGROFORESTRY

COMPONENT 2A: CLIMATE SMART AGRICULTURE

Climate smart agriculture is fundamental to increasing productivity, addressing current climate variability and future climate risks and reducing greenhouse gas emissions. Integrated ways of improving soil fertility

and increasing farm profitability are best supported by a range of services, such as climate information systems, financial services like improved access to credit and insurance, and capacity building training to link researchers and practitioners.

Women and youth have an increased vulnerability to men, based on their greater dependence on natural resources for livelihoods, responsibility for food production, water and fuel for their households, more limited assets, and social, cultural, and political barriers, among other factors. With regard to increasing agricultural productivity, the Green Climate Fund recommends that the following efforts are undertaken to address gender: systematic gender analysis to identify where there may be differences in men's and women's productivity; resolution of the challenges women experience in accessing, using, and supervising farm labour; improvement in women's access to productive inputs and resources such as extension and technologies; improvement in women's use of agricultural inputs; and improving their tenure of natural resources, as women's lack of access to secure land tenure is a major constraint. During the design of the projects, it is recommended to use this framework as a guideline.¹⁹⁹

The priority areas for the country in Phase 1 are the Eastern Province, given its vulnerability to drought, and the North-western region, given its vulnerability to flooding. In Phase 2 of the project, it may be rolled out on a national level.

Project 1: Climate Smart Index-Based Insurance

In Rwanda, agriculture has the lowest rate of insurance product uptake (only 7% of credit goes toward agriculture), despite the sector's high risk to weather, price shocks, price volatility and destructive rains, floods, landslides, and droughts. Research has shown that farmers who farm on two acres or less are the most adversely affected by weather-related risks. According to Access to Finance, the majority of farmers are not covered by an insurance product and in case of emergencies (e.g. harvest and/or livestock loss) most farmers rely on cutting down expenses and borrowing money, which only further increases their vulnerability.

Currently, *Access to Finance Rwanda* in collaboration with MINAGRI and MINECOFIN is undertaking a project to design and support implementation of a National Agriculture (crop and livestock) Insurance Scheme (NAIS) in Rwanda. In order to benefit from the findings of the project, including the extensive consultations undertaken as well as an understanding into appropriate insurance products and barriers to scaling, it is critical that this project be seen as a continuation of that work. At present, that project has elected to pursue Multi-Peril Crop and Livestock Insurance products as compared to the Weather Index Based Insurance, but it will be important to let the findings of that work inform this project design once appropriate.

Insurance operates best inside the climate smart ecosystem, when it has the full willingness of the entire value chain of stakeholders (from the farmer to the insurer to the Meteo Rwanda). Thus, this project will require substantial cross-sectoral collaboration and may provide a good opportunity for a public-private partnership that supports both technical and financial innovation.

Project 2: Linking Climate Smart Agriculture Research to Projects

According to the *Draft PSTA 4*, research and development have attracted a very low share of PSTA3 expenditures (only 0.7% out of a target 7.1% share). Inadequate spending on R&D can affect ability to provide and keep providing innovations such as new varieties that are both productive and resilient to the changing climate, pests, and diseases. Failure to generate such varieties, innovations and management practices will lead to agricultural production becoming less knowledge-based, more susceptible to various risks, and ultimately will lead to the decline of the sector's performance.

This portion of the project will draw on work by REMA, RAB, and MINAGRI and others to look at how best to get start of the research into action and how best to dissemination CSA technologies and practices. This project is intentionally left to the direction of RAB and MINAGRI to look at how research on issues such as Integrated Soil Fertility Management (ISFM), Integrated Pest Management (IPM), bio-fertilisers technologies, the development of resistant varieties, and animal genetic improvement, can lead to investment. This ethos of this project is to turn research into real investment. The critical transformative measure of this project is the linking of research and application. The findings of these research projects must be linked to demonstration plots, supported by a grant, that emphasize the climate smart agricultural applications of the research.

The SPCR has suggested that the project begin with two projects: (1) **organic based fertilizers** with proven soil improvement capacity, and (2) a project targeted at **improving intensive farming practices through irrigation**. At the time of financing, however, should there be ample investment in these areas, MINAGRI and RAB may look at other investments.

Organic Based Fertilizers: Soil fertility is low and decreasing in many areas due to poor soil fertility management, limited application of inorganic fertilizer and farmer's lack of knowledge on fertilizer application and options to systematically combine organic and inorganic fertilizers for enhanced soil organic matter and productivity.²⁰⁰ The PSTA 4 outlines that there are opportunities to increase the support to local, organic fertilizer production as part of integrated soil fertility management practices in conjunction with the gradual liberalization of fertilizer supply. Such local, organic fertilizers are expected more sensitive to conserving soil quality without diminishing yield potential. Further, developing **competitive local fertilizers** would offer perspectives for job creation in rural areas. Moreover, the optimal number of agricultural seasons subsidized needs an assessment.²⁰¹

Small-Scale Irrigation Technology: In Rwanda, prevalent low productivity rain-fed crop production is worsened by climate change and climate variability (characterized by long droughts or short heavy rains causing flash floods). To sustain cultivation and productivity on steep-slopes, comprehensive climate smart watershed management has become a necessity not a choice. To promote the development of affordable and sustainable irrigation technologies, the Government of Rwanda introduced the Small-Scale Irrigation Technology (SSIT) project for improved productivity and commercial farming. There is a great potential and demand for investment in small-scale irrigation systems to complement the large-scale irrigation investments undertaken to date.

COMPONENT 2B: CLIMATE SMART AGROFORESTRY

The effects of a changing climate have put agriculture and agroforestry in Rwanda at serious risk. Exposure of crops to warmer and drier environments means an increase in drought susceptibility and decrease in productivity, in both the already drought-prone areas like the East, but also in more tropical regions with increased seasonal dry periods. There is still significant scope for increasing the use of agroforestry in both research and in practice to improve Rwanda's production systems. While this project sits inside the FIP, its framing and link to this investment programme is critical.

Agroforestry has been a reliable tool in improving soil fertility and increasing farm household resilience through the provision of additional resources. While the understanding of these benefits is not new, in light of growing food insecurity and shortages and rising prices of fossil fuel based agricultural inputs, the imperative for Rwanda to look at agroforestry as a necessary and cost-effective tool is even greater.

Within the framework of wider landscapes, as a result of increasing population and rising expectations, agriculture has been extended onto non-sustainable locations. Soil conservation measures have not kept pace with the rate of expansion leading to floods, soil loss and landslides. Extension services are insufficient to support the widespread application of high quality tree planting and agroforestry and both require a greater range of new options to enhance resilience to climate change. Active research, diversification of the species base for forestry and agroforestry, an improved supply of reproductive material and skills building on field techniques will all be necessary for improved practices.

The Rwanda Readiness Preparation Proposal (R-PP) identifies three Strategic Options to be employed in countering and reversing the causes of deforestation and forest degradation. Most relevant to the agroforestry component of this Investment Programme is the modernisation of agriculture and soil protection, which aims to improve food security while also employing agroforestry to control soil erosion and improve fertility. In order to provide sustainable landscapes that will control current problems and deliver increased levels of products and services for more efficient value chains, improved agriculture, forestry and agroforestry will need to be developed in close concert through fine-scale land use planning.

In terms of climate change, restoring and improving forest cover will provide mitigation of GHG emissions and increase substantially carbon sequestration and storage. Improved site-user-species matching based on a widened and diversified base of forestry and agroforestry species and high-quality germplasm, combined with greater application of best practices, will adapt current interventions to give greater resilience to the direct effects of climate change and the indirect effects, such as pests and diseases.

G 1.3. Indicative Costing

Below is a detailed representation of the costs associated with each component and project.

Estimated Total Cost: \$ 44 365 200

CLIMATE RESILIENT VALUE CHAIN DEVELOPMENT

Providing Investment to New Climate Resilient Value Chains

SCHEDULE OF QUANTITIES		COST (US\$)	DESCRIPTION
1	INVESTMENT SCOPING	US\$ 300,000	<ul style="list-style-type: none"> The investment scoping will focus on 3 crops and will incorporate: enhanced risk and vulnerability analysis; climate risks screening and mapping; and the development of a pest-monitoring programme.
2	SELECTION OF SITES FOR PLOTS	US\$ 80,000	<ul style="list-style-type: none"> Identify and rank potential plots using meteorological station data and detailed spatial expansion maps.
3	ESTABLISHMENT OF APIARIES FOR HONEY PRODUCTION	US\$ 296,000	<ul style="list-style-type: none"> Construction of 10 modern apiaries (RWF15m/unit) and 300 modern apiaries (RWF333k/unit).
4	DEVELOPMENT OF PLOTS (FRUIT AND VEGETABLE)	US\$ 24,000,000	<ul style="list-style-type: none"> Demonstration plots will be planted which will comprise 2,000 ha of fruit and 12,000 ha of vegetables. Average planting costs per hectare for fruit (USD3,000) and vegetables (USD1,500) were assumed.
A	SUB-TOTAL	US\$ 24,676,000	Sum 1 – 4
B	CONTINGENCY	US\$ 2,467,600	10% of A
C	TOTAL	US\$ 27,143,600	A + B

Unlocking Barriers to Investment in Agriculture

SCHEDULE OF QUANTITIES		COST (US\$)	DESCRIPTION
1	SCOPING WORK	US\$ 200,000	<ul style="list-style-type: none"> The scoping exercise will conceptualise and assess different sustainable value chain financing mechanisms and identify the two most suitable mechanisms to take forward as pilots. The mechanism will be designed to ensure participation by SMEs.
2	PROJECTS TO TEST THE EFFECTIVENESS OF FINANCING MECHANISMS	US\$ 1,500,000	<ul style="list-style-type: none"> Implement two financing mechanisms that will be trialled over a 3-year period in 2 to 4 locations.
3	MONITORING OF PILOTS AND REPORTING ON OUTCOMES	US\$ 300,000	<ul style="list-style-type: none"> To conclude on the effectiveness of the financing mechanisms, the pilots will be closely monitored over a 3-year period.

A	SUB-TOTAL	US\$ 2,000,000	Sum 1 – 3
B	CONTINGENCY	US\$ 200,000	10% of A
C	TOTAL	US\$ 2,200,000	A + B

Building Storage Facilities and Drying Grounds

SCHEDULE OF QUANTITIES		COST (US\$)	DESCRIPTION
1	DEVELOPMENT OF DESIGNS FOR STORAGE FACILITIES AND DRYING GROUNDS	US\$ 150,000	<ul style="list-style-type: none"> Innovative designs will be developed for two climates in respect of new storage facilities and drying floors. Solutions/designs will be developed for the upgrading of existing storage facilities and drying floors.
2	DESIGN OF NEW INFRASTRUCTURE	US\$ 2,763,000	<ul style="list-style-type: none"> The designs will be built at around 50 sites where new storage facilities and drying floors will be constructed. The cost per MT of storage is assumed to be RWF 150,000 and the average size of a storage facility is assumed to be 200 MT (i.e. 10,000 MT to be constructed in total). The average price of a drying floor is assumed to be RWF 16.7 million or RWF 835m across 50 sites.
3	BUILDING AND ENHANCING RETROFIT SOLUTIONS	US\$ 1,382,000	<ul style="list-style-type: none"> Retrofit solutions will be built at 50 sites to demonstrate their effectiveness. The average size of a storage facility is assumed to be 200 MT and that 10,000 MT of storage will be retrofitted in total. It is assumed that retrofit costs equate to 50% of new build costs.
4	SUB-TOTAL	US\$ 4,496,000	Sum 1 – 4
A	CONTINGENCY	US\$ 449,600	10% of A
B	TOTAL	US\$ 4,945,600	A + B

CLIMATE SMART AGRICULTURE

Climate Smart Insurance

SCHEDULE OF QUANTITIES		COST (US\$)	DESCRIPTION
1	BUILDING ON AFR-MINAGRI WORK	US\$ 200,000	<ul style="list-style-type: none"> This analysis will conceptualise distribution mechanisms that can be put in place that will allow farmers to access insurance products. The distribution channels could include agribusinesses, microcredit institutions, and professional farmer cooperatives. The analysis will also consider technology solutions that could be implemented/developed to make insurance more accessible to farmers.
2	NATIONAL CLIMATE INSURANCE PROGRAMME	US\$ 1,800,000	<ul style="list-style-type: none"> This programme is designed for maize and beans. Any additional crops will result in an increase in price. It is assumed that the premiums will be subsidised that allow for around \$20 million of insurance cover to be issued over the test period. The value of maize that will be insured is estimated at around \$300/ha whilst the value of beans to be insured is estimated at \$500/ha. Assuming that maize accounts for 60% of the hectares insured and beans for 40%, 52,600 hectares could be insured over the pilot period for a harvest cycle.

			<ul style="list-style-type: none"> This would represent 14.2% of cultivated maize and soya bean hectares.
3	MONITORING OF PROJECT AND REPORTING ON OUTCOMES	US\$ 300,000	<ul style="list-style-type: none"> To conclude on the effectiveness of the distribution mechanisms, the project will be monitored over a 3-year period.
A	SUB-TOTAL	US\$ 2,300,000	Sum 1 – 3
B	CONTINGENCY	US\$ 230,000	10% of A
C	TOTAL	US\$ 2,530,000	A + B

Linking Climate Smart Agriculture Research to Projects

SCHEDULE OF QUANTITIES		COST (US\$)	DESCRIPTION
1	BIO-FERTILISER TECHNOLOGIES DEMONSTRATED	US\$ 3,100,000	<ul style="list-style-type: none"> Implement demonstration facilities based on vermi-composting, organic fertilizer and enriched compost research outcomes at up to 1,000 sites at a cost of \$100 per site. Implement windrow composting facilities that will have a total treatment capacity of 50,000 t/annum to demonstrate the effectiveness of organic fertilizer production at different sites (capital cost per annual capacity assumed: \$60/tonne)
2	NATIONALLY ADAPTED ANIMAL BREEDING PROGRAMME DEMONSTRATED	US\$ 2,360,000	<ul style="list-style-type: none"> Demonstration will include the artificial insemination of 200,000 cows and 10,000 pigs at RWF9,500 per animal.
3	IMPLEMENTATION OF SMALL SCALE IRRIGATION PROJECT	US\$ 1,400,000	<ul style="list-style-type: none"> Implementation over 875 ha across 3 sites in the East and Southern Provinces, as a priority. Cost per hectare for the implementation of small irrigation infrastructure is assumed to be \$1,600 per hectare.
A	SUB-TOTAL	US\$ 6,860,000	Sum 1 – 3
B	CONTINGENCY	US\$ 686,000	10% of A
C	TOTAL	US\$ 7,546,000	A + B

AGROFORESTRY

Done by FIP, and excluded from total costing.

G 2. INVESTMENT PROGRAMME 2: WATER SECURITY FOR ALL: STRENGTHENING RESILIENCE IN THE WATER SECTOR

G 2.1. Objective

Objective: To promote water security for all in Rwanda in the face of socio-economic development and climate change, through improved and integrated water resource management, effective institutions and resilient infrastructure.

This investment programme focuses on (1) integrated strategic water resource planning and management; (2) catchment restoration; and (3) climate resilient water infrastructure.

G 2.2. Components and Projects

Components and projects will be identified during detailed project design, with framework suggestions provided in this section. It is recommended that during the design stage of each activity, a comprehensive planning process be conducted that finds ways to include gender, youth and other vulnerable groups in the entire project lifecycle. Moreover, it will be critical to look at ways to improve knowledge and lessons learned through the generation and dissemination of knowledge products during the project, as well as continuous opportunities for capacity building.

