



Rwanda's Green Well

Opportunities to engage private sector investors in Rwanda's forest landscape restoration



Global Forest and Climate Change Programme



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This report has been produced by IUCN's Global Forest and Climate Change Programme, funded by UKaid from the UK government.

Published by: IUCN, Gland, Switzerland

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Citation: IUCN (2015). *Rwanda's Green Well: Opportunities to engage private sector investors in Rwanda's forest landscape restoration*. Gland, Switzerland: IUCN. xii+85pp.

Cover Photo: Craig Beatty/IUCN 2016

Layout by: Chadi Abi

Available From: IUCN (International Union for Conservation of Nature)
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Executive summary

Rwanda has pledged to plant two million hectares of trees by 2020. Adopting a forest landscape restoration (FLR) approach, the country has committed to the Bonn Challenge: a global aspiration to restore 150 million hectares of the world's deforested and degraded lands by 2020 and 350 million hectares by 2030.

In order to achieve this goal, Rwanda needs to undergo five restoration transitions as recommended by the International Union for Conservation of Nature and the World Resources Institute in the paper *Forest Landscape Restoration Opportunity Assessment for Rwanda* (MINIRENA, 2014). If implemented, these transitions will constitute a significant FLR achievement and contribute towards multiple sustainable development objectives, including: increased agricultural productivity, food security, and rural incomes; increased resilience to climate change; improved water supplies; and reduced vulnerability to landslides and other disasters.

Current official development assistance (ODA) and government funding, however, cannot meet the financial needs of Rwanda's FLR plans. For Rwanda to meet its goal of restoring two million hectares, it will require attracting new sources of financing, including private investors.

This desk-based study assesses the feasibility of attracting private investments to finance FLR in Rwanda. It provides a detailed review of the main factors that will determine if and how Rwanda can attract private (return-motivated) investors. These factors include the alignment of policies, the country's investment profile, availability of public funds, investment potential of specific FLR activities, and potential private investors in Rwanda's FLR. The study also provides recommendations on how Rwanda can move forward and mobilize the resources and technical assistance needed to secure private investment in FLR.

Rwanda has a complex policy environment as it relates to investment in FLR. The country's Vision 2020 promotes the expansion of both forest cover and Rwanda's forest-based industries as a means of raising per capita incomes. Rwanda's Economic Development and Poverty Reduction Strategy promotes the use of key performance indicators to guide the distribution of resources from Rwanda's national environmental fund. The National Green Growth Strategy – Vision 2050 promotes low-carbon economic development and aims to reduce the impact of climate change on the national economy.

Central to achieving the objectives of these national policies are sectoral strategies, as well as private sector, export and other finance-related strategies. The selected strategies include the National Forestry Policy, aimed at improving management and competitiveness, various agricultural policies and institutional frameworks, and the Private Sector Development Strategy, which promotes greater investment and improved financial tools for businesses and entrepreneurs. It also includes the Finance Strategy, which promotes improved financial inclusion, institutions, and markets, and the National Export Strategy, aimed at increasing the value and competitiveness of domestically produced goods.

Rwanda's attractive World Bank "ease of doing business" ranking is the highest in East Africa, with inflation and currency exchange remaining stable over the past decade. Given that 70% of the country's exports are agricultural, there is a strong basis for FLR activities that rely upon exports for returns. The financial and tax treatment for domestic and international investments is favourable, with laws that protect property rights. The newly completed land tenure reform and the implementation of the Land Administration Information System

have registered millions of parcels, allowing for tracking of smallholdings that can support FLR investments. The government is making a concerted effort to promote private investments through the Rwanda Development Board. Their current set of investment offerings, however, lack the professionalism needed to attract private investment, particularly from international sources.

Although the government has prioritized public sector support for agriculture by allocating over 10% of the budget for agricultural activities, there remains a large financing gap of as much as ten times the annual national budget that is needed to implement its policy objectives. This budget allocation is also broadly applied to agriculture and does not specifically focus on FLR.

Rwanda has seen a growth in ODA, with over a third of the allocation dedicated to agriculture. There is the potential to dedicate some of these programmes to attracting matching private investment funds. Development finance institutions (DFIs) have provided a limited amount of grant funding. The Overseas Private Investment Corporation and the International Finance Corporation have provided political risk and weather insurance products for private investors in Rwanda, and if scale can be achieved to create investment packages of at least US\$ 10 million, DFIs could be a valuable source of funding for FLR.

Promoting the transition from traditional agriculture to agroforestry will require smallholder farmers to adopt crops grown in integrated agroforestry systems. For these productive systems to be investable, they will need to combine fast-growing and tree crops that can produce high value exports. These will include selected fruits, nuts, essential oils and pyrethrum. There are numerous private companies in Rwanda that can be leveraged to promote commercially viable agroforestry practices with farmers.

Promoting the improved management of woodlots and plantations can be addressed with better silvicultural practices for woodlots, as well as reducing the demand for wood through fuel-efficient stoves and green charcoal. However, unless investors target large wood and charcoal producers or there is adequate market demand for emission reductions from these activities, investment opportunities in this area may be limited. Instead, forest plantations could offer attractive long-term investment opportunities by replacing imported wood with local sources.

For the improved management of natural forests, there are two potential investment opportunities; including expansion of ecotourism and cultivation of non-timber forest products such as honey and bamboo in the buffer zones.

Investment opportunities for the improvement or establishment of protective forests includes the installation of small-scale hydropower; a cost-effective, multi-use energy source for rural communities that reduces wood energy usage. Another potential investment opportunity could come from the FLR activities that produce emission reductions for voluntary and compliance markets. However, this would require the demand for emission reductions to improve; given Rwanda's limited forest areas, this would primarily come from afforestation.

Smallholder farmers will be a key source of private investment if they adopt commercially viable FLR activities at scale while still balancing their food security needs.

Although Rwanda's banks and the Business Development Fund offer programmes that can be expanded to finance FLR, additional capital and the tailoring of the programs to fit FLR are needed. Rwanda's microfinance sector is geographically dispersed and has the potential to assist in FLR financing. By leveraging mobile banking channels, microfinance programmes

could effectively supply funds and distribute weather insurance to smallholders without expensive intermediaries.

Existing impact funds, DFIs, and private equity funds with active agricultural investments (primarily coffee) in Rwanda and the region, will be important private investors to approach once commercially viable FLR activities in Rwanda are identified. Additionally, there are active public-private partnership (PPP) programmes that can be tailored to FLR, including loan guarantees by the United States Agency for International Development.

This study demonstrates that Rwanda is well positioned to attract private investment for FLR from both a policy and ease of doing business perspective. Moreover, there are existing financial products that can be leveraged. The process of attracting private investment at scale will require Rwanda to implement a program that: (1) identifies and promotes commercially viable FLR practices and partners, (2) supports the commercialisation and preparation of the business case for these FLR activities, (3) organises fundraising to secure private investments for FLR, and (4) designs and operationalizes a Rwanda FLR-dedicated PPP entity.

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Abbreviations

AfDB	African Development Bank
ARR	Afforestation, reforestation and revegetation
ARECO	Rwandan Association of Ecologists
BIFSIR	Building Inclusive Financial Sector in Rwanda
BNR	National Bank of Rwanda
CBFF	Congo Basin Forest Fund
CCB Standards	Climate, Community and Biodiversity Standards
CDM	Clean Development Mechanism
CER	Certified emission reduction
CPI	Corruption Perception Index
DDTP	Development-Driven Trade Policy
DFIs	Development finance institutions
DFID	Department for International Development (UK)
DNA	Designated National Authority
EAC	East African Community
EDFI	European Development Finance Institutions
EDPRS	Economic Development and Poverty Reduction Strategy
EWSA	Energy, Water and Sanitation Authority (formerly ELECTROGAZ)
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign direct investment
FLR	Forest landscape restoration
FMNR	Farmer-managed natural regeneration
FONERWA	Fund for Environment and Climate Change in Rwanda
FPIC	Free, prior and informed consent
FTF	Feed the Future initiative
GDP	Gross domestic product
GEF	Global Environment Facility
GHG	Greenhouse gas
GNI	Gross national income
IBA	Important bird area
ICS	Improved cookstoves
IFC	International Finance Corporation
IPP	Independent power producer
IUCN	International Union for Conservation of Nature
KBA	Key biodiversity area
KPI	Key performance indicators
LSHP	Large-scale hydropower
LULUCF	Land use, land-use change and forestry
MDG	Millennium Development Goals
MFI	Microfinance institution
MININFRA	Ministry of Infrastructure Rwanda
NAFA	National Forest Authority
NES	National Export Strategy
NFF	National Forestry Fund