Indicatively, investment programme two's components and projects are as follows:

COMPONENT 1: INTEGRATED STRATEGIC WATER RESOURCE PLANNING AND MANAGEMENT

While Rwanda has made significant efforts in water resource management, the nature of its water resources renders the country extremely vulnerable. This is because the water resources in Rwanda exhibit significant variations at a spatial and seasonal scale. As climate change continues to impact Rwanda, the spatial and seasonal variations in water resources will be increased. This variability of water resources means that long-term planning is critical for not only ensuring water security, but also promoting sustainable ecological flows as well as sufficient water for the economy of Rwanda.

Due to the growing demands of a developing economy, it is important to promote an integrated approach to water resources management. Added to this, it is essential that coordination is promoted between the different sectors of the economy as well as major water users, which includes sectors such as energy, land-use, city planning and conservation.

The objective of this component is to ensure that the catchments in Rwanda are managed effectively, particularly in the context of climate variability and increasing water demand. While it is evident that a lot has been done to improve water resource management in Rwanda, there is a need to extend these initiatives to all corners of the country. This component will also ensure that long-term water resource planning and management does not jeopardise healthy natural resources. Added to this, opportunities also exist for Rwanda to promote water access by implementing climate resilient and multi-purpose infrastructure.

Project 1: Strategic Catchment Planning for Level One Catchments

Rwanda should continue promoting integrated water resource management, institutional strengthening and capacity building in catchments across the country. This will ensure that all the catchments in Rwanda are effectively managed and governed, based on the local context. In addition, integrated water resource management will ensure that the water demands of the catchment are sustainably met, while also maintaining environmental flows.

Initiatives such as Catchment Task Forces (under the new Water Law called Catchment Committees), community water management committees or irrigation boards provide useful supporting governing structures for catchment management. This offers catchment managers the opportunity to engage different members of society, and therefore also allows women to be integral members of catchment management initiatives. Examples of such initiatives include:

- The Lake Victoria Environment Management Project (LVEMP) Phase II, which focused on watershed management protection initiatives across the various catchment of Lake Victoria. In Rwanda, this is specifically the Akagera Catchment, where 90% of the waters are drained through the Akagera River into Lake Victoria. Phase II will end in 2017, and preparation for Phase III is underway.
- The Water for Growth Rwanda project has played a critical part in improving water resource management in Rwanda, by strengthening relevant institutions at national and catchment level, building staff capacity in IWRM among others by providing instruments to simulate Water Evaluation and Allocation Strategies at catchment and national level, growing and sharing the knowledge base, and build investment in integrated water resources management. The project has been implemented in four demonstration catchment areas, namely Upper Nyabarongo, Nyabugogo, Sebeya and Muvumba. As

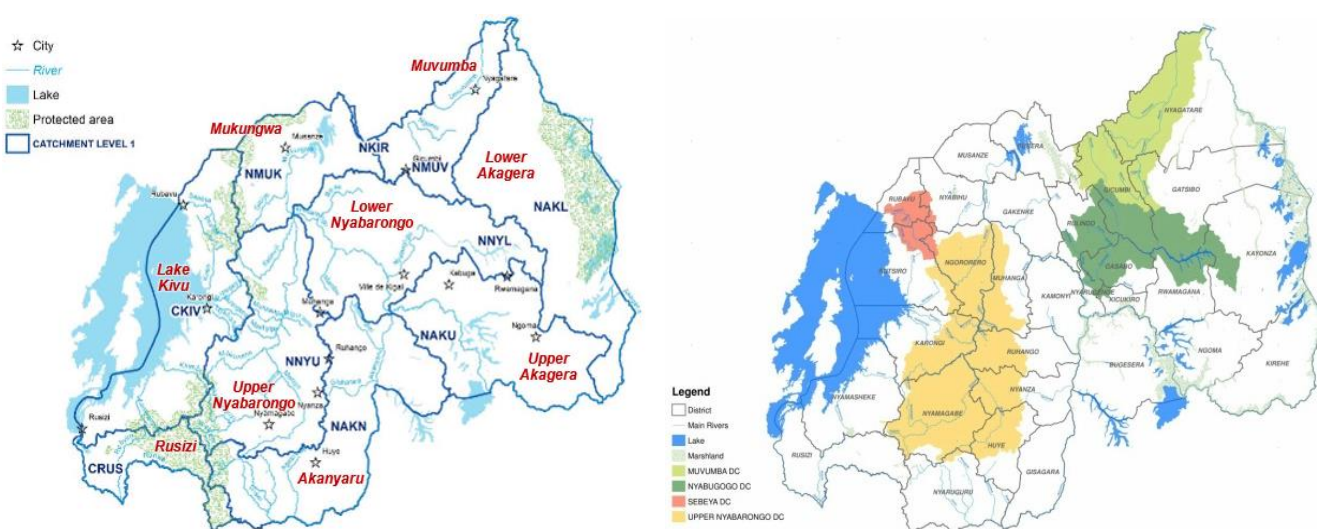


Figure 12: Comparison between Level 1 Catchments and Catchments covered by Water for Growth Project (Adapted from MINIRENA, 2014; Water for Growth Website, n.d.)

shown in the figure below, Upper Nyabarongo and Muvumba are Level 1 Catchments, while Sebeya and Nyabugogo are sub-catchments of Lake Kivu and the Upper Nyabarongo Level 1 Catchments, respectively.

This project will be focused on **strategic catchment planning** for all Level 1 catchments. This planning will ensure that catchments are managed effectively and efficiently, and are supported by the required capacity and institutional collaboration at all required governance levels. These plans should be updated regularly (e.g. every 6 years), and should include detailed considerations of water demand and availability, the long-term climate impacts and the interaction between surface and groundwater. Importantly, the plans should be forward thinking and not reactive. This will be achieved by:

- Enhancing and upscaling **institutional support and capacity development** for the catchments supported by the Water for Growth Program, or similar initiatives. This process should also strengthen the required platforms/processes that will enable multi-district level coordination and collaboration (i.e. Upper Nyabarongo and Muvumba).
- **Developing strategic and tactical catchment plans** for Level 1 catchments not covered in the Water for Growth Program or LVEMP, and include the required institutional support and capacity development. This can be implemented in two phases:
 - Phase 1: Level 1 catchments that have been partly addressed during the Water for Growth Program and LVEMP projects (i.e. Lake Kivu, Upper Akagera, Lower Akagera, and Upper Nyabarongo).
 - Phase 2: Level 1 catchments that have not been addressed at all (i.e. Rusizi, Akanyaru and Mukungwa).

Project 2: Groundwater Study and Mapping Exercise

Rainfall is the main form in which Rwanda's groundwater aquifers are recharged. However, rainfall variability results in variability of hydrological flow, leading to decreased groundwater recharge. A lowering of water tables as well as reduced water flows has been observed, especially in eastern Rwanda. These impacts are at least partially attributed to climate change stresses, as well as sub-optimal water resource and watershed management.

As the population and economy grows and the demand for water resources increases, groundwater resources will form an important water resource and also will, therefore, come under increasing pressure. This is particularly true for sectors such as agriculture, which are water intensive and often pollute water resources, and also domestic users who often have inadequate water and sanitation infrastructure; such sectors continue to pose threats to the quantity and quality of groundwater resources in Rwanda.

This project provides Rwanda the opportunity **to study and map the groundwater resources** and to optimize its management at a high-resolution. This study will include an assessment of groundwater quality and quantity, as well as a detailed consideration of surface and groundwater interactions (for recharge considerations) and potentiality mapping. The study and maps should be updated on a regular basis (i.e. every 10 to 15 years). As a pilot study is being planned for the Eastern Region (by Water for Growth Program), it is important that this study builds on that. This project will also provide valuable lessons when the exercise is expanded throughout the country.

Project 3: Complete and Automated Hydrological Network

Accurate and relevant data is the cornerstone of effective water resource management. Rwanda is thus expanding its hydrological monitoring network, and ensuring that water balance studies are done for all its catchments. Although this has not been completed yet, significant progress has been made. Added to this, long-term climate projections and long-term changes in water resources are being investigated and included in the catchment strategies, and these rely on accurate data. To ensure that this can be done, equipment, information technology and sufficient human resource capacity is required, and this is currently not available.

A Water Resource Portal has been developed by Water for Growth. The portal is a web platform where water resources related information such as Water Quality, Surface Water, and Ground Water, Water laws and policies are stored to make them easily accessible. This portal has been established so that the water resources of Rwanda are protected, conserved, managed and developed in an integrated and sustainable manner to facilitating public to access to information related to water use in Rwanda. Although useful, this portal can be expanded.

This project, therefore, provides a good opportunity to **develop an automated and complete hydrological monitoring network**, and to ensure that hydrological data is available in a timely manner through innovative software packages. By implementing a monitoring framework, IT systems, and the required infrastructure, Rwanda will be able to monitor water quantity and quality for both surface and groundwater. To meet its objectives, this project will be supported by innovative software that translates hydrological data to users (e.g. providing early warnings when runoff is high and floods are projected), and also ensure that data is easily available to institutions that require the data for decision-making processes (e.g. city planners and disaster management officials).

It is important that this project builds on the water portal. There is an opportunity for a more granular approach to water resource monitoring. Therefore, a survey at locations so as to calibrate the gauging stations will be required. This will be useful in not only identifying sensitive sites that require monitoring, but also currently existing sites that require improvements.

COMPONENT 2: CATCHMENT RESTORATION

As populations grow, the demand for natural resources increases. Currently, in Rwanda, most streams are poorly managed, resulting in overgrazing and soil compaction, loss of water retention capacity of soils, excessive surface water run-off, soil erosion and loss of soil fertility. Added to this, deforestation in order to get firewood, land clearing for shelter construction, and bush burning in order to get land for crop and cattle farming, is severely degrading the vegetation. It is therefore crucial that the connectivity between the natural resources such as water, land, and energy is adequately considered.

This requires that land-use and catchment management is viewed in a holistic manner. More importantly, there is a need for more integrated catchment management and restoration, targeted at catchments that are already degraded. For example, promoting reforestation and terracing of hilly areas, will not only serve as an ecosystem function, but also prevents erosion and landslides. This component will also ensure that the catchments are restored to their natural state.

Project 1: Catchment Rehabilitation (through Agriculture)

The overall objective of this project is to enhance the protection of vulnerable river(s) in Rwanda. Apart from restoring the river banks, the project will also improve the water quality in the water and increase soil productivity. There is, therefore, an opportunity of planting trees that have a commercial agriculture potential, and also include women and the local rural communities as a core part of the project implementation. The outcome of this project will therefore not only be a restored catchment, but also a population that is empowered by increasing climate resilience through: (1) improved economic opportunities by improving sources and opportunities for generating income for the communities, and (2) sustainable livelihoods by building capacity and promoting sustainable food supply.

Similar projects were implemented in the Nyamagabe District (in the Mwogo Catchment) and in the Nyagatare District. These offer valuable lessons and also highlight the value for the money offered by this type of project. As a tried and tested project in Rwanda, and makes sense to expand the project to other areas in the country.

This project will be implemented in priority catchments such as Lower Nyabarongo, Upper Nyabarongo, and Lake Kivu Catchments. These catchments have been identified as having a risk of erosion and a high rural population. In addition, it is critical that areas with a favourable agricultural potential are selected so to promote the livelihoods of the population through the agricultural opportunities offered by this project.

There is an opportunity to link this project with the IWRM Fund established by the Water for Growth project.

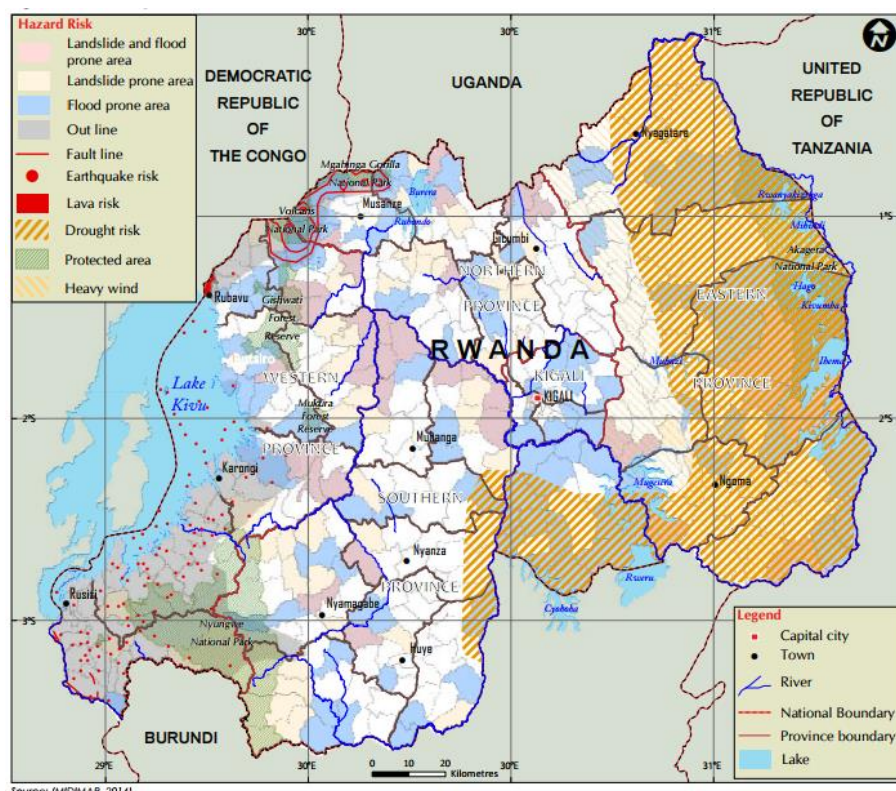


Figure 13: Hazard Prone Areas (REMA, 2015)

This project is very strongly linked to the Forestry Investment Plan's (FIP's) investment programme, *Sustainable forest and landscape management*, which comprises (1) forest rehabilitation in public forests with interventions in surrounding land; (2) capacity building; and (3) revenue diversification. Forest restoration will focus on erosion hotspots, especially water courses and be based around indigenous and multi-purpose tree species where possible to enhance biodiversity corridors and provide income opportunities through extractive use and single tree based management systems. Thus, a linked funding investment may be optimal in order to maximize synergies.

Added to this, during the project design phase, opportunities for designing a project that combines the advantages offered by this project, with Component 2 (Project 2) and Component 3 (Project 2) of this Programme, together with Component 1 (Project 1) of Programme 4, should be explored. This is critical since these three projects address various elements of catchment restoration, erosion control and slope stability.

Project 2: Implementing the Water-Energy-Food Nexus (through Hydropower)

This project will be targeted at the water-energy-food nexus. The nexus affects the extent to which water, energy and food security objectives can be simultaneously achieved. Water is required for extracting and processing fossil fuels as well as for generating electricity from various sources. Conversely, disruptions in the provision of energy services, which are essential for water treatment, production and distribution, also have direct implications for water security. Vulnerabilities in water and energy supply also pose critical risks for food security, as severe droughts and fluctuations in energy prices can affect the availability, affordability, accessibility and utilisation of food over time. Renewable energy could address some of the trade-offs between water, energy and food, bringing substantial benefits in all three sectors, by providing energy services using less resource-intensive processes and technologies, compared to conventional energy technologies.²⁰²

This project focuses on **renewable energy as a part of the water water-energy-food nexus**. Through this project, two things will emerge: (1) a more holistic understanding of the advantages and disadvantages of energy options, which are critical to the Rwanda energy landscape but also have considerable linkages to natural resources and agriculture; and (2) implementing of projects that explore the positive aspects of the nexus, such as investments in energy (fuel) resources that have a low impact on natural resources, or agricultural projects that minimise the impact on hydropower.