NFP	National Forestry Policy
NTFP	Non-timber forest product
ODA	Official development assistance
OPIC	Overseas Private Investment Corporation
POA	Programme of activities
PPA	Power purchase agreement
PPP	Public-private partnership
PSDS	Private Sector Development Strategy
PSP Project	Private Sector Participation in Micro-hydropower Project
PSTA	Strategic Plan for the Transformation of Agriculture
PWS	Payments for watershed services
RBS	Rwanda Bureau of Standards
RDB	Rwanda Development Board
REDD+	Reducing emissions from deforestation and forest degradation
REMA	Rwanda Environment Management Authority
SACCO	Savings and credit cooperative
SAGCOT	Southern Agricultural Growth Corridor of Tanzania
SEW	Sustainable Energy through Woodlots and Agroforestry in the Albertine Rift
SMEs	Small and medium-sized enterprises
SSHP	Small-scale hydropower
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
VCS	Verified Carbon Standard
VNP	Volcanoes National Park
WGI	Worldwide Governance Indicators
WRI	World Resources Institute

1. Introduction

Around the world, governments, private enterprises, communities, non-governmental organisations and land managers are pledging their support to the Bonn Challenge; a global goal of restoring 150 million hectares of deforested and degraded lands by 2020 and 350 million hectares by 2030. In an effort to provide support to those defining and implementing pledges, the International Union for Conservation of Nature (IUCN) is assessing the feasibility of creating investment packages to finance forest landscape restoration (FLR), with Rwanda as the pilot country.

This study was designed as a desk review to assess potential investment packages for Rwanda. It looks at how different types of private sector actors could be incentivized to invest in FLR and its associated products, such as: timber, non-timber forest products (NTFPs), agricultural products, emission reductions and other value chains that are linked to FLR activities.

The FLR activities considered for the study were defined by IUCN and the World Resources Institute (WRI) in the report *Forest Landscape Restoration Opportunity Assessment for Rwanda* (MINIRENA, 2014). The study recommends five FLR transitions necessary for Rwanda to implement in order to reach the goal of restoring two million hectares of trees:

1. Traditional agriculture Agroforestry systems for crops and livestock;
2. Poorly managed eucalyptus woodlots and plantations Improved management of existing woodlots;
3. Poorly managed eucalyptus woodlots and plantations Improved management of existing woodlots, with best practices for tree spacing, erosion and fire prevention;
4. Deforested land Improvement or restoration of natural forests; and
5. Deforested land Improvement or establishment of protective forests.

From the perspective of an investor, transitions 2 and 3 are very similar. As such, this study treats them as a single FLR transition type.

The goal of this study is to evaluate each of the five desired FLR transitions and determine which activities are, or could become, commercially viable. It also provides the Government of Rwanda with a roadmap for attracting private investors to FLR and serves as a resource to investors interested in the country's FLR investment opportunities. The term *commercially viable* in this study refers to projects or activities that meet the requirements of private investors with respect to risk and return, while also generating income for Rwanda's smallholders.

The ability of Rwanda to attract private investment capital depends on more than the existence of investable opportunities in these FLR activities. It also depends on the competitiveness of Rwanda's investment landscape and the availability of public/concessional funds that can be leveraged to create reduced risk and/or enhanced returns for private investors. The competitiveness of Rwanda's investment landscape is determined by how well the country's policies and strategies are aligned with FLR and private investors.

Section 2 evaluates Rwanda's key policies and strategic priorities and how these can impact FLR investment opportunities. Section 3 provides a profile of the major country-level indicators that investors will evaluate in determining whether to make investments in Rwanda; assessing the country risk of any FLR investments.

Section 4 identifies the investment potential for specific FLR value chains. The focus of this section is on defining the specific revenue generating activities within the targeted FLR transitions that could be commercially viable,

are appropriate within Rwanda's smallholder-dominated environment, and are within the context of Rwanda's limited forest landscape. For each of the five FLR transitions, the steps needed to create commercially viable opportunities, as well the specific types of FLR investment and projects/partner entities are identified. Given that this study was desk-based, it is not possible to provide the specific details of any particular investment opportunity; including business model, size of potential investment, and investee entity (producer groups, small and medium-sized enterprises [SMEs], and companies).

Section 5 discusses sources of public funds and risk mitigation instruments for FLR in Rwanda. Section 6 identifies the potential private investment funding sources for FLR in Rwanda, reviewing the types of private investors that are investing in FLR globally. Where available, specific examples of private investments in

Rwanda's FLR-related activities are provided. This section identifies the spectrum of private investors that can be mobilized by Rwanda and how each of their investments could be used to support FLR. At present, there appears to be a limited amount of private investment in the FLR transitions identified in the IUCN and WRI report. There is significant private investment in cash crops (largely tea and coffee), but these are primarily made in downstream value chain activities, such as: transport, storage, milling and export. There has been little private investment in Rwanda's upstream FLR activities such as: inputs, smallholder producers and local processing.

In conclusion, Section 7 provides guidance for the Government of Rwanda on the process and technical assistance that is needed to attract private investment for FLR, as well as the barriers that will need to be overcome.

2. Alignment of national policies and strategic priorities with FLR

SECTION HIGHLIGHTS

This section highlights key national-level policies and strategies relevant to FLR in Rwanda. These policies and strategies demonstrate the ways in which FLR-related activities and related priorities, including sources of funding and/or investment, have been mainstreamed by the Government of Rwanda, and how numerous social, economic and environmental objectives are supported across overlapping policies.

Rwanda has a complex policy environment as it relates to investment in FLR. The Government's **Vision 2020** promotes the expansion of both forest cover and Rwanda's forest-based industries as a means of raising per capita incomes. The **Economic Development and Poverty Reduction Strategy** (EDPRS) promotes the use of key performance indicators (KPIs) to guide the distribution of resources from Rwanda's national environmental fund. The National Green Growth Strategy, **Vision 2050**, aims to reduce the impacts on the national economy that result from climate change while promoting low-carbon economic development. Central to achieving the objectives of these national policies are sectorial strategies, as well as private sector, export and other finance-related strategies. The selected strategies covered in this section include: the **National Forestry Policy** (NFP), aimed at improving management and competitiveness; various **agricultural policies and institutional frameworks**; and the **Private Sector Development Strategy** (PSDS), which promotes greater investment and improved financial tools for businesses and entrepreneurs. It also includes the **Finance Strategy**; which promotes improved financial inclusion, institutions and markets; and the **National Export Strategy** (NES), aimed at increasing the value and competitiveness of domestically produced goods.

A country's ability to attract investment is largely dependent on its strategic priorities and national policies, as these determine the overall investment landscape. These also provide insights and foundational data needed for investments in a given sector and highlight the government's programs and publically funded activities that can be leveraged to source and support attractive investment returns. This section provides an overview of Rwanda's national policies and strategic priorities as they relate to investments in FLR.

Given the integrated nature of FLR, this review includes the following documents: Vision 2020, National Green Growth Strategy, EDPRS, NFP, agricultural policies and institutional frameworks, PSDS, Finance Strategy, and NES.

2.1 Vision 2020

Vision 2020 is a government development program launched in 2000 by Paul Kagame, President of Rwanda. The goal of Vision 2020 is to transform Rwanda from a low-income,¹

1 The World Bank classifies countries with a per capita GNI of less than or equal to US\$ 1,035 as low income.

subsistence-based agricultural economy to a knowledge-based society with an annual per capita income of US\$ 900 by 2020. Average per capita incomes have increased year over year since 2003. In 2012, Rwanda's gross national income² (GNI) per capita was approximately US\$ 600, against a GNI of US\$ 200 in 2000 (World Bank, 2014a).

The primary forestry objective of the Vision 2020 program is the maintenance and good management of existing forest stocks, while increasing forested areas to 30% of total national area by 2020. Currently, approximately 435,000 ha, or nearly 18% of total national area, is considered forested (World Bank, 2014b). In addition, the programme intends to create a favourable environment for thriving forestry business and wood-based industries, which includes increasing forest-generated incomes.