Rwanda's energy sector is heavily dependent on environmental resources with around half of its electricity coming from hydropower and more than 80% of the population depending on fuel wood for their energy needs; hydropower and biofuel are, however, vulnerable to the impacts of climate change. As Rwanda is highly vulnerable to climate change and natural disasters, the country's energy resources are at risk. This means that the country needs to increase its efforts to adapt and mitigate against the impacts of climate change and preserve the environment.²⁰³

Hydropower is seen as a way forward in Rwanda, for not only increasing the country's energy capacity and the access to energy, but also minimising fuelwood usage and the associated deforestation. The country's overall potential is estimated at about 400 MW but the current installed hydro capacity is 98.5 MW. As a result of extremely low operational costs, hydropower is still one of the cheapest forms of generation in the long run.²⁰⁴

This project, therefore, focuses on the development of hydropower as an alternative clean energy source to reduce dependence on fuelwood in order to reverse deforestation (and improve slope stabilisation).²⁰⁵ This project also has the opportunity to promote catchment rehabilitation and river bank stabilization, as engineering designs (such as canals) may need to be constructed in areas to ensure that hydropower plants function efficiently and are sustainable.

A priority area for this project is the Upper Nyabarongo Catchment, where 36 sites have been identified for micro-hydropower plant installations (under the Hydropower Development Master Plan and under the catchment planning process). Most sites identified have a potential of between 50 kW and 1 MW; the location of each site within the catchment will be determined during the inception phase.²⁰⁶

This project will be focused on securing funding for all phases of this project (from feasibility to operation), and ensuring that the power plants are built. Potential opportunities for private-public partnerships exist with Water for Growth.

This project will entail assessing and implementing the water, energy and food nexus at the catchment and national level. It will be targeted at minimising the negative effects of the nexus in identified areas. It is envisaged that, over the years, this project be replaced by a project under one of the following project themes:

1. Promoting sustainable biomass and preventing erosion and catchment degradation
2. Subsistence farming and links to deforestation, resulting in erosion and catchment degradation (with possible links to Programme 1)
3. Promoting alternative options to household energy sources, and thus preventing erosion and catchment degradation (with possible links to Project 1 under this component, and the fuelwood Project under Programme 4)
4. Expanding the national energy network through greener options that also have minimal impacts on river banks and on community sources of livelihoods (the project proposed for this SPCR falls under this theme)

Added to this, during the project design phase, opportunities for designing a project that combines the advantages offered by this project, with Component 2 (Project 1) and Component 3 (Project 2) of this Programme, together with Component 1 (Project 1) of Programme 4, should be explored. This is critical since these three projects address various elements of catchment restoration, erosion control and slope stability.

COMPONENT 3: CLIMATE RESILIENT WATER INFRASTRUCTURE

As the competition for water resources in Rwanda continues to increase, driven both by population growth and economic development, it is critical to continue providing water to all members of society. This includes not only effective planning, but also implementing engineering designs that serve multiple purposes (such as multi-purpose dams). In times of variability, sustainable water supply requires climate resilient water infrastructure. This is unfortunately currently lacking, particularly large multi-purpose storage or upland small dams, as well as wetlands.

Project 1: Large-scale Water Storage Infrastructure

Infrastructure development is seen as one of the key investment areas in enhancing water security in Africa. In Rwanda, promoting water storage in the eastern parts, which are often exposed to droughts, is key to building climate resilience. This can be achieved by promoting green infrastructure and multi-purpose dams, which will enable the country to improve water security in the country, and therefore achieve the objectives outlined in Vision 2020.

Strategies for building resilience need to be either low-cost and easy to implement, or either win-win or no/low regret investment options (i.e. where the investment in the project will result in benefits regardless of the extent of climate change, and would not cause detriment). The Muvumba Multipurpose Dam (in Nyagatare District in the Eastern Province) achieves this by storing water in periods of high-flow in order to minimise the impacts of droughts and promote more sustainable water access – the dam is expected to secure stable water resources for domestic water supply, livestock, irrigation and hydropower generation, by collect water on catchment area of 942.7 km², of which 62% is located in Uganda

This project is aimed at building climate resilience in Rwanda by:

- supporting the update and/or development of 3 feasibility studies on dams that have been prioritised in Rwanda. This will ensure that climate is mainstreamed into the project design, and that the advantages offered by the dam(s) in managing climate variability are highlighted. This should be done for future infrastructure projects in Rwanda; and
- building of the Muvumba multi-purpose dam.

Project 2: Small-Scale Water Storage Infrastructure

Due to the uncertainties associated with climate change, dams are one of the most vulnerable types of infrastructure to climate change.²⁰⁷ Therefore, if Rwanda puts all of its eggs in one basket, it may become more vulnerable to the impacts of climate change (such as climate variability).

In regions expected to become drier (such as the Eastern and Southern Provinces of Rwanda) there may be a stronger rationale for constructing more small and medium-sized reservoirs as opposed to fewer large dams. In addition to hedging drought risks, the costs of abandonment and new build are more affordable than those associated with large reservoirs.²⁰⁸ A 2011 World Bank report recognized that "long-lifespan infrastructure, is generally less adaptable to changes whereas short-lifespan infrastructure can be replaced in the long term as the climate changes."²⁰⁹

As stated in Project 1 of this component, strategies for building resilience need to be either low-cost and easy to implement, or either win-win or no/low regret investment options. In addition to the cost advantages identified above, environmental and social impacts of small dams are more widely distributed, but it is

difficult to generalise as to whether their cumulative impacts will be greater or less than a few large reservoirs. Where the dams are small enough not to impede fish migration or alter river flows and sediment movement, such as with many run-of-river schemes, their impact may be low. Small multifunctional water storage will provide a wider range of benefits including local water storage for domestic and small-scale industrial use, and habitat for small-scale aquaculture.²¹⁰

This project will be implemented in the Akanyaru, Muvumba, Lower Nyabarongo, Upper Akagera and Lower Akagera Catchments (i.e. the Eastern and Southern Provinces). The dams should be tailored for local needs, more directly address local livelihoods and poverty, and permit more input and control from local users.²¹¹ Added to this, dispersed networks of small dams may provide more flexibility, thereby reducing hydrological risk and hedging drought risks. Therefore, to maximise potential benefits, the dams should have the following elements built into the design and should be located in areas where these benefits can be achieved:

- Regulating river runoff (i.e. storage during rainy season and release during dry season)
- Promoting groundwater recharge
- Enabling water supply for local rural communities to promote agriculture (i.e. irrigation)
- Location specific dam size (i.e. either multiple micro-small dams or one small-medium sized dam).

This type of infrastructure has been very successful in India. A study was conducted in the dryland districts, namely, Dahod in Gujarat and Jhalawar and Banswara in Rajasthan state, to assess the impacts of small check dams. The study showed that 356 dams built during 1990-2012 across the tribal drylands, with a cost of USD 17 million, benefited over one million people from farming communities. The dams also increased groundwater levels in villages, revived rivers during dry season and increased forest growth along rivers, ultimately mitigating local climate change-imposed negative consequences.

Source: Agoramoorthy, G, and Minna J Hsu, MJ, 2016. Small dams revive dry rivers and mitigate local climate change in India's drylands. International Journal of Climate Change Strategies and Management, Vol. 8 Issue: 2, pp. 271-285, <https://doi.org/10.1108/IJCCSM-12-2014-0141>

Added to this, during the project design phase, opportunities for designing a project that combines the advantages offered by this project, with Component 2 (Project 1 and 2) of this Programme, together with Component 1 (Project 1) of Programme 4, should be explored. This is critical since these three projects address various elements of catchment restoration, erosion control and slope stability.

Project 3: Rainwater Harvesting: Urban, Rural and Agriculture Applications

Promoting water storage in the Rwanda is critical, particularly since the country is often exposed to droughts. Added to this, rapidly growing cities often struggle to keep up with growing water demands, particularly at a household level. By providing rainwater harvesting infrastructure at a household level, the country will reduce the demand on the national water supply system, and will increase water access and ensure that the population builds climate resilience and livelihoods. In addition, providing rainwater harvesting infrastructure for agriculture purposes will enable the country to promote subsistence farming as a source of livelihood.

This project, therefore, includes **expanding the pilot rainwater harvesting projects** that have been implemented in the country. This will enable the country to improve water security and reduce poverty (through agriculture) in the country, and therefore achieve the objectives outlined in Vision 2020. This project can also be integrated as part of a larger water infrastructure project that promotes issues such as storm-water and water supply infrastructure in settlements.

This project will be implemented in the Akanyaru, Muvumba, Upper Akagera and/or Lower Akagera Catchments (i.e. the Eastern and Southern Provinces), as well as in the City of Kigali. This project offers the opportunity to expand previously implemented projects targeted at rainwater harvesting.

G 2.3. Indicative Costing

Below is a detailed representation of the costs associated with each component and project.

Estimated Total Cost: \$310 475 000

INTEGRATED STRATEGIC WATER RESOURCE PLANNING AND MANAGEMENT

Strategic catchment planning for all Level 1 catchments

SCHEDULE OF QUANTITIES	COST (US\$)	DESCRIPTION
1 INFORMATION & DATA ACQUISITION <i>Ensures the project is based on credible sources</i>	US\$ 250,000	<ul style="list-style-type: none"> Source information from existing catchment restoration projects by Water for Growth, including: Upper Nyabarongo, Nyabugogo, Sebeya and Muvumba; Assess preliminary opportunities to expand on the Water for Growth catchment restoration projects to date, including comprehensive set of lessons learnt; and Collect information and data to perform situational analysis for catchment authorities in five identified Level 1 catchments.
2 STAKEHOLDER CONSULTATION <i>To involve authorities, and interested and affected communities</i>	US\$ 250,000	<ul style="list-style-type: none"> Institutional collaboration at all required governance levels, particularly those institutions (catchment authorities) that require a situational analysis to support the strategic catchment restoration plans; and Engage government officials and communities in five Level 1 catchments to ascertain the critical improvement zones. Three stakeholder consultation sessions should be sufficient in each of the Level 1 catchments over the duration of the project.

3	DELIVERABLES <i>Reports, strategies and/or action plans</i>	US\$ 1,250,000	<ul style="list-style-type: none"> • Scope improvements to five level 1 catchments, in addition to the sub-catchments in the Lake Kivu catchment that fall outside the Sebeya sub-catchment); • Develop five strategic catchment plans for Rusizi, Mukungwa, Akanyaru, Upper Akagera and Lower Akagera, as well as the sub-catchments in the Lake Kivu catchment that fall outside the Sebeya sub-catchment; and • Conduct a comprehensive situational analysis for the catchment authorities and supporting institutions within the five identified Level 1 catchments, and make recommendations for institutional strengthening in each.
4	TRAINING & AWARENESS <i>Upskilling and education for authorities and/or interested and affected communities</i>	US\$ 250,000	<ul style="list-style-type: none"> • Carry out training among the identified government authorities, including catchment authorities, in the five identified Level 1 catchments; • Training sessions should be provided 3 times in each of the five identified catchments.
A	SUB-TOTAL	US\$ 2,000,000	Sum 1 - 4
B	CONTINGENCY	US\$ 200,000	10% of A
C	TOTAL	US\$ 2,200,000	A + B

Groundwater study and mapping exercise

SCHEDULE OF QUANTITIES		COST (US\$)	DESCRIPTION
1	INFORMATION & DATA ACQUISITION <i>Ensures the project is based on credible sources</i>	US\$ 2,000,000	<ul style="list-style-type: none"> • Collecting and collating information on all groundwater and surface-water studies to date; • Identification of 10 sites - key catchments and localised areas - to conduct groundwater and surface-water studies in 5 secondary cities. • Carry out a series of borehole logs, installation of pilot abstraction wells, water quantity and quality tests, over a period of 12 months, at all 50 sites.
2	STAKEHOLDER CONSULTATION <i>To involve authorities, and interested and affected communities</i>	US\$ 500,000	<ul style="list-style-type: none"> • Conduct a series of stakeholder engagements among officials to ascertain the most appropriate sites for groundwater and surface-water studies; • Conduct pre-screening site visits of identified sites before commencing studies.
3	DELIVERABLES <i>Reports, strategies and/or action plans</i>	US\$ 2,000,000	<ul style="list-style-type: none"> • Produce groundwater and surface-water reports for all 50 sites; • Produce a synthesis report of groundwater and surface water abstraction opportunities.
4	TRAINING & AWARENESS <i>Upskilling and education for authorities and/or interested and affected communities</i>	US\$ 500,000	<ul style="list-style-type: none"> • Conduct several groundwater abstraction training sessions among officials in all secondary cities; • Conduct several groundwater and surface-water quality training sessions among officials and communities in all secondary cities;
A	SUB-TOTAL	US\$ 5,000,000	Sum 1 - 4
B	CONTINGENCY	US\$ 500,000	10% of A
C	TOTAL	US\$ 5,500,000	A + B

Developing an automated and complete hydrological network

SCHEDULE OF QUANTITIES		COST (US\$)	DESCRIPTION
1	PRELIMINARY	US\$ 250,000	<ul style="list-style-type: none"> • Conducting catchment management studies in all 9 catchments in the country;

	<i>Studies, site identifications and/or agreements required before implementation</i>		<ul style="list-style-type: none"> Identification of 5 priority watercourses in eastern and northern catchments, for a total of 7 key watercourses; Design and procurement of hydrological assessment technologies and software to translate real-time hydrological data in the eastern and northern catchment; Identification of institutional and organisational support in eastern and northern catchment for hydrological infrastructure; Identification of key hydrological areas of importance in southern and western catchments for future hydrological assessment technologies and software.
2	UTILITIES & SERVICES <i>To support the projects implementation</i>	US\$ 100,000	<ul style="list-style-type: none"> Small-scale supporting infrastructure for hydrological assessment technologies and software, for 7 priority watercourses.
3	INFRASTRUCTURE <i>The hard civils infrastructure required for the project</i>	US\$ 4,200,000	<ul style="list-style-type: none"> Construction of measurement infrastructure on priority watercourses in eastern and northern catchments, including channels, canals and weirs, for the 7 priority watercourses. A unit cost of US\$600,000 per watercourse, which will vary according to watercourse length, width and priority sites.
4	PLANT & EQUIPMENT <i>The hard mechanical-electrical components required for the project</i>	US\$ 6,300,000	<ul style="list-style-type: none"> Installation of hydrology and hydraulic measurement equipment in the 7 priority watercourses; An allowance of approximately US\$ 900,000 is provided for each watercourse, for hydrologic monitoring and measuring equipment.
A	SUB-TOTAL	US\$ 10,850,000	Sum 1-4
B	CONTINGENCY	US\$ 1,085,000	10% of A
C	TOTAL	US\$ 11,935,000	A + B