2.2 Economic Development and Poverty Reduction Strategy

Rwanda's EDPRS has existed in two iterations. The first, EDPRS I, was executed from 2008

to 2012, while the second, EDPRS II, began in 2013 and will continue through 2018. As part of the government's effort to mainstream climate change in the policy sphere, the EDPRS was revised in 2012. Key to these revisions, as well as the revisions to Rwanda's Vision 2020 programme, is the use of KPIs as a means of guiding Rwanda's National Fund for Environment and Climate Change (FONERWA) outreach to key sectors critical to achieving EDPRS objectives. In order to operationalise FONERWA, environment and climate change-related issues must be mainstreamed, including the formulation and monitoring of at least three KPIs by key ministries, as well through the inclusion of at least three KPIs in sectoral monitoring and evaluation frameworks (Government of Rwanda, 2012).

2.3 National Green Growth Strategy – Vision 2050

Rwanda's National Green Growth Strategy – Vision 2050 – is an umbrella strategy aimed at mainstreaming climate resilience and the

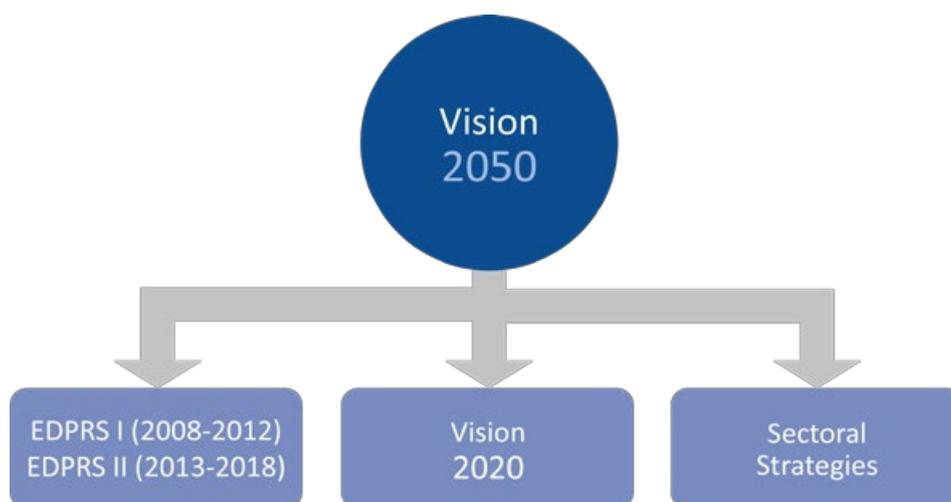


Figure 1. The primary strategies (EDPRS I & II; sectoral strategies) and government development programme (Vision 2020) currently supporting the objectives of the National Green Growth Strategy, Vision 2050

2 GNI represents total annual national income divided by the total population and reflects the average income of a country's citizens.

development of a low-carbon economy in key economic development policies and strategies. The costs of climate change in Rwanda could be as much as 1% of gross domestic product (GDP; Government of Rwanda, 2011a), due to, among other things, a very heavy reliance on rain-fed agriculture for both food and export crops like tea and coffee. By 2050, Rwanda's population will have more than doubled, from 11 million people in 2011 to 26 million (Government of Rwanda, 2011a), further exacerbating population pressures in Africa's most densely populated country.³

While there is a strong synergy between Rwanda's NFP 2010, EDPRS and Vision 2020; Vision 2050 will be achieved in part through the promotion of sector-specific strategies that will help attain the following strategic objectives at the national level:

- Achieve energy security and a low carbon energy supply that supports the development of green industries and services; and
- Achieve sustainable land use and water resource management that results in food security, appropriate urban development, preservation of biodiversity, and preservation of ecosystem services.

Sector-specific strategies, which are detailed in annexes of the original National Green Growth Strategy documents, have been established for the following sectors: cities and the built environment, water, agriculture, energy, finance, forests and tree-based systems, land, mining, and transportation. The Vision 2020, National Green Growth Strategy and EDPRS II provide the foundational elements for sector specific strategies and policies including the NFP (last updated in 2010), agricultural policies and institutional frameworks, PSDS, finance strategy and NES, each summarized below.

2.4 National Forestry Policy 2010

Rwanda's NFP 2010 was born out of the desire to "make the forestry sector one of the bedrocks of economy and national ecological balance for sustainable benefits to all segments of society" (MINIFOM, 2010). The 2010 version of the policy contains a variety of additional considerations that were not originally included in the 2004 version, with particular regard for ways in which the process of achieving goals outlined in the EDPRS and Vision 2020 can be improved and mainstreamed. Specific issues addressed in the NFP include:

- Increasing competition for land between forestry and other development activities;
- Poor management of planted forest compromising a sustained yield;
- Low private investment in the creation of forest resources, in the value-addition to forest products and in the diversification of forest products;
- Existence of over mature and degraded forests; and
- High dependence on importation of industrially processed forest products.

Interventions and activities identified within the NFP to address these issues that are related to FLR include:

- **Permanent forest estate keeping**,⁴ with special attention given to permanence of forests in Rwanda and the lack of classification and other data critical to implementing effective FLR activities;
- **Forest-based industries promotion**, emphasising biophysical inventories, due diligence on forest tenure issues, and promotion of sustainable industry practices;
- **Capacity building in the forestry sector**, including strengthening institutions, forestry research, and enhancement of forestry training;

³ 987 people per km²

⁴ FAO defines a permanent forest estate as any forest area that is designated to be retained as forest and may not be converted to other land use; permanent forest estates may include both forested and non-forested areas.

- **Urban and peri-urban forest development**, beginning with the inclusion of urban forestry in urban planning and effectively demonstrating the added value of urban forests;
- **Farm forestry enhancement**, including mainstreaming agroforestry and NTFP cultivation in the policy arena, and supporting different community groups in the farm forestry process;
- **Promotion of profitable, productive forest plantation business**, including legal mechanisms to encourage private sector investment, and innovative financing mechanisms through the National Forestry Fund (NFF); and
- **Establishment, rehabilitation and conservation of watershed protecting forests**, including environmental assessments of major watersheds and the development of regulations and guidelines for measuring riparian zone forests.

Other noted areas of opportunity for Rwanda's forestry sector considered in the drafting of the NFP 2010 are the NFF (which exists alongside

FONERWA), and a forum for private sector engagement with the Government of Rwanda. Related to these opportunities are the guiding principles of the NFP 2010: commercialization of forestry activities including efforts by the Government of Rwanda to drive investment, and private sector involvement via a systematic 'phasing in' process, particularly in areas of forestry management and forest products processing.

The NFP 2010 highlights the key roles that financial institutions, investors, and development partners play in the policy's outcomes. These include:

- Providing access to finance for forest investors;
- Requiring reasonable guarantees on loans, and provide flexibility for new entrants into the market;
- Providing reasonable and low interest loans where returns on investment take time to generate; and
- Providing preference in credit to investors with a good approach, since forestry business takes time to generate returns.