CATCHMENT RESTORATION

Catchment Rehabilitation: Agriculture Project

SCHEDULE OF QUANTITIES		COST (US\$)	DESCRIPTION
1	PLANNING & IDENTIFICATION OF SITES	US\$ 200,000	<ul style="list-style-type: none"> Identify stretches of river equating to 1,500km of total intervention.
2	AFORESTATION OF RIVER BANKS & SUPPORTING INFRASTRUCTURE	US\$ 30,000,000	<ul style="list-style-type: none"> It is assumed that each river bank will be planted to a depth of 80m, resulting in a total area covered of 30,000 ha. Supporting infrastructure will be implemented where required. Cost per hectare assumes that trees will be planted that support agriculture and that hard infrastructure will also be put in place where required.
3	PROJECT MANAGEMENT	US\$ 2,400,000	<ul style="list-style-type: none"> Project management costs are assumed to represent 8% of physical interventions.
A	SUB-TOTAL	US\$ 32,600,000	Sum 1-3
B	CONTINGENCY	US\$ 3,260,000	10% of A
C	TOTAL	US\$ 35,860,000	A + B

Implementing the water-energy-food nexus: Hydropower Project

SCHEDULE OF QUANTITIES		COST (US\$)	DESCRIPTION
1	PRELIMINARY	US\$ 1,200,000	<ul style="list-style-type: none"> Support for Water for Growth's development of hydropower as an alternative clean energy sources to reduce dependence on fuel

	<i>Studies, site identifications and/or agreements required before implementation</i>		<p>wood is a key element of the strategy to reverse deforestation, which can also aid in slope stabilisation;</p> <ul style="list-style-type: none"> • Sites for development of micro-hydropower projects have been identified under the Hydropower development master plan; • Technical and financial feasibility studies will be conducted and thereafter the sites can be tendered out to private developers; • Review of provision of subsidies for pico-hydro equipment from a basket fund; and • Assist entrepreneurs or village cooperative to develop financial skills and business development plans
2	UTILITIES & SERVICES <i>To support the projects implementation</i>	US\$ 300,000	<ul style="list-style-type: none"> • Provide supporting infrastructure, namely: access roads, and piped reticulation for potable water and sewer (where required). • A provision of US\$5,000 is made per identified site.
3	INFRASTRUCTURE <i>The hard civils infrastructure required for the project</i>	US\$ 300,000	<ul style="list-style-type: none"> • Retrofitting of 50kWp to 1MWp pico-hydropower systems on existing bulk pipework at 36 sites in the Upper Nyabarongo Catchments; • Provision of control rooms, MMC rooms and motor houses for pico-hydropower systems; and • A provision of US\$8,000 is made per identified site.
4	PLANT & EQUIPMENT <i>The hard mechanical-electrical components required for the project</i>	US\$ 400,000	<ul style="list-style-type: none"> • Installation of 36 pico-hydropower turbines and associated mechanical-electrical equipment in the Upper Nyabarongo Catchments; • A provision of US\$10,000 is made per identified site. • Trainings of local entrepreneurs in turbine manufacture and plants operations and maintenance; • Training on the dimensioning of turbines.
A	SUB-TOTAL	US\$ 2,200,000	Sum 1-4
B	CONTINGENCY	US\$ 220,000	10% of A
C	TOTAL	US\$ 2,420,000	A + B

CLIMATE RESILIENT WATER INFRASTRUCTURE

Large-scale water storage infrastructure

SCHEDULE OF QUANTITIES	COST (US\$)	DESCRIPTION
1 INFORMATION & DATA ACQUISITION <i>Ensures the project is based on credible sources</i>	US\$ 50,000	<ul style="list-style-type: none"> • Collect information for the Muvumba Multipurpose Dam feasibility study and implementation phases; • Develop lessons learnt and associated recommendations from Muvumba Multipurpose Dam project that focus specifically on climate resilience; and • Identify three additional multipurpose dam projects in the eastern and northern catchments, scaling up the lessons learnt from the Muvumba Multipurpose Dam project.
2 STAKEHOLDER CONSULTATION <i>To involve authorities, and interested and affected communities</i>	US\$ 150,000	<ul style="list-style-type: none"> • Conduct a series of stakeholder engagements among government officials and affected communities in the identified three additional catchments; and • Use engagements of government officials and communities to develop lessons learnt from Muvumba Multipurpose Dam project.
3 DELIVERABLES <i>Reports, strategies and/or action plans</i>	US\$ 3,600,000	<ul style="list-style-type: none"> • Assess and document multiple uses for the three additional multipurpose dam projects, focusing on: include water supply, irrigation, hydro-power, and regulating river discharge; and • Conduct a feasibility study of the climate resilient actions for the three additional multipurpose dam projects.
4 PRELIMINARY REQUIREMENTS FOR	US\$ 2,500,000	<ul style="list-style-type: none"> • The detailed design and final costing must be carried out.

	CONSTRUCTION OF MUVUMBA MULTIPURPOSE DAM <i>Detailed design and agreements required before implementation</i>		<ul style="list-style-type: none"> Drafting of implementation schedules, performance specifications and the facilitation of procurement for construction. The cost includes the facilitation of all agreements between private and public entities before financial close.
5	CONSTRUCTION OF MUVUMBA MULTIPURPOSE DAM <i>Including utilities and services, infrastructure and plant and equipment</i>	US\$ 170,000,000 ¹⁰	<ul style="list-style-type: none"> On 21st January 2015, the steering committee meeting of Muvumba multipurpose dam project has approved the feasibility study of Muvumba multipurpose dam. The dam will be located in Nyagatare District, Karama and Gatunda sectors and is expected to secure stable water resources for domestic water supply (135.1MCM/) in Nyagatare, Karangazi and Rwimiyaga sectors, livestock (0.7.106m³) in Musheli, Rwempasha, Tabagwe, Nyagatare and Rukomo sectors, irrigation (5,820ha) and hydropower generation (6.039 Gwh/year). The dam will have total storage of 73.16 million cubic meter (38m of height; 1,195 m of length and reservoir area of 5.56 km²). It will collect water on catchment area of 942.7 km² of which 62% is located in Uganda. This study was also presented together with its environmental impact assessment study, resettlement and compensation plan. 3,947 inhabitants of Karama and Gatunda sectors will be affected either because they live or own properties in area to be submerged by the dam.
6	TRAINING & AWARENESS <i>Upskilling and education for authorities and/or interested and affected communities</i>	US\$ 200,000	<ul style="list-style-type: none"> Training at all levels of government and all stakeholders; and Sessions to be undertaken in all secondary cities.
A	SUB-TOTAL	US\$ 176,500,000	Sum 1 - 6
B	CONTINGENCY	US\$ 17,650,000	10% of A
C	TOTAL	US\$ 194,150,000	A + B

Small-scale water storage infrastructure

SCHEDULE OF QUANTITIES	COST (US\$)	DESCRIPTION
1 FEASIBILITY STUDY	US\$ 1,750,000	<ul style="list-style-type: none"> Option analysis studies will be conducted for 5 catchments, which will analyse different technical solutions for up to 6 sites in each catchment. Each study will conclude on the 2 most viable sites and the associated infrastructure solutions (i.e. multiple micro dams/reservoirs) by ranking them in terms of cost, environmental impact, social impact etc. Cost per catchment: US\$350,0000
2 PREPARATION OF DETAILED DESIGNS <i>Detailed design and agreements required before implementation</i>	US\$ 1,500,000	<ul style="list-style-type: none"> The detailed design and final costing must be carried out. Drafting of implementation schedules, performance specifications and the facilitation of procurement for construction. The cost includes the facilitation of all construction agreements Cost per catchment to develop designs for 2 facilities/sites: US\$300,0000

¹⁰ According to the approved feasibility study conducted by K-Water and Yooshin companies, the preliminary cost for the dam is estimated to 172,555,021 USD (as at 21st Jan 2015) although the final cost will be provided after detail design. It is assumed that the capital cost for construction excludes the preliminary costing associated with the detailed design, final costing exercise, performance specifications, procurement, and facilitation of agreements between all contracting parties. This has been costed separately.

3	CONSTRUCTION OF INFRASTRUCTURE	US\$ 40,000,000	<ul style="list-style-type: none"> \$8 million is budgeted for construction costs per catchment (to cover multiple micro dams/reservoirs on 2 sites per catchment)
4	TRAINING & AWARENESS <i>Upskilling and education for authorities and/or interested and affected communities</i>	US\$ 150,000	<ul style="list-style-type: none"> Training at all levels of government and all stakeholders
A	SUB-TOTAL	US\$ 43,400,000	Sum 1 - 4
B	CONTINGENCY	US\$ 4,340,000	10% of A
C	TOTAL	US\$ 47,740,000	A + B

Rainwater Harvesting: Urban, Rural and Agriculture Applications

SCHEDULE OF QUANTITIES		COST (US\$)	DESCRIPTION
1	PRELIMINARY <i>Studies, site identifications and/or agreements required before implementation</i>	US\$ 500,000	<ul style="list-style-type: none"> Identification of cities, farmers, communities and rural nodes for the application of 25,000 RWH systems over 4 years; Identify opportunities to integrate with Sustainable urban Drainage System (SuDS) Treatment Trains; Environmental and/or social compliance reporting and requirements; Strengthening the existing loan scheme for RWH facilities, and revisit subsidy and loan system basing on Ubudehe categorization; Preliminary designs and costing; and Detailed designs, costing and procurement.
2	UTILITIES & SERVICES <i>To support the projects implementation</i>	US\$ 200,000	<ul style="list-style-type: none"> Provision of supporting utilities and services necessary to support the installation of RWH systems; Disseminating very low cost (artisan) RWH techniques for rural poor households.
3	INFRASTRUCTURE <i>The hard civils infrastructure required for the project</i>	US\$ 9,000,000	<ul style="list-style-type: none"> Capital costs for the construction of RWH systems for urban, farming and rural households and pre-selected public buildings. Assume that 60% of the capital cost to be funded by the beneficiaries of the RWH scheme¹¹.
A	SUB-TOTAL	US\$ 9,700,000	Sum 1-4
B	CONTINGENCY	US\$ 970,000	10% of A
C	TOTAL	US\$ 10,600,000	A + B

G 3. INVESTMENT PROGRAMME 3: CLIMATE RESILIENT HUMAN SETTLEMENTS

G 3.1. Objective

Objective: To improve climate resilience in Rwanda by ensuring that the country's built environment will be designed and constructed in ways that allow infrastructure and service delivery in human settlements to be more flexible and resilient to temperature and rainfall extremes as well as extreme weather, and to

¹¹ This amount will cover 100% the cost for RWH facilities to be purchased through "loan only"; 70% of the cost of the facilities through "loan and subsidy" and 50% for the low-cost systems.

enable climate change adaptation in human settlements to be achieved in a manner that increases rural and urban socio-economic prosperity, promotes economic growth, and thereby reinforces broad-based resilience to climate change.

This investment programme focuses on (1) climate-conscious integrated land use planning and spatial planning (2) storm-water and drainage management; (3) urban waste management; and (4) climate-robust road transport infrastructure.

G 3.2. Components and Projects

Components and projects will be identified and scoped during a detailed project design phase, with the frameworks provided in this section. It remains critical that the SPCR steering committee and funding partners ensure that the scoping and detailed project design should explicitly reflect the needs and interests of women and vulnerable groups. The detailed scoping and design stage must also ensure that institutional arrangements for each project (which will likely be shaped by the funder's own requirements) should promote knowledge-product generation and the capturing of lessons learnt.

Indicatively, investment programme three's components and projects are as follows:

COMPONENT 1: CLIMATE-SENSITIVE INTEGRATED LAND USE PLANNING AND SPATIAL PLANNING

This component's objective is to build climate change resilience in Rwanda by ensuring that future climate change considerations are mainstreamed into Rwanda's land use planning process, so that integrated land use planning and spatial planning can shape Rwanda's development in more climate-compatible ways and can embed climate change resilience into the country's evolving built environment.

Throughout the course of the SPCR development process, stakeholders from different sectors and institutional affiliations stressed the need for more advanced land use planning approaches in Rwanda, especially the need for comprehensive spatial planning for Rwanda's growing urban centres. It was noted repeatedly that while Rwanda does have a land use master plan, it needs to be revised with plausible climate change futures in mind. Similarly, while Rwanda does have a host of strategies and plans focused on urban development (Urbanization Sector Strategic Plan for EDPRS II; National Urban Housing Policy; National Urbanization Policy; National Informal Settlement Upgrading Strategy, amongst others), none of them meaningfully integrate climate change. This leaves these plans unable to support medium to long term climate change resilience in Rwanda.

Some (but not all) of Rwanda's population centres have Local Land Development Plans. These too are not currently responsive to climate change projections, and have not relied on advanced spatial planning

methods. Recognizing the need for a comprehensive approach to urban planning, in 2016 Rwanda launched an effort to develop or revise (i) Conceptual Urban Master Plans; (ii) Local Land Development Plans; and (iii) Land Subdivision Plans (detailed physical plans) for its six secondary cities.²¹² However, this effort did not actively seek to integrate climate change factors into the planning process.

Land use planning is gaining recognition globally as one of the most fundamental and most impactful opportunities to build climate change resilience, especially over a longer time horizon.²¹³ In Rwanda, a revision of the National Land Use Master Plan, and the recently initiated development (and revision) of Urban Master Plans and Local Land Development Plans, represent two distinct and important opportunities to mainstream climate change resilience into the built environment, especially human settlements.

Project 1: Updating Rwanda's National Land Use Master Plan to integrate future climate change

The project is designed to take a phased approach from planning to ground-level interventions, with the goal of mainstreaming of climate resilience into a revised National Land Use Master Plan. The project is structured to not only result in a plan that takes future climate change into account, but also to support the acquisition of advanced land use planning tools and technologies that will better equip Rwanda's land use planning community, and to provide the necessary training and capacity building to enable land use planners to use specific tools and approaches to factor in climate change in their decision-making for both rural and urban areas.

The project will thus be multi-pronged, and will entail:

- a. Information and data acquisition: support for sourcing the existing national land use master plan and all supporting information to inform a consolidated national climate-responsive planning strategy; strategic discussions and interviews with officials and key private stakeholders in land use planning, spatial planning, and urban planning; collection and collation of research studies of national level climate change risks and vulnerability across Rwanda.
- b. Stakeholder consultation: support for a collaborative and participatory approach to revising, updating, strengthening the national land use master plan through the integration of climate change considerations. This will entail several consultative workshops over a two-year period, both in Kigali and in the country's five provinces.
- c. Software acquisition, training, and commissioning: support for selecting and rolling out the necessary technical infrastructure. The project implementation team will review and carefully study a range of available user-friendly software-based tools that aid in national master planning and the integration of climate change scenarios and projections into land use planning. The software should have key climate resilient and sustainability indexing functionality, including national sustainability and liveability analysis,

to inform immediate, short, medium, and long-term settlements planning and the siting of associated infrastructure. This will be a consultative process with the Rwandan land use planning community in order to ensure that the technical tool selected can be used widely in Rwanda, will suit and reflect Rwandan needs, and the Rwanda will be able to sustain and continue the use of such technology after the completion of the project. Example tools to examine before making a final decision include (but are not limited to) ESRI's ArcGIS, ArcIMS, ArcSDE; INDEX; I-Place etc. Once a selection is made and the software tool acquired (within a six-month period), this will be followed by six months of training workshops to train personnel who would use and implement the tools. Process-flow diagrams will be developed to indicate how national master planning software interfaces with city-scale master planning.