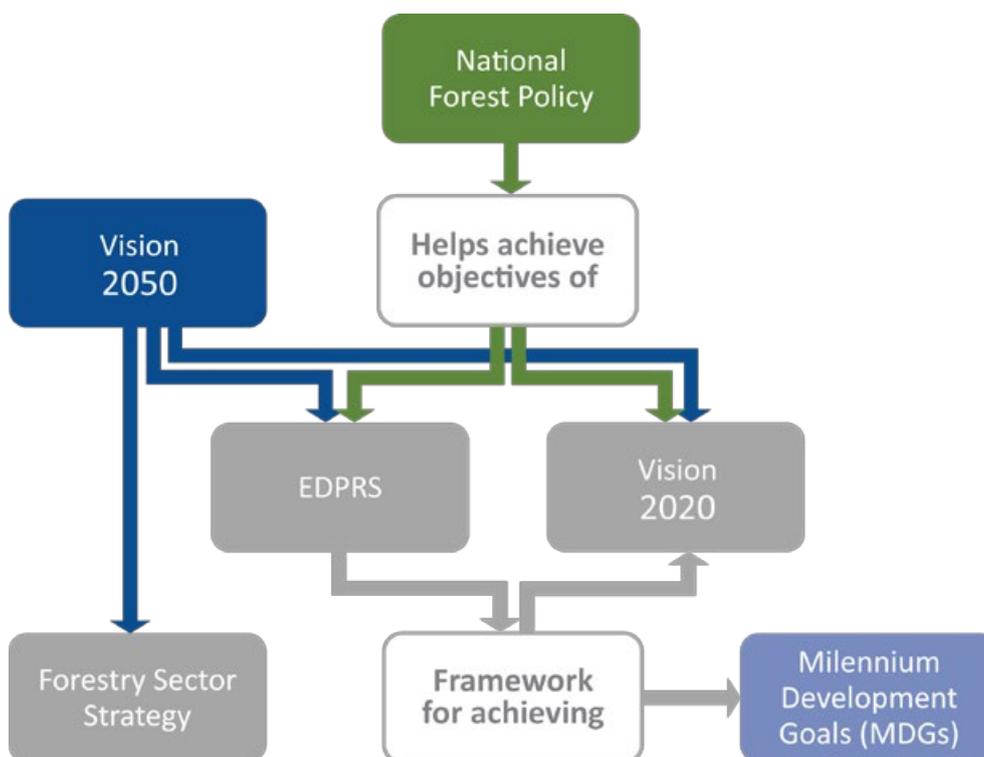


Figure 2. Relationship between Rwanda's NFP and country-level policies

2.5 Agricultural policies and institutional frameworks

Currently, Rwanda lacks a single, unified policy or strategy to address agricultural development in the country. Rather, the country's agricultural agenda is embedded in a series of strategies and institutional frameworks designed to simultaneously address agriculture, economic development and poverty reduction. These various initiatives are broadly regulated by 2004's National Agricultural Policy, which establishes a high-level framework for the country's agricultural priorities. National and sector-specific policies and strategies focused on agriculture are further bolstered by international and regional frameworks, such as the New Partnership for African Development, Common Markets for Eastern and Southern Africa the Central African Forest Commission, and the East African Community (EAC), which are intended to improve market access and supply chain sustainability of forest products, address food security and boost rural livelihoods through increases in agricultural productivity and modernization, as well as policy reform.

Rwanda's national framework for agricultural development lies within four policies. The first, Vision 2020, has established as one of its 'pillars' the "transformation of agriculture into a productive, high value, market-oriented sector, with forward linkages to other sectors" (Alinda & Abbott, 2012). The other pillars support agricultural development through a variety of economic, social, and resource-related development goals. Central to the successful execution of Vision 2020 will be regional integration and cooperation of markets, as noted above. Vision 2020, in turn, is driven by its implementation strategy, the EDPRS (I & II), which represents a medium-term framework for Rwanda's long-term agricultural objectives

under the Millennium Development Goals (MDGs). Agricultural productivity is central to increasing Rwanda's GDP, particularly through an increase in contributions from strategic exports, such as coffee and tea.

Other relevant, overarching policies in Rwanda's national agricultural agenda include the 2010 Development-Driven Trade Policy (DDTP) Framework and the Strategic Plan for the Transformation of Agriculture (PSTA), Phase Two.⁵ The PSTA-II approaches improved agricultural productivity through the lens of food security, aiming to "rapidly increase agricultural output and incomes under sustainable production systems for all groups of farmers, and to ensure food security for all the population." Among its four primary programmes, two are especially relevant for FLR:

- Intensification and development of sustainable production systems, and
- Promotion of commodity chains and agribusiness development.

Strategies to achieve these include improved access to finance, as well as the development of a robust and efficient private sector. Since 2010, several policies have emerged under the umbrella of the PSTA-II:

- National Agricultural Extension Strategy,
- Agriculture Mechanization Strategy (2010-2015),
- National Post-Harvest Staple Crop Strategy (2011-2016), and
- Agriculture Gender Strategy.

The 2010 DDTP, a joint effort between Rwanda's Ministry of Trade and Industry and the United Nations Conference on Trade and Development, promotes the idea that agricultural policy in Rwanda should be development driven, rather than driven by demand. But ironically, the DDTP states that the primary role of investments is enabling diversification of exports and markets

5 PSTA-III was being finalised at the time of writing and was available as a draft.

and adding value to agricultural and other exports through the development of local processing infrastructure, which is demand driven. Ultimately, the DDTP represents a call for investments with a focus on creating added value for agricultural exports and market diversification.

2.6 Private Sector Development Strategy

Currently, the private sector in Rwanda consists mainly of small enterprises that provide low returns and employment opportunities, with only a few large competitive businesses. Rwanda's PSDS, developed in accordance with the country's EDPRS (2013-2018), provides an overarching framework for reforms that will help achieve the key growth targets articulated in Vision 2020 as well as the Seven-Year Government Programme. The PSDS is being implemented through seven programmes:

- 1. Infrastructure for Growth.** This programme aims to continue and expand Rwanda's Special Economic Zone to develop locations where energy infrastructure constraints are minimized.
- 2. Investment Promotion.** This programme aims to develop the marketing capacity within the Rwanda Development Board (RDB) and to create a more streamlined investment promotion service. Part of the programme will be to provide the RDB greater powers to propose a package backed by firm inter-ministerial commitments and a clear public service delivery schedule.
- 3. Entrepreneurship Development.** Through this programme, the government will create an enabling environment for micro, small and medium enterprises, particularly in low-cost areas where such enterprises can operate.
- 4. Credit Expansion.** The programme addresses the significant lack of instruments to increase bank lending through significant expansion of the current credit guarantee scheme that

reduces the risk to banks while also assisting enterprises in establishing credit worthiness.

- 5. Skills and Innovation.** This programme will expand the RDB's Skill Sector Councils, bringing together the private sector, via relevant chambers of commerce, with government institutions and higher education institutions in order to address commercial skills training deficits.
- 6. Better Regulation.** The programme will simplify the way that companies are taxed to ensure greater certainty and transparency in the system, particularly with respect to corporate and withholding taxes. It will also create tax business advisory panels to push for further reforms.
- 7. Market Access.** Through this programme, the government is developing a strategic approach to increasing market access, reducing trade barriers and promoting activities that link producers with markets (Government of Rwanda, 2013).

Additionally, the RDB has developed a detailed investment process, the *Roadmap for Agribusiness Investment Facilitation* (RDB, 2013), supported by the United States Agency for International Development (USAID). The roadmap details the agricultural investment process from the perspective of the RDB, mapping processes related to origination, information gathering, evaluation, decision to invest, implementation, and aftercare.

2.7 Finance Strategy

Developing an efficient, sound and inclusive financial sector is key to meeting the Vision 2020 and the Seven-Year Government Programme targets, particularly in achieving Rwanda's long-term development plan to transform the country into a middle income country by 2020. Building on the success of its first Financial Sector Development Programme, adopted in 2008, the government is implementing the second phase of the programme. Its overarching goal is to develop

a reputable and stable financial sector that is sufficiently deep and broad, capable of efficiently mobilizing and allocating resources to address the development needs of the country. The programme aims to achieve this goal through four main strategies:

1. **Financial inclusion.**⁶ This programme aims to increase financial inclusion to 80% by 2017, and to 90% by 2020. It will enhance monitoring, disaggregating data on women and youth, and roll out a district-focused financial education and literacy program alongside the provision of mid-level financial training. It will also provide a range of low-cost financial products to households, including mobile money transfers, mobile and internet banking, agent banking, insurance, and micro lending. Among the most important activities for financial inclusion is the strengthening of *Umurenge* savings and credit cooperatives (SACCOs) under the supervision of the National Bank of Rwanda (BNR), which is expected to form district SACCOs that will eventually be linked to a national system.
2. **Developing financial institutions, markets and the supporting infrastructure.** A particular focus of this programme is building capacity in the financial sector through partnerships between financial sector associations and institutions, and educational institutions. The programme also focuses on new entrants to the banking market that offer a new business model (e.g. focus on SMEs), refining the regulatory environment for insurance, completing the legal foundation for the country's capital markets, and strengthening the Rwanda Social Security Board governance, administration, investment and risk management.
3. **Investment and savings to transform the economy.** This programme aims to increase domestic credit to the private

sector from 13% of GDP to 27% by 2017. Reforms include completion of the electronic land registration process, greater use of available guarantee programmes to encourage banks to lend to credit-worthy enterprises, and specialized training for lenders in agricultural credit and housing finance (Andrews, et al., 2012).

4. **Protecting consumers and maintaining financial stability.** Through this programme, a new financial sector unit is being created to allow consumers a redress mechanism. It will make a number of regulatory revisions, including updates to the banking legislation and prudential standards, and the central bank law. Formalized arrangements for crisis management, including failure of financial institutions, are also being put in place.

2.8 National Export Strategy

Rwanda's five-year NES is driven by the country's "inability to capture most of the value" (Government of Rwanda, 2011b) of the products produced within its borders, leading to overdependence on unstable commodities as a base for export-driven revenue. In considering the objectives of the Vision 2020 and EDPRS, the RDB urged the creation of a comprehensive and coordinated strategy to promote export growth in key sectors while balancing cross-cutting issues through the provision of general incentives alongside well-defined interventions. Thus, the NES was put forth in 2011 with the objective to "identify prioritized actions that respond to issues that affect Rwanda's international competitiveness, or Rwanda's [ability to] upgrade to high value-added products in export clusters" (Government of Rwanda, 2011b). The methodological approach is similarly two-pronged. The first activity is identifying and prioritizing actions that can improve Rwanda's overall business environment, including the competitiveness of

6 Financial inclusion is the provision of low cost/affordable financial services to low-income and other disadvantaged communities.

domestic firms in the global market. The second is the identification of key sectors and sector-specific actions that can remove barriers to sectoral growth and boost export potential.

It should be noted that the NES represents a framework for short- and medium-term export growth only (through 2015), though in practice, the NES should have a more longitudinal impact by addressing the priority 'cross-cutting' issues and their corresponding strategic actions. With regard to the issue of finance and investment, the Strategy outlines two actions to be spearheaded by the RDB: facilitate financing to address specific issues through sector-specific financing schemes, and increase the level and quality of investments in productive sectors. The results of a 2008 survey of Rwandan businesses (RPSF, 2008) determined that the following represented the three largest constraints to accessing finance: a lack of collateral for securing loans, excessive interest rates charged by lenders, and a limited availability of leasing; overall, two-thirds of Rwandan businesses identified access to finance as a major constraint.

The sectors targeted by the Strategy relevant to FLR include some of Rwanda's traditional export sectors – tourism, tea, coffee – as well as non-traditional sectors like horticulture, which may include fruits, vegetables and cut flowers. These sectors were determined via an analysis of more than 50 potential export sectors in Rwanda, with the frontrunners ranked, via a weighting system, by their potential export contribution, potential for job creation, number of existing firms or cooperatives, and investor prospects, among others. The selected sectors also have value chains that would benefit significantly from the NES emphasis on addressing cross-cutting issues (Government of Rwanda, 2011b).

Tourism in Rwanda has historically been Rwanda's top foreign exchange earner, but the Government of Rwanda wants to create a high-demand environment by diversifying

the tourism sector, particularly with regard to nature/ecotourism. Gorilla tourism is an especially important draw, and the country hopes to expand this niche of the sector as well. Tourism represents an important opportunity for restoration transitions in Rwanda, particularly if the country intends to promote biodiversity and maximize the use of its natural resources. Currently, the government feels that the country is overly dependent on gorilla tourism, and has identified avitourism as an area with a high potential for growth as the country is home to over 700 confirmed species of birds (RDB, 2011).

Tea and coffee are Rwanda's traditional export commodities and provide income for over one million people. For Rwandan tea to become more competitive in the international market, the country is hoping to generate nearly US\$ 160 million by 2015, which can only be accomplished through an increase in yields per hectare and increased production capacity of processing facilities. The current industry trajectory is driven by the 2008 National Tea Strategy, which calls for, among other things, increased investment throughout the supply chain. An oversupply of Rwanda's primary bulk tea variety – black tea – in the international market will require a shift to the production of higher quality and more diversified varieties. However, expansion of tea export has some ability to impact FLR in Rwanda. Studies in China (Liang, et al., 2013) and Kenya (Githiru, et al., 2009) on tea farm biodiversity have shown that tea forests may provide habitat for a higher number of species than even natural forests in the immediate vicinity. For example, Chinese tea farms were found to be habitat for nearly 250 species, including 15 rare or endangered plant species, while well-managed tea farms in Kenya resulted in a higher number of observed bird species, including several rare birds, than adjacent non-cultivated areas.

Coffee also represents a traditional export and priority sector. Though only a small percentage of Rwanda's coffee is now fully washed, most

of this coffee falls into the 'specialty' category and has attracted international demand from major retailers. Unfortunately, Rwanda has been unable to capitalise on increasing international coffee demand due to decreasing yields caused by a variety of factors. The National Coffee Strategy incorporates five priority programmes

aimed at eliminating constraints to improved productivity and revenue generation. Relevant to FLR is the need for the mainstreaming of best practices in farming and integrated pest management through focused agronomic support, with a focus on value addition throughout the rest of the supply chain.

3. Rwanda's investment profile

SECTION HIGHLIGHTS

This section details the factors that contribute to Rwanda's country-level investment profile. It provides the Government of Rwanda with a benchmark on how the country is positioned to compete for private capital with other countries in the region and provides private investors details on the country's investment landscape and how to assess the country-level risk.

Rwanda's attractive World Bank "**ease of doing business**" ranking is the highest in East Africa, with inflation and currency exchange remaining stable over the past decade. Given that 70% of the country's exports are agricultural, there is a strong basis for FLR activities that rely upon exports for returns. The government is making a concerted effort to promote **private investments** through the RDB, but their current set of investment offerings lack the professionalism needed to attract private investment, particularly from international sources. The financial and tax treatment for **domestic and international investments** is favourable in Rwanda, with laws that protect property rights. The newly completed **land tenure reform** and the implementation of the **Land Administration Information System** have registered millions of parcels, allowing for tracking of smallholdings that can support FLR investments.

There are a number of country-level conditions that will determine Rwanda's potential for attracting private investment in FLR. With the limited investment capital available to developing countries for forestry and agriculture, a country's investors will evaluate the following before investing in a country: (i) risk ranking and ease of doing business, (ii) macroeconomic factors driving returns, (iii) institutional support provided by the government, (iv) financial and accounting regulations, and (v) land tenure. These are all key factors that will impact Rwanda's ability to attract investment capital for FLR over other developing countries. The sections below provide an assessment of Rwanda's investment landscape for each of these main factors.

3.1 Rwanda's risk profile and ease of doing business

There are various country risk indicators that investors will review to assess the risk of

investing in a frontier market like Rwanda. These risk indicators include:

- **Regulatory risk**, such as foreign ownership restrictions, currency limits, local custody rules, local funding and registration requirements;
- **Currency risk**, including convertibility of local currencies and inflation which could impact costs;
- **Governance risk** related to the corruption, governance and financial reporting that is required of investment entities; and
- **Political risk** related to political instability (terrorism, riots, coups, civil war, and insurrection).

Many investors are managing geographically diverse portfolios in multiple countries and do not consider themselves political analysts. Thus, they rely on published risk rankings such as the World Bank's Worldwide Governance Indicators (WGI), the International Country Risk Guide published by the PRS Group, and Transparency

Table 1. Worldwide Governance Indicators and Corruption Perception Index scores for East African countries

Country	WGI	CPI
Rwanda	-0.31	53
Uganda	-0.58	26
Tanzania	-0.38	33
Kenya	-0.72	27

Sources: World Bank, 2013b; Transparency International, 2013.