- d. Production of final climate-sensitive or climate-compatible national land use master plan: support for updating of the national land use master plan with climate change factored in. This will be an iterative process that will include learning-by-doing as well as guidance by external experts. This revised plan will include spatial development frameworks for Rwandan provinces with climate change futures taken into consideration.
- e. Training and awareness: support for development of decision-support systems and analytical frameworks to assist urban and spatial planners. This will include training for individuals beyond the core technical staff trained to use the software. Beyond the software tools a number of analytical tools or decision support systems are involved in the integration of climate change into land use planning, and significant learning is required about key concepts and approaches. It will be important that this broader knowledge-base is also strengthened in Rwanda. Thus, the project will include structured training programmes for officials involved in land use and spatial planning in Rwanda, to equip them to integrate climate change into future planning processes. A complete national master planning course will be constructed (certified by a registered national certification authority) for the training. In particular, the training will help planners understand the interfacing and alignment of national land use master plans, climate risk and vulnerability maps, spatial development frameworks, and other key planning instruments. Such training will ensure that there is a progressive gender balance in the training beneficiaries.

The location of such activities will be predominantly in Kigali (e.g. trainings and soft-ware installation) but stakeholder workshops to solicit input will be nationwide, with one in each province in Rwanda.

Project 2: Climate-responsive urban spatial development master plans for six secondary cities.

The project is designed to ensure the integration of climate change into local spatial development plans being prepared for six secondary cities (complementing them with climate risk and vulnerability maps), and embedding climate change into the local planning apparatus through training and staff development.

The project will have several key elements:

- a. Information and data acquisition: support for sourcing any existing drafts of Local Land Development Plans or Urban Master Plans and all supporting information for the six secondary cities; strategic discussions and interviews with local officials and key non-governmental stakeholders in land use planning, spatial planning, and urban planning; collection and collation of research studies of local climate change risks and vulnerability, sustainability, and environmental protection in the six secondary cities.
- b. Stakeholder consultation: support for a collaborative and participatory approach to revising, updating, strengthening urban spatial development plans and local land development plans through the integration of climate change considerations. This will entail several consultative workshops over two years, especially to ensure accurate priority-setting and identification of climate resilience needs that should be reflected in city-scale plans.
- c. Software acquisition, training, and commissioning: support for selecting and rolling out the necessary technical infrastructure. The project implementation team will review and carefully study a range of available user-friendly software-based tools that aid in city-scale master planning and the integration of climate change scenarios and projections into urban land use planning. The software should have key climate resilient and sustainability indexing functionality, including local, city-scale sustainability and liveability analysis, to inform immediate, short, medium, and long-term settlements planning and the siting of associated infrastructure. This will involve a consultative process with the Rwandan land use planning community in order to ensure that the technical tool selected can be used widely by city planners and that city governments will be able to sustain and continue the use of such technology after the completion of the project. Once a selection is made and the software tool acquired (within a six-month period), this will be followed by six months of training workshops to train personnel who would use and implement the tools. Process-flow diagrams will be developed to indicate how national master planning software interfaces with city-scale master planning.
- d. Production of final climate-sensitive or climate-compatible planning instruments: support for the integration of climate change into six secondary city urban master plans and local land development plans currently under development (or under revision); development of detailed climate change risk and vulnerability maps for all six secondary cities.
- e. Training and awareness: support for introduction of analytical tools, frameworks, and decision-support systems to assist urban and spatial planners; structured training programmes for national and local officials involved in land use and spatial planning in Rwanda, to equip them to integrate climate change into future planning processes as well as to co-create local (secondary city and district level) climate

risk and vulnerability maps; and to train the officials and service providers responsible for updating or creating urban master plans and local land development plans in methods and tools that will ensure climate change informs the plans generated. A complete city master planning course will be constructed (certified by a registered national certification authority) for the training. In particular, the training will help planners understand the interfacing and alignment of local land use master plans, local climate risk and vulnerability maps, spatial development frameworks, and other key city-scale planning instruments.

In terms of project location, the project would be implemented in the six secondary cities: Muhanga, Huye, Rubavu, Nyagatare, Musanze and Rusizi.

COMPONENT 2: CLIMATE RESILIENCE THROUGH STORM-WATER AND DRAINAGE MANAGEMENT

This component's objective is to build climate change resilience in Rwanda by strengthening adaptive capacity in human settlements in terms of better preparedness for large volumes of rainfall, enhanced drainage and absorptive systems to channel heavy rainfall and avoid accumulation, and reduced flooding through improved storm-water management.

Floods are already a common occurrence in Rwanda, and are expected to increase with climate change. Studies indicate that over the last two decades in Rwanda, the most commonly observed natural disasters were the result of heavy precipitation in single, intense events.²¹⁴ Climate change projections strongly suggest that such heavy rainfall events are likely to become more frequent, with higher rainfall volumes expected in each such event. Relative to a 1970 baseline, rainfall variability is also likely to increase by 5-10%, making it harder to predict and prepare for immense volumes of rainfall during specific times of the year.²¹⁵

Flooding and waterlogging in human settlements not only pose a threat to life and property, they impair businesses and trade. For instance, the Nyabugogo business district in Kigali experiences flooding and standing water every year during the rainy season. Small businesses and entrepreneurs in Nyabugogo recently surveyed estimated that such flooding costs them approximately 178 million Rwandan Francs annually. This represents over 23% of their yearly profit.²¹⁶ The flooding also costs the Rwandan exchequer dearly; the government already developed a small drainage channel in the area but waterlogging continues.²¹⁷ This left Rwanda with few options but to take a large loan of \$ 74 million USD from China's Export Import Bank to redevelop the area and build new road networks that will lead to less flooding.²¹⁸

Kigali's flooding challenges have received attention from the Rwandan government, but as secondary cities grow around the country similar challenges will be encountered in other human settlements unless adequate storm-water management and drainage measures are introduced now.

Project 1: Climate-smart storm-water management and drainage initiative in secondary cities

The project will focus on secondary cities, but can be used as a model and replicated (with changes in scale and levels of infrastructure investment in rural settlements as well). However, not all elements are easily fungible between urban and rural settlements; as built areas expand in urban settings, natural infiltration and drainage reduce, giving the challenge a different hue in urban areas and thus also calling for distinct strategies that target urban areas.

The project, targeting four of Rwanda's six secondary cities (recommended by national stakeholders), will comprise:

- a. Preparatory tasks: support for conceptualisation of Sustainable Urban Drainage Systems (SUDS) in the Rwandan context, Best Management Practices (BMPs), and Low Impact Development (LID) with relevant Rwandan authorities; identification of priority neighbourhoods or communities within the chosen cities; selection of household level, source level, and local level SUDS options to collectively form a "treatment train" to tie into larger, regional interventions. Wherever existing pre-feasibility studies or feasibility studies exist, these will be integrated and built on without the project duplicating any prior efforts and to ensure resources are prioritized for new and additional analysis and preparatory activities.
- b. Utilities and services: support for preparation and retrofitting of conventional regional storm-water facilities to enable the use of treatment trains sequentially.
- c. Infrastructure: support for the construction of 10 large-scale treatment trains in the four selected cities. Treatment trains may include (depending on options tailored for specific sites) green roofs, soak ways, permeable pavements, filter strips, swales, infiltration trenches, bio-retention areas, and sand filters. Infrastructure installation is anticipated from the household-scale to the local-scale, tying into the regional infrastructure
- d. Plants and Equipment: support for the installation of necessary equipment and for the construction of infrastructure such as green roofs, bio-retention areas, and sand filters.

In terms of project location, while all six secondary cities will be initially scoped, the primary focus and project emphasis will be narrowed to Musanze, Rubavu, Muhanga and Rusizi, where storm-water management and drainage issues are more problematic (based on stakeholder guidance).

COMPONENT 3: CLIMATE RESILIENCE THROUGH IMPROVED WASTE MANAGEMENT

This component's objective is to build climate change resilience in Rwanda by enhancing human settlements' ability to reduce, re-use, and treat waste (solid waste as well as wastewater) -- thereby improving overall resource-efficiency (making settlements more adaptable in the medium-to-long term) -- and diminishing the levels of contaminants spread by runoff or waterlogging during heavy rainfall events.

Rwanda's waste-related national policy and regulatory architecture displays critical gaps. Somewhat curiously, even though Rwanda does not have an overarching national integrated waste management framework (nor policy, strategy, or guidelines), it has started addressing waste in more sophisticated (albeit piece meal) ways: it has developed a National e-Waste Management Policy,²¹⁹ is funding (through FONERWA) the development of a National e-Waste Strategy and the establishment of sustainable recycling industries,²²⁰ has adopted national guidelines on healthcare waste management,²²¹ has evolved a plan to address the transboundary movement of hazardous wastes and their disposal,²²² and formulated guidelines on the management of waste disposal in landfills.²²³

Yet, even in the face of these multifarious efforts, Rwanda is grappling with underdeveloped waste management capacity, at the policy level as well as infrastructure and operational level. Solid waste management remains a problem in rural and urban settlements.²²⁴ Recognizing this gap, a National Task Force on solid waste management has been conceptualized and charged with devising an integrated approach to waste, but the task force's progress is indeterminate.²²⁵

While one notable effort on consolidated waste management that focused on improved landfills (funded by UNDP) has had a beneficial outcome,²²⁶ other sporadic attempts have fallen short, such as the City of Kigali's efforts to develop a waste to energy project, a composting facility at Nduba, and a new sanitary landfill – documented in a highly critical and telling report by Rwanda's Auditor General.²²⁷

AfDB has recently launched an effort to build landfills and faecal sludge treatment plants in four cities in Rwanda – Rusizi, Karongi, Rubavu, and Musanze.²²⁸ This, however, still leaves waste management needs in the secondary cities of Huye, Muhanga, and Nyagatare unaddressed and also does not extend to rural settlements where sanitation and waste management are growing priorities.

Overall, waste management is an area where Rwanda is falling short. Without adequate systems and infrastructure and trained personnel to address waste management, Rwanda's human settlements are unlikely to provide households and businesses the level of service delivery and municipal support needed for broad-based socio-economic resilience.

Project 1: National Waste Management Flagship Project, including infrastructure development in Three Secondary Cities and Three Rural Settlements

The project lends itself to implementation in multiple sites and is highly replicable and scalable based on available funds. This project is designed with both urban centres (secondary cities) in mind, as well as rural settlements. Therefore, some elements of the project would differ between urban and rural locations and the dual streams of the project would need to be customized during the project scoping and detailed design phase to reflect distinctions in urban and rural settlements (where waste types, sources, and volumes differ, e.g. with agricultural waste being more predominant in rural areas).

This multi-pronged project will cover both the enabling environment as well as hard infrastructure, and will entail:

- a. Preparatory tasks and guidance development: support for a comprehensive status quo assessment of national solid waste and wastewater management in all districts; development of key guidance documents for solid waste and wastewater, i.e. national integrated policy, national integrated strategy, regional and city-wide integrated management plans, national best practice guidelines for government and industry classes etc., building on what's in existence; identification of alternative, sustainable, integrated waste management options – one each for solid waste and for wastewater in each of the six project locations identified; extensive training programme for relevant government officials and key stakeholders to enable effective co-creation of a national integrated waste management policy and strategy, regional and city-wide integrated waste management plans, and best practice guidelines for government and industry. This task will also include carrying out city-wide solid waste characterisation and sewage sludge studies, to determine the calorific value and biomethane potential, respectively, and inform the options analysis in each of the three secondary cities and rural settlement areas.
- b. Utility and services: support for development of necessary infrastructure, institutional capacity, and services to enable the design and implementation of one solid waste and one wastewater project in three secondary cities and three rural settlements. In the rural settlements, the focus would be on designing and implementing interventions that could convert solid waste into compost. Given the location of the rural settlements, the interventions in some of the rural settlements will be designed to integrate and align with the strategy and larger interventions in the secondary cities they are closest to.
- c. Infrastructure: support for implementation of one complete project each for solid waste and wastewater in the three secondary cities and three rural settlements. This entails building of an alternative, sustainable, climate-resilience-focused solid waste management project with a capacity of 100 tonnes a day, as a pilot or demonstration project in three cities; and the building of an alternative, sustainable, climate-resilience-focused wastewater management project with a capacity of 40 million litres a day in

three cities. In rural settlements the infrastructure would be designed to convert solid waste into compost for agricultural use. In cities where it is possible, organic solid waste projects may be integrated with wastewater projects (if for example, anaerobic digestion (AD) is an appropriate solution and co-digestion is favourable). Infrastructure needs in the rural settlements differ, hence options in the rural settlement areas would include optimal reuse of organic waste materials at source through interventions such as urine diversion, compostable toilets, vermiculture, small-scale open-windrow composting, micro-material recovery facilities, bailing and transportation of recyclables, etc. Organic waste products such as compost and vermiculture liquids shall be extracted and used in local agriculture at source.

- d. Plants and equipment: support for installation of small-scale, low-tech, sustainable plant and equipment at each solid waste and wastewater project location in three secondary cities and three rural settlements.

Based on stakeholder preferences, the project could cover the urban areas of Huye, Muhanga, and Nyagatare (where the AfDB's project is not being implemented), and three rural locations that deal with significant volumes of solid waste (domestic or agricultural) and wastewater. The three rural settlements identified by stakeholders are: Muyebe district rural settlement area (with a total of 200 households (115 households in sector 1, 85 in sector 2); Huye district rural settlement area (with a total of 606 households (372 households in Akanyana site, Rurogwe cell, Ruhashya sector; and 234 households in Kinazi site, Gitovu cell, Kinazi sector); and Nyagatare district rural settlement area (with a total of 809 households (400 households in Rwabiharamba site, Karangazi sector; and 409 households in Barija A site, Barija cell, Nyagatare sector).

It should be noted that final project locations can be revisited during a detailed project design and scoping phase, keeping in mind the volumes of waste generated in different locations. For instance, according to one estimate, Kigali generates 60% of Rwanda's municipal solid waste, but Rubavu is also a significant source, accounting for 34% of the country's municipal solid waste. In relative terms, only 3%, 2%, and 1% is generated by Rusizi, Nyamagabe, and Muhanga. Musanze and Huye contribute insignificant amounts (although with population growth this is rapidly changing for both cities).²²⁹

COMPONENT 4: SUSTAINABLE, CLIMATE-RESILIENT ROADS AND BRIDGES

This component's objective is to build climate change resilience in Rwanda by strengthening climate-robustness of Rwanda's district road network, designing and constructing roads – and one critical bridge - so that they are better able to reduce the risk of landslides, thereby reducing climate change vulnerability of communities and businesses that depend on road transportation. The component also offers an opportunity to explore the other side of the equation, i.e. to investigate how district roads in Rwanda could

be constructed and maintained in ways that minimize damage to and destabilization of the surrounding environment.

The transport sector is fundamental to Rwanda's development, and is an engine of growth for the country's economy.²³⁰ Reliable, accessible, and affordable transportation options are essential for trade in goods and services, and for the mobility of Rwanda's people in pursuit of better opportunities. Not only is transport critical for value addition in Rwanda's agriculture sector and to improve access to markets for agricultural produce, it is pivotal to the country's intended transition from an agrarian economy to a middle income, knowledge-based economy.²³¹

Road transport is the dominant mode of transport in Rwanda, with the vast majority of movement of people, goods, and services taking place by light and heavy motor vehicles and two-wheeled transport. Largely as a result of its mountainous terrain that requires lengthy, weaving roads, Rwanda has a high road density of 0.53 km of road / km², which is close to Africa's weighted average of 0.57 km / km².²³² The table below indicates varying lengths of different classes of roads in Rwanda (from 2012).