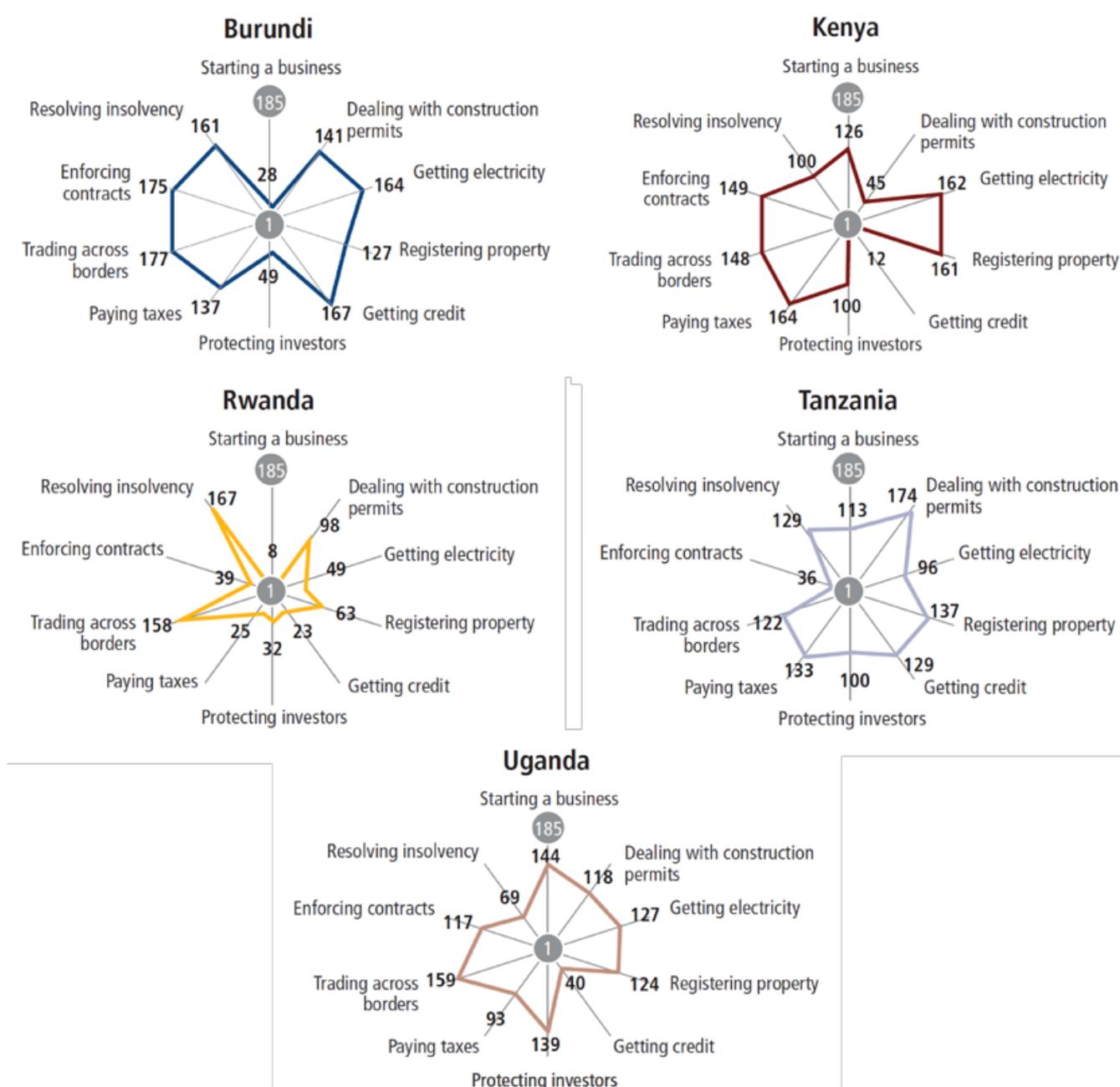


Figure 3. Ease of doing business rankings for East African countries

International's Corruption Perception Index (CPI) as measures of country risk.

Rwanda's performance relative to other countries that might compete for investment funding in the region compares favourably on the three main indicators of risk. Based on the WGI averages over the last five years, Rwanda has the lowest risk score. Under the CPI, Rwanda has the highest score, correlating with the lowest level of corruption in the region.

In addition to the positive risk rankings under WGI and CPI, Rwanda was identified as the second most improved country since 2005 for ease of doing business, and the first in its region (World Bank, 2013a). Based on the ease of doing business indicators, Rwanda ranks favourably when compared to the other four East African countries (Figure 3). This is evidenced through an evaluation of ten indicators used to measure ease of doing business.⁷ The closer a point is to the centre, the higher (better) the ranking.

3.2 Macroeconomic factors

Macroeconomic factors will impact investment desirability, including economic growth, market supply and demand, agricultural and forestry products, labour availability, currency stability, and inflation. Rwanda was listed as one of the world's top ten fastest growing economies in 2013, with GDP growth of 7.1% since 2004 (World Bank, 2013a), and stable inflation and exchange rates. However, Rwanda still ranks as a low income, predominately agricultural country (World Bank, 2013a), as agriculture accounts for one-third of GDP, and provides 90% of the country's food supply. Agriculture is also responsible for 70% of export revenues (RDB, n.d.). Rwanda's national strategies indicate intent to continue focusing efforts

on traditional cash crops (tea and coffee) and pyrethrum,⁸ as well as on the nascent, non-traditional horticultural crops and plants, including various fruits and vegetables, flowers (mainly fresh roses), essential oils, stevia, dairy, meat, poultry, and fish. These priorities will need to be balanced by the risk of food scarcity in Rwanda, but also highlight important opportunities.

3.3 Institutional support for investing

The RDB states its vision is "to transform Rwanda into a dynamic global hub for business, investment, and innovate," with the mission of "fast-tracking economic development in Rwanda by enabling private sector growth." The role of the RDB is to address the needs of companies and both local and foreign investors. It is structured to report directly to the President with a board of directors from all key ministries. Rwanda hopes to transition its agricultural sector toward commercial farming; agro-processing, import substitution and increased exports are key elements of achieving Vision 2020.

The RDB has a comprehensive website with 25-30 'investment opportunities' in the area of agriculture alone. While this shows a strong interest in attracting investments, most documents on the website do not provide a compelling case for investors and could be upgraded to serve as a valuable investment sourcing portal. Another resource to help investors navigate Rwanda's processes and procedures for establishing a company and making investments is the recently published *Roadmap for Agribusiness Investment Facilitation* (RDB, 2013). This comprehensive document provides a set of flow charts for making greenfield investments in Rwanda by making it easier for an investor to understand

7 Scores for each of the ten indicators range from 1 to 185

8 A perennial flowering plant, some species of which have application as a pesticide.

the steps required to establish a new business, or ensure that they have comprehensive due diligence for their investments. The establishment of the RDB, new policies, and the simplification of formalities related to business registration in the country are among the factors that have contributed to an increase of private firms; from 3,000 operating in 2008 to nearly 18,500 in 2010 (World Bank, 2013a).

3.4 Financial and accounting regulations

The financial, tax and accounting treatment for onshore and offshore investments can make a significant impact on the investment outlook for Rwanda's FLR. This is relevant for both the treatment of investment entities that are set up onshore in Rwanda, as well as the treatment of offshore capital investing in these onshore investment entities. Rwanda has one of the most open systems in Africa when it comes to making foreign investments. The 2005 Investment and Export Promotion and Facilitation law explicitly states that "foreign investors may invest and participate in the operation" (UNCTD, 2006) of any business in Rwanda. The constitution also grants protection over private property rights, which can be expropriated only for reasons of public interest and after fair and prior compensation. If an investor registers and is certified under the Rwanda Investment and Export Promotion Agency, then the compensation can be received in a convertible currency in case of expropriation; investors receive a guarantee that the compensation will be free of any tax or duty and freely transferable overseas.

As far as taxation, Rwanda has made efforts over the last ten years to streamline the three functions of its tax department (large taxpayers, internal revenue, and customs) in order to build synergies in tax management and in services to taxpayers. The tax rate for

corporations is 30%, but there are discounts for entities that have been established in free trade zones and for those that employ different tiers of employees. Rwanda has the lowest tax rate on profits compared to Burundi, Kenya, Tanzania and Uganda, and is ranked 25th of over 100 countries for their fair and transparent tax system. Rwanda is trying to encourage investment by offering discounted taxes for SMEs and zero tax for microenterprises (PWC, 2013). As far as exports are concerned, the Government of Rwanda has established tax discounts based on the percentage of value for exports that bring revenue to the country, starting as low as US\$ 3 million per tax year.⁹ Rwanda has been an increasingly attractive destination for foreign direct investment (FDI), and in 2009 had US\$ 118 million, which represents a fourteen-fold increase over 2004 (RDB, 2010).

Another element that has impact on the investment environment in Rwanda is accounting standards. If the accounting standards generally used and recognized by Rwandan entities do not follow recognized international standards, investors could have difficulty understanding the financial statements of potential investment entities. A strong financial reporting regime for corporate entities in both the public and private sectors will increase FDI by improving the confidence and comparability of financial information. As of September 2008, only the banking and financial institutions in Rwanda seem to have adopted the International Financial Reporting Standards reporting framework.

3.5 Rwanda's credit rating

Another indicator of investment worthiness is credit rating. According to credit rating agencies Fitch and Standard and Poor's, Rwanda's sovereign credit rating is what is known in the market as junk or speculative (B rating), after

9 RRA tax and growth March 2012.

a revision from stable to positive late last year. Credit agencies consider that Rwanda has shown strong economic growth and signs of stronger future growth, having grown at an average 8.3% since 2005 (IMF, 2013b), and being the third best place to do business in Africa according to the World Bank. This improvement in Rwanda's credit rating implies that the world perceives the country's default risk as low and therefore interest rates for loans to the country and to investors operating in the country will be lower.

3.6 Land tenure and its impact on landscape investments

The ability to understand and ensure that investments are made in entities that have defined and secure tenure either individually or through a collective is of upmost importance for investors in FLR activities. Without it, there is too much uncertainty around whether the entity receiving the investment represents those who are rightfully on the land (or using the land) that generates the return. The further downstream the investment is being made, the more important it will be to have secure tenure. For example, tenure will be extremely important for investments being made to support growing new crops and less important if the investment is being made in a processing plant.

Rwanda has extremely high demographic pressure, which has resulted in landless people and inappropriate land use that results in land degradation, deterioration in soil fertility and declining yields. Rwanda has been implementing a major land tenure regularisation

process and is in its final stage. The process included the implementation of a Land Administration Information System, which is now the official digital land register that is used to conduct all transactions related to land. By the end of December 2012, an estimated 10.3 million parcels were demarcated, adjudicated, and digitized, and only 11,840 disputes were registered countrywide (Ruruagwa, 2013). In agriculture, women are a dominant force, and a short-term study of the impact of Rwanda's land tenure reforms has shown land tenure security for women has improved access to land for legally married women and prompted more gender-neutral recording of inheritance rights (Ali, et al., 2011). Rwanda is considered a country with "low productivity in agriculture, but strong legal rights," and ranks highly in ease of doing business. However, agricultural productivity per worker remains less than US\$ 1,600 (IFC, 2012).

Although the amount of unclaimed land is high due to people and refugees from outside of the country and rural woman having lower registration rates because they are not aware of their land rights, Rwanda is likely among the most prepared countries in sub-Saharan Africa to meet challenges regarding land administration and management. Rwanda's land reform process has been cited as one reason for increased investments in soil conservation measures, particularly among female-headed households (Ali, et al., 2011). Actions by the Rwandan Government indicate that they look to capitalize on the positive relationship between tenure security and land-related investment (Byamugisha, 2013).

4. Identifying investment potential in FLR value chains

SECTION HIGHLIGHTS

The focus of this section is on defining the specific revenue generating activities within the targeted FLR transitions that could be commercially viable, are appropriate within Rwanda's smallholder-dominated environment, and are within the context of Rwanda's limited forest landscape. For each of the five FLR transitions, the steps needed to create commercially viable opportunities, as well the specific types of FLR investment and projects/partner entities are identified.

IUCN and WRI, working with the Government of Rwanda, have developed a set of targeted restoration interventions that work within the mosaic of different forest land uses, including: agriculture, agro-forestry, plantations, and natural forests. This section contains: (i) a review of Rwanda's Bonn Challenge commitment of planting two million trees on their landscape, (ii) the specific land-use transitions that are recommended by IUCN and WRI in *Forest Landscape Restoration Opportunity Assessment for Rwanda* (MINIRENA, 2014), and (iii) an identification of the potential value chain activities that provide investment opportunities for each type of transition.

4.1 Rwanda's participation in the Bonn Challenge

In 2012, the Government of Rwanda pledged two million hectares of degraded land to the Bonn Challenge, signalling their intent to restore these lands by 2020.

The Bonn Challenge on Forests, Climate Change and Biodiversity was a product of the Bonn Climate Change Conference, which was the 34th session of the Subsidiary Body for Implementation and Subsidiary Body for Scientific and Technological Advice under the umbrella of the United Nations Framework Convention on Climate Change (UNFCCC). The Bonn Challenge represents a global commitment to restore 150 million hectares of degraded and deforested land by 2020, activities that could be worth US\$ 85 billion per year to national and global economies, and could reduce the current emissions gap by up

to 17% (GPFLR, 2011). This practical, action-oriented approach also helps achieve goals established under other existing international commitments that require restoration activities, such as reducing emissions from deforestation and forest degradation (REDD+) goals under the UNFCCC, and the land restoration goals to come out of Rio +20.

4.2 Recommended FLR interventions for Rwanda

IUCN and WRI's recommendations in the *Forest Landscape Restoration Opportunity Assessment for Rwanda* identify five broad restoration **interventions** that could be used to improve the ecological and economic productivity of degraded lands:

- 1. Agroforestry for crops and livestock** – Involves the use of trees on agricultural land to improve soil fertility and stability, fuelwood and timber production, and

reduce fertiliser costs by using 'green manure.'

- 2. Improvement or restoration of natural forests mainly in or around protected areas** – Uses natural and assisted natural regeneration practices to allow native species to passively regenerate on degraded and deforested land.
- 3. Improved management of existing woodlots for fuelwood and timber** – Improves the spacing density of trees on existing woodlots and timber plantations.
- 4. Improved management of existing woodlots for fuelwood and timber with best practices for spacing, erosion and fire prevention** – Improves the stocking density of trees on existing woodlots and timber plantations and includes establishing anti-erosion ditches and fire lines.
- 5. Improvement or establishment of protective forests on ridge tops and near water bodies** – Establishes native and non-native tree species on steeply-sloped ridges and hillsides and protects rivers and wetlands from the harmful effects of erosion by creating buffer zones of natural forest around these vulnerable sites.

Using geospatial and economic analysis, the following restoration transitions were identified:

1. Traditional agriculture → Agroforestry for crops and livestock;
2. Poorly managed eucalyptus woodlots and plantations → Improved management of existing woodlots, spacing only;
3. Poorly managed eucalyptus woodlots and plantations → Improved management of existing woodlots with spacing, and erosion and fire-prevention best practices;
4. Deforested land → Improvement or restoration of natural forests; and
5. Deforested land → Improvement or establishment of protective forests.

For the identification of potential investment opportunities in this study, transitions 7 and 8 have been combined, as they are not uniquely different in their investment potential.

4.3 FLR value chain investment opportunities in Rwanda

Rwanda as a country has an attractive country profile for investors (see Section 3). The country has had some success in attracting financing for certain agricultural value chain opportunities, with most success in downstream investments in cash crop value chains such as coffee. Given the nature of Rwanda's small land holdings, averaging just 0.59 hectares per household, increasing agricultural productivity can only be achieved through either: (i) urbanisation, where landholdings are consolidated into traditional-sized agribusiness operations, or (ii) promotion of efficient and effective aggregation programmes that harness the power of smallholders to deliver investable opportunities that improve rural livelihoods (IMF, 2013a). The risks of the first agribusiness approach include land displacement and the promotion of monoculture systems, and while there is a place for agribusiness approaches, integrated agroforestry systems may be better suited to smallholders. However, a leading expert in Brazil notes the difficulties in harmonising these two approaches – public policies often support the smallholders, but most investments are made in the agribusiness sector (Gonçalves, 2013).

The suggested value-chain investment opportunities in this paper focus on achieving the goal of more trees on the landscape as a vehicle for poverty alleviation for Rwanda's majority smallholders. Though to date some value chains have had limited focus on downstream investment opportunities, there is recognition that functioning value chains are a critical component of increasing productivity and profitability for smallholders, whether for new or existing products.

Traditional agriculture → Agroforestry for crops and livestock

Agroforestry promotion is of critical importance in Rwanda due to the wide array of ecosystem services that agroforestry provides, the role it

Table 2. Opportunity areas for agroforestry interventions by province

Intervention	Unit	Province					National total
		East	West	North	South	Kigali	
New agroforestry on sloping land	Area (ha)	272,723	87,183	63,683	250,504	31,069	705,162
New agroforestry on flat land	Area (ha)	135,437	15,952	12,164	69,078	9,108	241,739
New agroforestry on pasture land	Area (ha)	96,418	29,780	28,045	9,332	--	163,575
Total		504,578	132,915	103,892	328,914	40,177	1,110,476

Source: MINIRENA, 2014.

can play in FLR, and the associated benefits of soil and water improvement. These include but are not limited to: food, fuel, fodder for livestock, fibre, improved water quality and quantity, promotion of biodiversity, soil stability and improved soil fertility, and improved agricultural yields on rehabilitated degraded lands. The potential for investments in agriculture and agroforestry is varied in Rwanda. Table 2 provides the estimated hectares and locations for conversion of traditional agricultural land to agroforestry for crops and livestock.