Table 9: Total Length of Roads in Rwanda (MININFRA, 2012)²³³

Type of Roads	Length (km)	
Classified		4 698
<i>Paved National Roads</i>	1 075	
<i>Unpaved National</i>	1 785	
<i>Unpaved District Roads</i>	1 838	
City of Kigali Roads		1 017
<i>Paved Roads</i>	153	
<i>Unpaved Roads</i>	864	
Unpaved Roads		8 285
Grand Total Road Length in Rwanda		15 00

This component seeks to build on and expand key elements from a successful African Development Bank (AfDB) and Nordic Development Fund (NDF) driven project in Rwanda currently underway: Developing capacity for climate resilient road transport infrastructure. That project is the first of its kind in Rwanda, with an explicit focus on climate change resilience in the roads and bridges sector, with three primary objectives: (i) increased multi-stakeholder knowledge and supporting tools required to integrate climate change adaptation and disaster risk management into the transport sector; (ii) enhanced infrastructure protection in right-of-way areas vulnerable to landslides, erosion, intense precipitation and high temperatures; and (iii) increased capacity by transport sector experts for disaster risk management.²³⁴ The specific focus of the AfDB-NDF project, however, is the upgrading of a 125 km stretch of Rwanda's Base-Gicumbi-Rukomo-Nyagatare national highway road section (with the upgrading effort being used as an opportunity for broader capacity building, knowledge-sharing, introduction of tools to integrate climate change considerations etc.).

The SPCR seeks to complement the AfDB-NDF effort through a combination of activities that will move the road transport sector even farther in terms of the ability to mainstream climate change into sector planning and operations. In contrast to the aforementioned project, this project will focus not on a national road but rather on district roads, which are more vulnerable to climatic impacts.

Additionally, this component will also demonstrate – through a high-profile bridge project currently in development in Rwanda – how climate change robustness can be integrated into the engineering and operations and maintenance aspects of a transport infrastructure project. Plans and technical studies for the Nyabarongo bridge (between Nyarugenge and Kamonyi districts) already exist, but which do not factor in climate change. Even the socio-environmental study for the bridge project does not take climate change into account.²³⁵ In light of the fact that the intended location for the bridge is in an area identified by MIDIMAR as being at high risk of floods and landslides, the bridge represents a pivotal opportunity to showcase in Rwanda approaches gaining traction the world over to integrate future climate change considerations into the design, construction, and operation of an infrastructure project to ensure that the asset maintains performance and value even in the face of climate change, and that it actively contributes to climate change resilience of the communities it serves. In the case of the bridge, it would be important to factor in changing flood levels in the future in Rwanda, and to ensure that even as return periods for 50-year floods and 100-year floods shorten considerably, the bridge will still be functional and won't get overtopped.

Project 1: Strengthening climate resilience in Rwanda's district road network, and integrating climate-robustness into the Nyabarongo Bridge design and construction.

This project is designed to strengthen Rwanda's resilience to the impacts of climate change whilst also improving the standard of living for its people. It also aims to increase the capacity of road transport decision-makers and planners in Rwanda to integrate consideration of climate change and disasters into the transport infrastructure project life cycle, the focus in this case being district roads and a key bridge.

The project lends itself to implementation in multiple sites and is highly replicable and scalable based on available funds. The project's design is informed by experience with climate mainstreaming in infrastructure in the roads and bridges sector across Africa,²³⁶ and also draws on lessons emerging from the AfDB-NDF project in Rwanda.

The project involves the following elements:

- a. Preparatory tasks: support for a scoping assessment for district roads, identification of sites, and development of feasibility assessments of the district roads that can benefit from being made climate resilient; and identification of the entry point and approaches for integration of climate change resilience into the project life cycle of the Nyabarongo bridge.

- b. Utilities and services: support for improving capacity of road transport sector planners and decision-makers to mainstream climate change into the sector, with a focus on capacity building of district level administration to integrate climate resilience.
- c. Infrastructure: support for upgrading of 200 km of district level roads within Rwanda, to achieve climate resilience standards at par or greater than the national road climate resilience effort already underway; and implementation of climate resilience measures to make the Nyabarongo bridge project climate robust in the face of probable climate futures, to allow for more sustainable transportation, enable greater rural-urban trade, appreciation of property value, and better overall performance in the face of climatic shocks and stresses.

In terms of project location, the focus would be on district roads in districts that are extremely prone to flooding and landslides, and thus require more climate-resilience. These are Musanze, Rubavu, Gakenke, Nyabihu, Ngororero, and Nyamagabe. The bridge component of the project is located in Nyabarongo.

G 3.3. Indicative Costing

Below is a detailed representation of the costs associated with each component and project.

Estimated Total Cost: \$ 150 727 500

COMPONENT: MAINSTREAMING CLIMATE RESILIENCE INTO URBAN LAND USE PLANNING

Project 1: National Land Use Master Plan

SCHEDULE OF QUANTITIES	COST (US\$)	DESCRIPTION
1 INFORMATION & DATA ACQUISITION <i>Ensures the project is based on credible sources</i>	US\$ 225,000	<ul style="list-style-type: none"> Sourcing the existing National Land-Use Master Plan and all supporting documentation, to inform a consolidated national planning strategy; Strategic discussions and interviews with officials and key private stakeholders in the land-use and spatial development sectors, with key representation from the five provinces; Collection and collation of research studies of national climate risk and vulnerability mapping.
2 STAKEHOLDER CONSULTATION <i>To involve authorities, and interested and affected communities</i>	US\$ 250,000	<ul style="list-style-type: none"> Collaboration between all public and private stakeholders in the spatial development and planning sectors of the country, via multiple stakeholder engagements over a period of 2 years. Engagements will be held at a national level in Kigali, in addition to satellite engagements in the five provinces of the country.
3 SOFTWARE ACQUISITION, TESTING AND COMMISSIONING <i>Institutionalise national master planning software</i>	US\$ 1,250,000	<ul style="list-style-type: none"> Conduct a product-independent options analysis to select the most appropriate national master planning software, to be used daily by national authorities. Software to have key climate resilient and sustainability indexing functionality, including national sustainability and liveability analysis, to inform the immediate-, short-, medium- and long-term settlements planning, and the associated, supporting infrastructure. Selected software to be procured, including selection of appropriate licensing packages, followed by consultation with information and

			<p>technology managers at a national authority level in respect of strategic use of software to inform installation scale and accessibility for planning officials.</p> <ul style="list-style-type: none"> • Process flow diagrams (PFDs) to be developed to indicate how national master planning software interfaces with city-scale master planning. • Key national planning authority to be sufficiently capacitated to champion the institutionalisation and efficient use of the master planning software.
4	DELIVERABLES <i>Reports, strategies and/or action plans</i>	US\$ 2,500,000	<ul style="list-style-type: none"> • Update/revise national Land-Use Master Plan, and consolidate electronic and hard-copy plans to ensure maximum functionality of selected software; • Updated climate risk and vulnerability maps at a provincial level; and • Development of Spatial Development Frameworks at national and provincial levels.
5	TRAINING & AWARENESS <i>Upskilling and education for authorities and/or interested and affected communities</i>	US\$ 450,000	<ul style="list-style-type: none"> • Development of technical tools and training programmes for national master planning strategy; • Develop and conduct full national master planning courses (courses to be certified by a registered national certification authority), integrated with new master planning software. • Structured training for consolidation and interfacing between Land-Use Master Plan, Local Climate risk and vulnerability maps, and Development of Spatial Development Frameworks, at a national level.
A SUB-TOTAL		US\$ 4,675,000	Sum 1 – 4
B CONTINGENCY		US\$ 467,500	10% of A
C TOTAL		US\$ 5,142,500	A + B

Project 2: Climate-Conscious City-Scale Urban Master Plans

SCHEDULE OF QUANTITIES		COST (US\$)	DESCRIPTION
1	INFORMATION & DATA ACQUISITION <i>Ensures the project is based on credible sources</i>	US\$ 200,000	<ul style="list-style-type: none"> • Sourcing the existing Land-Use Master Plans and all supporting documentation in six secondary cities; • Strategic discussions and interviews with officials and key private stakeholders in the land-use and spatial development sectors in the six selected secondary cities; • Collection and collation of research studies of local sustainability, climate risk and vulnerability mapping, in the selected secondary cities.
2	STAKEHOLDER CONSULTATION <i>To involve authorities, and interested and affected communities</i>	US\$ 300,000	<ul style="list-style-type: none"> • Collaboration between all public and private stakeholders in the spatial development and planning sectors of the six secondary cities, via multiple stakeholder engagements over a period of 2 years. • Regular engagements to be planned between the selected secondary cities and the national land-use master planning authority, to ensure effective integration of planning strategies and efficient interfacing of planning software.
3	SOFTWARE ACQUISITION, TESTING AND COMMISSIONING <i>Institutionalise national master planning software</i>	US\$ 1,800,000	<ul style="list-style-type: none"> • Conduct local product-independent options analysis to select the most appropriate city-scale, urban master planning software, to be utilised by the six selected secondary cities. • National master planning software to be given preference over local products to ensure optimum interfacing of land use master planning, nationally. Assumed economies of scale with licensing of the same software at a national and city-scale. • Software to have key climate resilient and sustainability indexing functionality, including national sustainability and liveability analysis, to inform the immediate-, short-, medium- and long-term settlements planning, and the associated, supporting infrastructure.

			<ul style="list-style-type: none"> Selected software to be procured, including selection of appropriate licensing packages, followed by consultation with information and technology managers at a national authority level in respect of strategic use of software to inform installation scale and accessibility for planning officials. Process flow diagrams (PFDs) to be developed to indicate how city-scale, and regional master planning software interfaces with the national land-use master plans. Key national planning authority to be sufficiently capacitated to champion the institutionalisation and efficient use of the master planning software.
3	DELIVERABLES <i>Reports, strategies and/or action plans</i>	US\$ 3,000,000	<ul style="list-style-type: none"> Develop city-scale Land-Use Master Plans in six secondary cities; Consolidate and/or develop Local Climate risk and vulnerability maps in the six secondary cities; and
4	TRAINING & AWARENESS <i>Upskilling and education for authorities and/or interested and affected communities</i>	US\$ 450,000	<ul style="list-style-type: none"> Development of technical tools and training programmes in six secondary cities; and Consolidate national and city-scale master planning courses (courses to be certified by a registered national certification authority), integrated with new master planning software in each secondary city. Structured training for consolidation and interfacing between Land-Use Master Plan, Local Climate risk and vulnerability maps, and Development of Spatial Development Frameworks, in six secondary cities for all mandated public officials and private stakeholders.
A SUB-TOTAL		US\$ 5,750,000	Sum 1 – 4
B CONTINGENCY		US\$ 575,000	10% of A
C TOTAL		US\$ 6,325,000	A + B

COMPONENT: CLIMATE RESILIENT STORM WATER MANAGEMENT AND DRAINAGE

Project: Climate Smart Storm Water Management and Drainage Initiative

SCHEDULE OF QUANTITIES		COST (US\$)	DESCRIPTION
1	PRELIMINARY <i>Studies, site identifications and/or agreements required before implementation</i>	US\$ 1,200,000	<ul style="list-style-type: none"> Conceptualisation of Sustainable Urban Drainage Systems (SuDS), Best Management Practices (BMPs) and Low-Impact Development (LID) among authorities in Rwanda; Best practice options assessment for secondary cities, with a focus on: (1) Musanze, (2) Rubavu, (3) Muhanga, and (4) Rusizi; Selection of 'household', 'source' and 'local' SuDS options, to form a 'Treatment Train', to tie into existing, larger 'regional' options, in each of the four selected secondary cities
2	UTILITIES & SERVICES <i>To support the projects implementation</i>	US\$ 3,000,000	<ul style="list-style-type: none"> Preparation and retrofitting of the conventional, regional storm water options to enable the use of Treatment Trains sequentially, in the four secondary cities. A budget of US\$ 750,000 has been assumed for each of the secondary cities to enable optimum integration of the existing hard-services infrastructure with the stormwater best practice options.
3	INFRASTRUCTURE <i>The hard civils infrastructure required for the project</i>	US\$ 32,000,000	<ul style="list-style-type: none"> The construction of 10 stormwater Treatment Trains in 4 secondary cities, from the household-scale to the local-scale, and tying into the regional infrastructure Treatment Trains to include: green roofs, soakaways, permeable pavements, filter strips, swales, infiltration trenches, bio-retention areas and sand filters.
4	PLANT & EQUIPMENT	US\$ 1,600,000	<ul style="list-style-type: none"> Installation of supporting equipment for infrastructure such as green roofs, bio-retention areas and sand filters.

	<i>The hard mechanical-electrical components required for the project</i>		<ul style="list-style-type: none"> A unit cost of US\$ 400,000 is assumed for each of the four secondary cities.
A	SUB-TOTAL	US\$ 37,800,000	Sum 1-4
B	CONTINGENCY	US\$ 3,780,000	10% of A
C	TOTAL	US\$ 41,580,000	A + B

COMPONENT: CLIMATE RESILIENT WASTE MANAGEMENT

Project: Solid Waste and Wastewater Guidelines and Interventions in Cities & Rural Settlements

SCHEDULE OF QUANTITIES	COST (US\$)	DESCRIPTION
1	PRELIMINARY <i>Studies, site identifications and/or agreements required before implementation</i>	US\$ 1,800,000 <ul style="list-style-type: none"> Status quo of national solid waste and wastewater management in all districts; Development of the following documentation for solid waste and wastewater: <ul style="list-style-type: none"> National policy; National strategy; Regional and city-wide integrated management plans; National best practice guidelines for government and industry. Identification of alternative, sustainable integrated waste management options – one of each solid waste and wastewater project in three secondary cities, namely (1) Huye, (2) Muhanga and (3) Nyagatare, supported by one of each project, albeit small-scale, in three rural settlement areas, namely (1) Muyebe District rural settlement area (200 households), (2) Huye District rural settlement area (606 households), and (3) Nyagatare District rural settlement area (809 households); Where district rural settlement areas are adjoining secondary cities that are also prospective project areas (in the case of Huye and Nyagatare), opportunities for technical integration of waste streams will be assessed and used. Extensive training programme for new solid waste and wastewater treatment documentation, including: <ul style="list-style-type: none"> National policy and strategy; Regional and city-wide integrated management plans, and best practice guidelines for government and industry. Carry out three city-wide solid waste characterisation and sewage sludge studies, to determine the calorific value and biogas potential, respectively, and inform the options analysis in each of the three secondary cities and rural settlement areas.
2	UTILITIES & SERVICES <i>To support the projects implementation</i>	US\$ 4,500,000 <ul style="list-style-type: none"> Development of supporting infrastructure, institutional capacity and services to enable the development and implementation of one of each solid waste and wastewater project in the three selected secondary cities and three rural settlement areas. The interventions in the rural settlement areas will be integrated with the strategy and larger interventions of the associated secondary cities.
3	INFRASTRUCTURE <i>The hard civils infrastructure required for the project</i>	US\$ 18,000,000 <ul style="list-style-type: none"> Implementation of one of each alternative solid waste treatment and wastewater project in each of the three-selected secondary city; <ul style="list-style-type: none"> Implementation of one of each alternative solid waste treatment and wastewater project in each of the three-selected rural settlement areas. Options in the rural settlement areas to optimise reuse of organic waste materials at source through interventions such as urine diversion, compostable toilets, vermiculture, small-

			<p>scale open-windrow composting, micro-material recovery facilities, bailing and transportation of recyclables, etc.</p> <ul style="list-style-type: none"> Organic waste products such as compost and vermiculture liquids shall be extracted and used in local agriculture at source. For the three selected secondary cities: <ul style="list-style-type: none"> Alternative, sustainable solid waste management projects for climate resilience to prioritise organic waste diversion, to be 100t/day; Alternative, sustainable wastewater treatment projects for climate resilience, to be 40ML/day. Organic solid waste project to integration technical solutions with of wastewater projects, if for example, anaerobic digestion (AD) is an appropriate solution and co-digestion is favourable.
4	PLANT & EQUIPMENT <i>The hard mechanical-electrical components required for the project</i>	US\$ 21,000,000	<ul style="list-style-type: none"> Installation of low-tech, sustainable plant and equipment at each of the solid waste and wastewater projects in each of the three-selected secondary cities Small-scale, low-tech technologies will be applicable for both wastewater treatment and solid waste management in the three rural settlement areas.
A	SUB-TOTAL	US\$ 45,300,000	Sum 1-4
B	CONTINGENCY	US\$ 4,530,000	10% of A
C	TOTAL	US\$ 49,830,000	A + B

COMPONENT: SUSTAINABLE, INTEGRATED AND RESILIENCE-BUILDING TRANSPORT

Transport Sector Infrastructure Project

SCHEDULE OF QUANTITIES		COST (US\$)	DESCRIPTION
1	PRELIMINARY <i>Studies, site identifications and/or agreements required before implementation</i>	US\$ 3,000,000	<ul style="list-style-type: none">This climate resilience project focuses on two adaptation measures, namely: (1) the replicability of the NDF-AfDB climate resilient road transport infrastructure project administered by the RTDA, and (2) integration of climate resilience into the RTDA's New Nyabarongo Bridge project;Perform a scoping assessment, sites identification and subsequent feasibility of the district roads that can benefit from the lessons learnt for the NDF-AfDB climate resilient road transport infrastructure project, in the following districts: (1) Musanze, (2) Rubavu, (3) Gakenke, (4) Nyabihu, (5) Ngororero, and (6) Nyamagabe;Identify opportunities to provide climate resilience measures for the Nyabarongo Bridge project.
2	UTILITIES & SERVICES <i>To support the projects implementation</i>	US\$ 500,000	<ul style="list-style-type: none">The district-level climate resilient road infrastructure project seeks to improve the level of transport service on the upgraded sections, and build the road maintenance planning capacities of the road administration to enable ongoing climate resilience.
3	INFRASTRUCTURE <i>The hard civils infrastructure required for the project</i>	US\$ 40,000,000	<ul style="list-style-type: none">Upgrade of 200km of district level roads within Rwanda with the same climate resilience mandate and standards as the NDF-AfDB climate resilient road transport infrastructure project, in the following districts: (1) Musanze, (2) Rubavu, (3) Gakenke, (4) Nyabihu, (5) Ngororero, and (6) Nyamagabe;Implementation of climate resilient measures on the New Nyabarongo Bridge project that focus on improved and sustainable commuter transportation, urban-rural trade, property value appreciation, skills betterment and rural area development.
4	PLANT & EQUIPMENT	US\$ -	<ul style="list-style-type: none">N/A

	<i>The hard mechanical-electrical components required for the project</i>		
A	SUB-TOTAL	US\$ 43,500,000	Sum 1-4
B	CONTINGENCY	US\$ 4,350,000	10% of A
C	TOTAL	US\$ 47,850,000	A + B

G 4. INVESTMENT PROGRAMME 4: STABLE AND SUSTAINABLE LANDSCAPES

G 4.1. Objective

Objective: To improve climate resilience in Rwanda by reducing vulnerability to floods, landslides, and related disasters, by strengthening the climate resilience of natural landscapes, and by enhancing Rwanda's preparedness and adaptive capacity through improved ability to predict, understand, and act on climate information.

This investment programme focuses on (1) flood and landslide risk reduction and management; (2) climate services; and (3) landscape restoration and conservation.

G 4.2. Components and Projects

Components and projects will be identified and scoped during a detailed project design phase, with the frameworks provided in this section. It is imperative that the SPCR steering committee and funding partners ensure that particular attention continues to be paid during this stage to gender concerns and to the inclusion of vulnerable groups, so that the project design actively benefits these vulnerable constituencies. The detailed scoping and design stage must also ensure that individual project institutional arrangements (to be influenced by the funder's own requirements) should explicitly assure knowledge-product generation and the capturing of lessons learnt.

Indicatively, investment programme four's components and projects are as follows:

COMPONENT 1: FLOOD AND LANDSLIDE PREVENTION, CONTROL, AND MANAGEMENT THROUGH IMPROVED LANDSCAPE RESILIENCE

This component's objective is to build climate change resilience in Rwanda by reducing and managing flood and landslide risk through ecosystem-based approaches (biophysical interventions), improved technical capacity for flood forecasting (information systems and climate services), supplementary physical structural approaches (infrastructure), coupled with community-based approaches.

This component seeks to draw on key elements from a successful World Bank driven project in Rwanda (funded by the Least Developed Countries fund and the Global Environment Facility), but to integrate those elements into an explicitly climate resilience oriented project focused on flood and landslide risk reduction and management. The prior project in question – Landscape Approach to Forest Restoration and Conservation (LAFREC), in Rwanda’s Gishwati forest region – integrated climate change as a cross-cutting issue and was one of the project’s major themes, but climate change resilience was not the primary driver of the project. Rather, it was forest conservation and natural resource management. The intention of this component is for the investment to be proactively designed with climate change adaptation benefits in mind, not merely co-benefits.

Moreover, LAFREC comprised of several elements, of which flood risk management was one. The SPCR intends for flood risk reduction and flood risk management to be the core feature of this component, and for a reduction in flood risk to be the principal outcome from this intervention.

This component also looks beyond the LAFREC approach by integrating a project that would be located in mining areas in Rwanda. As the mining and extractive sector in Rwanda expands, damaging impacts on landscapes are certain to increase, even with safeguards in place. Thus, alongside a growth in mining, Rwanda is also laying the ground for proactive landscape restoration in mining areas, to prevent and reduce the risk of erosion, landslides, and floods in such locations during heavy rainfall events.

Mining is already the second largest export in Rwanda’s economy, with tin, tantalum, and tungsten being the main exported ores. The mining sector’s contribution to GDP is expected to increase from 1.2% in 2011 to 5.27% by 2018. Similarly, the population working in this sector is projected to grow from 20,000 to triple that number, i.e. 60,000, by 2018. Investment in the sector is already skyrocketing, from USD 150 million in 2011 to an anticipated USD 500 million in 2018. This is also strongly correlated to an increase in export revenue from mining, from USD 158 million in 2011 to USD 400 million in 2018.²³⁷

The World Bank has underscored the role that Rwanda’s mining sector can play in boosting the country’s economy, including with a bullish 2014 World Bank report on unleashing the potential of the mining sector. The World Bank’s analysis identifies mining as a key opportunity for income diversification and creation of off-farm jobs to help Rwanda achieve its 30% poverty reduction target, and provides guidance on how Rwanda can rapidly expand mining operations.²³⁸ In light of this growth, it is also critical to support landscape resilience in areas where Rwanda is scaling up mining, to ensure that such economic development does not get eroded by loss and damage from floods and landslides.

Project 1: Integrated Flood Risk Management project in North-Western Rwanda

The project is designed to take an integrated approach, i.e. for the interventions to be multi-sectoral in character so that no one type of intervention operates in isolation. Integrated Flood Risk Management The

project is designed to take an integrated approach, i.e. for the interventions to be multi-sectoral in character so that no one type of intervention operates in isolation. Integrated Flood Risk Management projects, by their nature, are holistic interventions that take into account a range of linked factors that can support a common outcome.

The project will thus be multi-pronged, and will entail:

- a. Upgrading land and sustainable land management: support for the upgrading of 3500 hectares of forest land in a high flood risk, ecologically fragile (but unprotected) location in Rwanda, and the introduction of sustainable land management practices;
- b. Forest restoration and land husbandry: support for restoration of forests over a target area of 10,000 hectares, with a focus on ensuring slope stability through afforestation as well as physical reinforcement infrastructure (such as meshes);
- c. Sustainable and resilient livelihoods: support communities in the region to engage in community-based flood and landslide preparedness and response actions, and to take up and sustain income-generating activities that contribute to landscape preservation but also allow communities to tap into new income streams;
- d. Improved flood risk assessment: support for the use of advanced flood risk assessment tools and methods for the selected project area, building upon existing work that has gone into Rwanda's risk atlas;
- e. Flood forecasting and preparedness: support for improving technical capacity of flood forecasting institutions, and to contribute necessary technical components required for Rwanda to have a fully integrated flood early warning system and achieve critical milestones in flood forecasting and preparedness (this component will directly build on and draw from flood forecasting and hydrological modelling developed under the LAFREC project, as well as LAFREC's existing efforts to develop an early warning system. Furthermore, it will work well in concert with Projects 2 under this programme, i.e. strengthening climate services creation and delivery in Rwanda);
- f. Monitoring and project management: support for operational costs, services, equipment, and technical assistance for the project's management, administration, and monitoring and evaluation elements.

In terms of project location, suitable sites would appear to be in North-western Rwanda, in districts with higher risk of flooding and landslides. According to a combined flood and landslide risk map developed by MIDIMAR, the districts of Nyabihu, Ngororero, Muhanga, Kamonyi, Karongi, and Nyamagabe would offer appropriate candidate sites.²³⁹ Additional areas to be investigated include Musanze, Burera and Nyabihu. MIDIMAR's map of flood and landslide prone areas (as shown in the figure below) shows the distribution

of flood risk areas, of landslide risk areas, and areas with high combined risk of floods and landslides. As can be seen from the map below, by reading the map legend and comparing the distribution of colours from the legend, flood risk and landslide risk exist all across Rwanda, as does the risk of both combined. However, there is a slight preponderance and clustering of areas in the northwest that are highly prone to *both* floods and landslides. Hence these locations offer particularly suitable sites for the project (noting that this geographic focus does not imply that other regions in Rwanda are not suitable for such projects).

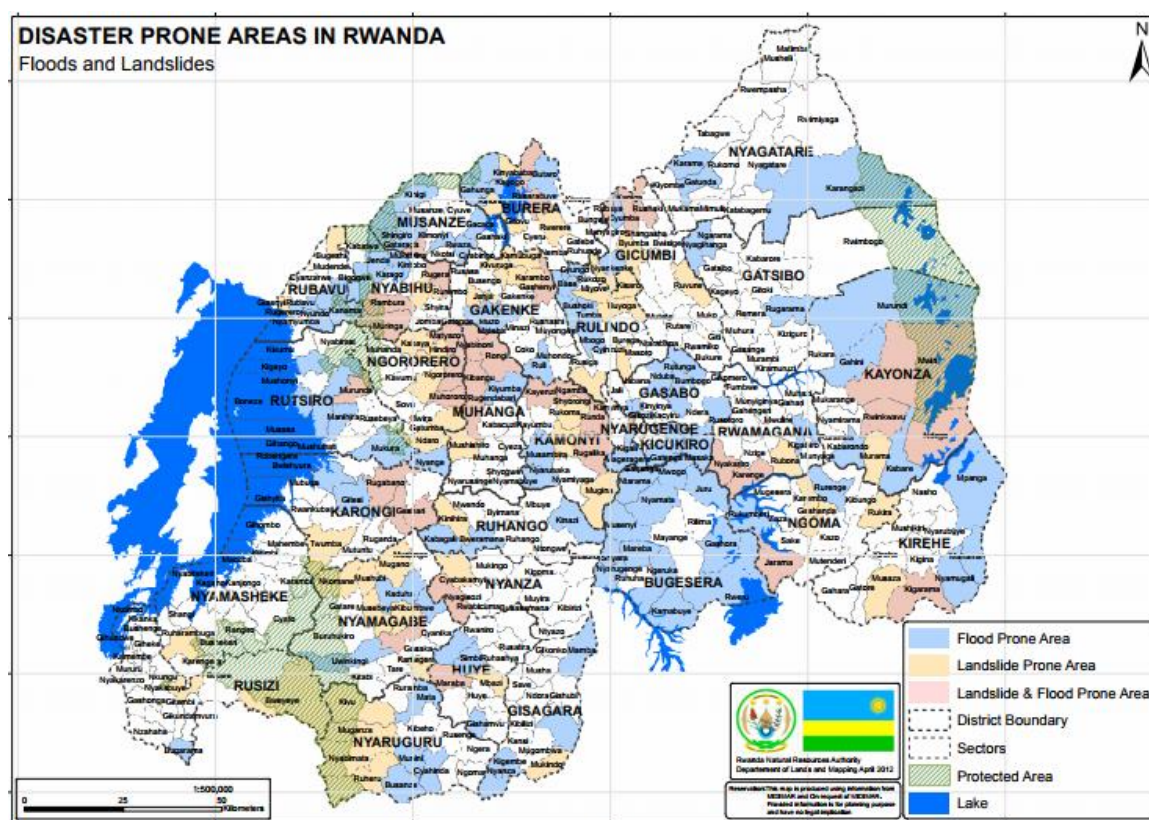


Figure 14: Disaster Prone Areas in Rwanda: Floods and Landslides (MIDIMAR, 2012)²⁴⁰

This project is very strongly linked to the Forestry Investment Plan's (FIP's) investment programme, *Sustainable forest and landscape management*, which comprises (i) support for land use planning; (ii) improving tree planting material; (iii) implementation of District Forest Management Plans; and (iv) Payment for Ecosystem Services (PES). Thus, a linked funding investment may be optimal in order to maximize benefits from both the SPCR and FIP. Synergies related to district locations, outputs, and outcomes of the project can be further harnessed during a joint scoping and project preparation exercise.

Added to this, during the project design phase, opportunities for designing a project that combines the advantages offered by this project, with Programme 2, particularly Component 2 (Project 1 and 2) and

Component 3 ((Project 2), should be explored. This is critical since these three projects address various elements of catchment restoration, erosion control and slope stability.

Project 2: Land Stabilization and Landscape Restoration in Areas Affected by Mining

The project reflects strong stakeholder demand for landscape resilience and restoration in areas affected by mining in Rwanda. The project is an indication that Rwanda wants to adopt a forward-looking approach to landscape based climate resilience, in anticipation of the growth of the mining and extractives industry in the country.

The project is multi-sectoral in character, bringing together mining (both the public and private sector), water resources management, disaster risk reduction, and land management (including through revegetation and community participation).

The project will thus be multi-pronged, and will entail:

- a. An options analysis for land restoration and rehabilitation through ecosystem approaches: support for identification of the most appropriate and locally viable (non-invasive) grass, creeper, or herb species that would be appropriate for revegetation and soil re-nutrition in closed open-pit mine areas in Rwanda. Several successful examples of such interventions exist in China²⁴¹ and India²⁴² (including the use of *Vetiveria Zizanioides*, promoted by the World Bank as a bio-engineering erosion control and slope stabilization intervention in India²⁴³) but analysis is required to determine one or more optimal species for Rwanda. The options analysis would also identify suitable project sites.
- b. Implementation of ground cover to prevent soil erosion and reduce rainwater runoff: support for the planting and upkeep of the chosen herb, creeper, or grass species (up to three species) at five open pit mine or quarry sites to reduce loose soil, increase land stability, and reduce gully erosion on sloping fields.
- c. Sustainable and resilient livelihoods: support communities in the region to engage in community-based landscape restoration including flood and landslide preparedness and response actions. Depending on the type of plant species chosen, there may be opportunities for development of a cottage industry or to support local trade, for instance through the planting of edible herbs that can be sold in local markets to supplement women's income streams, or the production of oil or fragrances from vetiver grass. The project's overall objectives will be more sustainable if local communities take up and sustain income-generating activities that contribute to landscape preservation and – especially in light of mine closures and the possibility that local communities may have previously relied on mining related income that now need replacement -- also allow communities to tap into substitute revenue streams (with a special focus on productive activities driven by women);

- d. Monitoring and project management: support for operational costs, services, capturing of lessons learnt; equipment, and technical assistance for the project's management, administration, and monitoring and evaluation elements. The lessons learnt through this project should be adequately captured through knowledge products and introduced into a significantly larger process to develop best practice guidelines for ecosystem-based restoration of mined areas. Such a broader, policy level initiative is beyond the scope envisioned for the current project, and would need to involve the entire mining community in Rwanda in a planning process that explores ecosystem based restoration and rehabilitation not only through cultivation of grasses, herbs, and creepers, but also trees and shrubs (afforestation), bio-fertilization, phytoremediation, sustainable grazing practices etc. Such a comprehensive effort aimed at making the mining industry in Rwanda more ecologically sustainable and environmentally responsible (beyond the objective of slope stability and reduction of landslides and floods, which is the primary focus in the current SPCR project) would draw on work done internationally by the International Council on Mining and Minerals,²⁴⁴ Business for Social Responsibility,²⁴⁵ and the Annual conference (held in Australia) on Best Practices in Ecological Rehabilitation of Mined Lands.²⁴⁶ It is recommended that such development of best practice guidelines and policy directives (which the Government of Rwanda appreciates the value of but does not see as a priority use of SPCR funds) would involve the Rwanda Mining Association, the Ministry of Environment, the Ministry of Lands and Forests, the Rwanda Natural Resources Authority, and other key stakeholders – especially from the private (mining) sector.

In terms of project location, suitable sites would appear to be in the districts of Ngororero, Gakenke, Muhanga, and Nyabihu, where there are large clusters of mines as per the map below. Juxtaposed with locations that have high combined flood and landscape risk (from MIDIMAR's map referenced earlier: disaster prone areas in Rwanda – floods and landslides), these districts emerge as strong candidates for land restoration and rehabilitation after mine closure.

completed 41 automatic weather stations; installed one C-band weather radar system that provides national coverage; developed over 160 manual weather stations; acquired and implemented an improved data management system known as CLIMSOFT; and introduced a modern forecasting system – PUMA.²⁵⁰ Nevertheless, Meteo still faces critical capacity gaps that constrain its ability to deliver the client-facing climate services that Rwandan ministries and communities seek from it.

Consistent feedback about Meteo during the development of the SPCR indicates that there is a pressing need to support Meteo in an organizational change process, to enable and empower it to step into a customer-facing role and transition into an institution that is better equipped to meet client needs. This is especially critical at a time when Rwanda is developing a National Framework for Climate Services (NFCS), to align with and reflect the tenets of the Global Framework for Climate Services. Unless this framework is accompanied by an institution-wide shift towards service delivery, towards differentiated, user-friendly climate product development, and enhanced project management capabilities, Rwanda may not be able to translate the NFCS into tangible results. If so, it risks falling short of the multi-sectoral climate change resilience potential that can be built off the back of a strong national climate services system.

Project 1: Technical and management capacity development for institutional transition of Meteo Rwanda to a climate services delivery agency and training to facilitate end-user orientation

The project will be led by Meteo Rwanda and will have a primary focus on capacity building and change management in Meteo Rwanda, but it will also reflect a multi-sectoral approach by developing and delivering bespoke training to a range of Rwandan agencies that represent Meteo Rwanda's client institutions, with a view to improving institutional coordination.

The project will comprise:

- a. Updating an organizational assessment and developing a customer-service organizational strategy: support for updating prior organizational assessments (Training Needs Analysis and an Organizational Situational Assessment) that were conducted by the UK Met Office to understand staff development and training requirements to develop Meteo into a more service-oriented institution. This will be coupled with formulating a comprehensive strategy and implementation plan to ensure a successful transition of Meteo Rwanda into a customer-oriented, client-facing, service-delivery institution, including strategic guidance on climate services development;
- b. Designing and conducting trainings: support for the provision of training to an estimated 60 Meteo staff (inclusive of current staff and staff who will join the organization over the next three years);
- c. Facilitating improved collaboration: support for specially designed joint training, over a three-year period, with key contact points and technical liaisons in other Rwandan ministries and agencies, to assist Meteo's clients to better understand how to engage or interface with it, how to improve inter-

agency communication and coordination, and how to collaborate on tailored climate products and services that address the specific needs of their institutions.

- d. Incentivizing participation in staff development: support in the form of top-up payments to staff to ensure attendance and regular participation in training, and to enable investment of time in trainings over and above existing workload pressures.
- e. Ensuring project management: support for the establishment of an externally driven project management unit to coordinate, manage, and monitor training sessions over the three-year period, whilst at the same time ensuring project management skills transfer over the three years, with the goal of Meteo Rwanda having strong project management capacity moving forward.
- f. Acquisition of required technical equipment: support for the purchase and rollout of advanced hydro-meteorological equipment (such as observational systems) required for data collection and analysis that would be the basis of climate products and services developed.
- g. Climate services product development and rollout: support for development of concrete, user-oriented, tailored climate services products that help realize the objectives of the National Framework for Climate Services. Two projects would focus on two sectors in Rwanda that are heavily reliant on climate services, i.e. agriculture and infrastructure. The former pilot would leverage and build on work done under the CGIAR-CCAFS project – building climate services capacity in Rwanda (focused on agriculture-oriented climate services) to develop and deliver concrete climate products and services to the agriculture sector, including farmers.²⁵¹ The latter (infrastructure) would develop and deliver similar tailored products and services for the infrastructure sector, including transport and energy. In doing so, this component would ensure that climate products and services developed are custom-designed based on user needs, and that the user interface is far more workable and less cumbersome than existing map-rooms (which have been relatively unwieldy and proven to be less end-user friendly than intended).

COMPONENT 3: LANDSCAPE CONSERVATION IN THE CONTEXT OF FUELWOOD PRODUCTION AND COLLECTION FOR BIOMASS USE

This component's objective is to build climate change resilience in Rwanda by reducing landscape fragility, especially in high risk locations, through increased slope stability. This would make these sites less disaster prone and would enhance ecosystem-based adaptive capacity.

Fuelwood collection is an important driver of deforestation and forest degradation in Rwanda.²⁵² A number of studies point to the reliance on fuelwood as a factor behind high rates of soil erosion, landslides, and

flooding in Rwanda. Experts suggest that this has caused relocation of people and sedimentation of hydropower plants, leading to power shortages and water scarcity in parts of the country.²⁵³ While Rwanda does not have a lot of deadwood, there is overcutting of live wood, which is the main challenge.

Project: Sustainable Fuelwood Management project in South-western Rwanda (Housed in the FIP)

This project was co-designed and developed by the SPCR and FIP. It is strongly linked to and contributes to the SPCR's efforts to strengthen landscape based resilience. However, given the core activities under the project, i.e. sustainable production and harvesting of fuelwood and development and management of community woodlots, the project has been moved in its entirety to the FIP at the request of Rwandan stakeholders and per the guidance of the Government of Rwanda.

This project is now housed under the FIP, with its key elements distributed between two of the FIP's three investment programmes (concept notes). Thus, the activities formerly under the SPCR's "Sustainable fuelwood management in South-western Rwanda" (such as creation of sustainable forestry woodlots) have been subsumed under the FIP's two programmes:

- a. One – *Sustainable forest and landscape management*, which comprises (i) support for land use planning; (ii) improving tree planting material; (iii) implementation of District Forest Management Plans; and (iv) Payment for Ecosystem Services (PES).
- b. Two - *Wood supply chain, improved efficiency, and added value*, which comprises (i) increased efficiency in wood conversion into timber and charcoal; (ii) wood value-chain development and use of new wood based products; (iii) efficiency in biomass use; and (iv) alternative sources of energy.

The FIP's investment programme and the SPCR's stable and sustainable landscapes investment programme complement one another and lend themselves to a linked funding investment that could leverage complementarities.

G 4.3. Indicative Costing

Below is a detailed representation of the costs associated with each component and project. This programme will leverage the \$US 9.5 million funding of LAFREC and potentially the EUR 3.7 million funding of the NDF's existing charcoal value chain project (the latter links to the sustainable fuelwood project initially proposed by the SPCR under this investment programme and which is now housed in the FIP). The SPCR's projects under Investment Programme 4 – stable and sustainable landscapes – demonstrate strong scale-up benefits, drawing on ongoing World Bank and NDF activities, and are thus not starting from scratch.

Note that the costing tables below provide approximations of what the project may cost, based on the broad project structure and content that emerged from stakeholder and technical consultations. These indicative

costings will necessarily have to be refined further during a scoping and detailed design stage when funding is attached to the projects.

Estimated Total Cost: \$ 28 749 050

FLOOD PREVENTION, CONTROL, AND MANAGEMENT IN HIGH FLOOD RISK LOCATIONS

Project: Integrated Flood Risk Management Through Landscape Restoration

SCHEDULE OF QUANTITIES		COST (US\$)	DESCRIPTION
1	UPGRADING AND SUSTAINABLE MANAGEMENT OF LAND	US\$ 1,400,000	<ul style="list-style-type: none"> Support the planned upgrading of around 3,500 ha remnant natural forest and introduce sustainable land management practices.
2	FOREST RESTORATION AND LAND HUSBANDRY	US\$ 8,500,000	<ul style="list-style-type: none"> Restoration of forests over a target area of 10,000 ha and ensuring slope stability through afforestation as well as reinforcement infrastructure.
3	SUSTAINABLE AND RESILIENT LIVELIHOODS	US\$ 2,600,000	<ul style="list-style-type: none"> Support income-generating activities in the area that will provide the communities with new income generation opportunities.
4	IMPROVED FLOOD RISK ASSESSMENT	US\$ 1,200,000	<ul style="list-style-type: none"> Trialling the use of advanced flood risk assessment tools and methods for the selected project area
5	FLOOD FORECASTING AND PREPAREDNESS	US\$ 1,200,000	<ul style="list-style-type: none"> Improve the technical capacity of flood forecasting institutions and complement identified important milestones required to have a fully integrated Early Warning System
6	MONITORING & PROJECT MANAGEMENT	US\$ 1,300,000	<ul style="list-style-type: none"> Operational costs, services, equipment and technical assistance for the project's management and monitoring.
A	SUB-TOTAL	US\$ 16,200,000	Sum 1–6
B	CONTINGENCY	US\$ 1,620,000	10% of A
C	TOTAL	US\$ 17,820,000	A + B

Project: Land Stabilization and Landscape Restoration in Areas Affected by Mining

SCHEDULE OF QUANTITIES		COST (US\$)	DESCRIPTION
1	OPTIONS ANALYSIS TO IDENTIFY SITES AND SUITABLE SPECIES	US\$ 50,000	<ul style="list-style-type: none"> Options analysis to identify potential grass (such as Vetiveria Zizanioides), herb and creeper species that can be used to restore mining landscapes and to stop the rainwater run-off on sloping fields so as to reduce gully erosion. The options analysis will also identify mining sites that are suitable for demonstration projects that could pilot up to 3 different grass, herb and creeper species.
2	IMPLEMENTATION OF GROUND COVER TO REHABILITATE SOIL AND PREVENT EROSION	US\$ 1,125,000	<ul style="list-style-type: none"> Cost of planting suitable grass (such as Vetiveria Zizanioides) is estimated at \$2.25 per square metre assuming that 7.5 slips are planted per square metre at a cost of 30c per slip. It is assumed that 500,000 square metres adjacent to 5 mine pits or quarries will be planted to stabilise slopes.
3	SUSTAINABLE AND RESILIENT LIVELIHOODS	US\$ 1,000,000	<ul style="list-style-type: none"> Support income-generating activities in the area that will provide the communities with new income generation opportunities.
4	MONITORING & PROJECT MANAGEMENT	US\$ 150,000	<ul style="list-style-type: none"> Operational costs, services, capturing lessons learnt, equipment and technical assistance for the project's management and monitoring.
A	SUB-TOTAL	US\$ 2,325,000	Sum 1–3

B	CONTINGENCY	US\$ 232,500	10% of A
C	TOTAL	US\$ 2,557,500	A + B

IMPLEMENTATION AND ROLLOUT OF RWANDA'S NATIONAL FRAMEWORK FOR CLIMATE SERVICES

Project: Technical capacity development in METEO Rwanda

SCHEDULE OF QUANTITIES		COST (US\$)	DESCRIPTION
1	ORGANISATIONAL ASSESSMENT & STRATEGY	US\$ 350,000	<ul style="list-style-type: none"> Undertake an organisational assessment to understand training and staffing requirements to develop METEO into a more service orientated organisation and develop an implementation strategy, including integration of Meteo's own vision and targets for itself.
2	TRAINING FOR METEO STAFF	US\$ 3,600,000	<ul style="list-style-type: none"> Provide training to 60 METEO Rwanda staff over a 3-year period assuming that \$20,000 is spent on average per annum per staff member.
3	INTRODUCTION OF TOP-UP PAYMENTS TO STAFF	US\$ 1,000,000	<ul style="list-style-type: none"> Introduction of top-up payments to staff to incentivise attendance of training over 3-year period. Top-up payments will equate to \$6,000 on average per staff member per annum.
4	TRAINING FOR STAFF OF KEY PARTNER INSTITUTIONS	US\$ 112,500	<ul style="list-style-type: none"> Annual training for 15 partner institutions will be provided. Three staff per partner institution will be invited to attend. It is assumed that \$2,500 is spent per annum per attendee.
5	PROJECT MANAGEMENT	US\$ 600,000	<ul style="list-style-type: none"> Establishment of a project management unit to co-ordinate, manage and monitor training sessions over 3-year period.
6	EQUIPMENT ACQUISITION AND ROLLOUT	US\$ 448,000	<ul style="list-style-type: none"> Acquisition of the following equipment for Metro Rwanda: <ul style="list-style-type: none"> Automatic weather stations (20 units) at US \$ 9,330 per unit; Rain gauges (60 units) at US \$ 352 per unit Weather Kits for schools (100) at US\$ 240 per unit Upgrade of hardware and software for DBMS for US\$ 83,210 Arc GIS group licence at US\$ 60,000 Forecasting system at \$80,000.
7	CLIMATE SERVICES PRODUCT DEVELOPMENT AND ROLLOUT	US\$ 1,500,000	<ul style="list-style-type: none"> Development of climate services products for the agriculture and infrastructure sectors through consultation with stakeholders. Cost per sector has been assumed to be US\$ 750,000 for the evaluation of services and development of communication tools (e.g. SMS platform) The associated training is costed above.
A	SUB-TOTAL	US\$ 7,610,500	Sum 1–7
B	CONTINGENCY	US\$ 761,000	10% of A
C	TOTAL	US\$ 8,371,500	A + B

LANDSCAPE CONSERVATION IN THE CONTEXT OF FUELWOOD COLLECTION AND BIOMASS USE

Project: Sustainable Fuelwood Management

See FIP.



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Hermog%C3%A8ne NSENGIMANA

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