Agroforestry – investment opportunities

Investment in the producer end of agroforestry will require identification of investments that provide an attractive return profile. One challenge with respect to investing in the transition from a non-tree landscape to a tree landscape is that trees take time to grow and thus, ‘greenfield’ investments are generally not attractive to most investors. Greenfield investments in agroforestry promote the planting of new tree-based systems on land that does not currently produce investable revenue streams. The relative lack of investor interest in greenfield investments can be overcome by: (i) bundling agro-systems with different return

profiles such as fast growing value-added crops with trees crops, or (ii) by identifying ‘brownfield’ investments that have been operating for some time that can provide a better return profile. When looking at which smallholder-linked components of the value chain would be attractive to investors in Rwanda, the combinations are virtually endless, which is a challenge for prioritising the FLR interventions.

The following criteria were used to determine which agroforestry value chain activities were candidates for private investment in Rwanda:

- Established demand and a competitive advantage in building demand for the revenue generating activities (international export, regional export, domestic growth);
- Activity expands trees on the landscape (there may be numerous investment opportunities, such as tea, that will not promote establishment of agro-systems with trees);
- The downstream components (processing, production, and distribution) are adequately in place to support the targeted growth in the activities (this may not be applicable for new products and value chains);
- Evidence of commercial viability exists in the value chain for landowners/producers

and has a return profile for investors (leveraging existing operations and publically funded activities);

- Activities are biophysically appropriate for landscape/ecosystem; and
- There are positive social implications (improved livelihoods, food security, inclusive of women and other marginalized groups).

In this initial evaluation of Rwanda based on the criteria above, there were a number of agroforestry activities that could be promising for investment. These must be further evaluated based on what will need to be designed such that, when combined on the landscape, the activities can deliver the multiple benefits of restoration, food security, and income generation for smallholders and investors alike. In practice, these will be site- and smallholder-specific, and should leverage the established

organisations while scaling on existing practices. Table 3 provides a list of potential investment areas in agroforestry, commercial partners in Rwanda, and how these can be leveraged to source and/or manage private investments. The crops and commercial value chain partners in the table serve as a starting point for prioritising which FLR activities are likely to be commercially viable, and with whom to investigate private sector investment opportunities.

Poorly managed eucalyptus woodlots and plantations → Improved management

According to the Food and Agriculture Organization of the United Nations (FAO), Rwanda has nearly 550,000 ha of forests and other wooded lands; 419,000 of these hectares are covered by both productive and protective plantations (FAO, 2005). Natural forest cover

Table 3. Potential value chain investments and commercial partners – agroforestry

Crops for integrated agroforestry systems	Commercial value chain partners
Apples, apple bananas, bananas (with possible coffee intercropping ¹⁰)	Floris, Shekina, Freshpak International Ltd, Urwibutso Entreprise
Avocados (Monitor Group, 2012)	Kigali Oil Company, Nakumatt Holdings, DD oil company, Ruremesha and Sons Fruits
Essential oils – geranium, patchouli	Ikirezi Natural Products
Pyrethrum	SOPYRWA (Rwanda Pyrethrum Company)
Food crops that can grow in and around trees – tree tomatoes, cassava, taro, chilies, and passion fruit	Shekina Enterprise, RChillex, Floris, Rwandaflora, Urwibutso, Nakumatt Holdings, multiple EU importers of passion fruit (Gikonyo & Wanjau, 2012)
Shade trees (<i>Grevillea robusta</i>) for coffee or tea, ¹¹ honey production	Rwacof Exports SARL, Campos, Misozi Coffee Company Ltd, RWASHOSCCO

¹⁰ It is not clear whether intercropping with banana would qualify for certification as shaded.

¹¹ Has limited application to full sun varieties, but could support valued-added shade grown systems.

is at 8%, while 13% is planted. Though forest inventories to date have typically excluded small woodlots measuring less than 0.5 ha in area, it is estimated that 6.6% of the country's total area is comprised of small woodlots and trees outside of forests (Nduwamungu, 2011).

As previously mentioned, the vast amount of energy used in Rwanda comes from biomass, comprising about 85% of the overall country energy consumption. It is estimated that 66% of biomass is used directly as fuel, 27% is converted into charcoal and the remaining 7% are crop residues and peat used directly or as charcoal. And while at least 70% of agricultural households in Rwanda have trees on their farms (Ndayambaje, et al., 2013), the 2008 National Agricultural Survey found that 9% of households own woodlots, while 34% own both woodlots and scattered trees.

Improved management of woodlot and timber plantation interventions focus on improving and intensifying fuelwood and timber production. While two categories of woodlots were considered (improved management through spacing only, and improved management through spacing and best practices), these were considered as one category for investment

opportunities. Given that eucalyptus is the primary source of fuelwood throughout Rwanda, it is assumed that all plots of eucalyptus have the potential to serve as woodlots for harvesting fuelwood.

Conversion of charcoal is highly inefficient, losing one third of the biomass utilized (World Bank, 2012a). Biomass is an important source of labour and income, especially for people in rural areas where half of the value is distributed among woodlot owners and charcoal users. Biomass will not cease to be an important source of energy in the foreseeable future as there is not a known substitute capable of meeting the same needs at a lower price. Improved cookstoves (ICS) are currently used in approximately 50% of households. Tables 4 and 5 provide the estimated hectares for FLR from improved woodlots and timber plantations in Rwanda.

Improved cookstoves – investment opportunities

The connection between ICS and reduced deforestation is clear from different angles, and adoption of ICS could significantly halt deforestation and permit the restoration of land in Rwanda. According to the Global Alliance

Table 4. Opportunity areas for woodlot interventions by province

Intervention	Unit	Province					National total
		East	West	North	South	Kigali	
Improve management of existing woodlots	Area (ha)	32,816	62,868	54,173	96,343	9,730	255,930

Table 5. Opportunity areas for industrial timber plantation interventions by province

Intervention	Unit	Province					National total
		East	West	North	South	Kigali	
Improve management of existing industrial timber plantations	Area (ha)	1,214	8,373	189	7,881	193	17,849

for Clean Cookstoves, approximately three billion people depend on traditional means of cooking, burning around two billion tons of biomass a year and causing 24% of black carbon emissions globally (GACC, 2012). Some countries have almost depleted their native forest cover in order to produce charcoal and/or source fuelwood for cooking. Unsustainable collection of wood causes deforestation, exacerbates erosion and mudslides, and contributes to desertification and loss of biodiversity, among other concerns.

Fuel efficiency benefits will translate into a reduced need for fuelwood, and therefore lower deforestation rates. Advanced biomass cookstoves that use raw or processed biomass, for instance, reduce fuel use by up to 65%. Alcohol cookstoves eliminate direct use of wood fuels by utilizing ethanol or methanol, and some biogas cookstoves use biogas produced from biomass that is CO₂ neutral with improved efficiency of up to 56%. Liquefied petroleum gas cookstoves have an estimated carbon

impact per energy unit produced that is under that of biomass, and reduces the fuel to cook by 90% when compared to open-fire cooking. Plancha cookstoves utilize biomass or charcoal and, depending on their design, reduce 50-80% of fuel (biomass or charcoal) utilization. Rocket cookstoves use raw or processed biomass as fuel and, when properly designed, can reduce fuel utilization from 40-50%. Finally, solar cookstoves are the cleanest, using direct solar thermal energy with no additional fuel inputs needed (GACC, n.d.).

Utilization and improvement of efficient cookstoves represents an important business opportunity in Rwanda for large producers/designers and SMEs, as well as for research institutions and distributors (wholesalers and retailers). The government's Biomass Energy Strategy not only encourages improved charcoal efficiency and diversification of fuel sources, but also stimulates the aggressive promotion of improved charcoal stoves. It sets forth a goal to eradicate inefficient cookstoves in 86% of

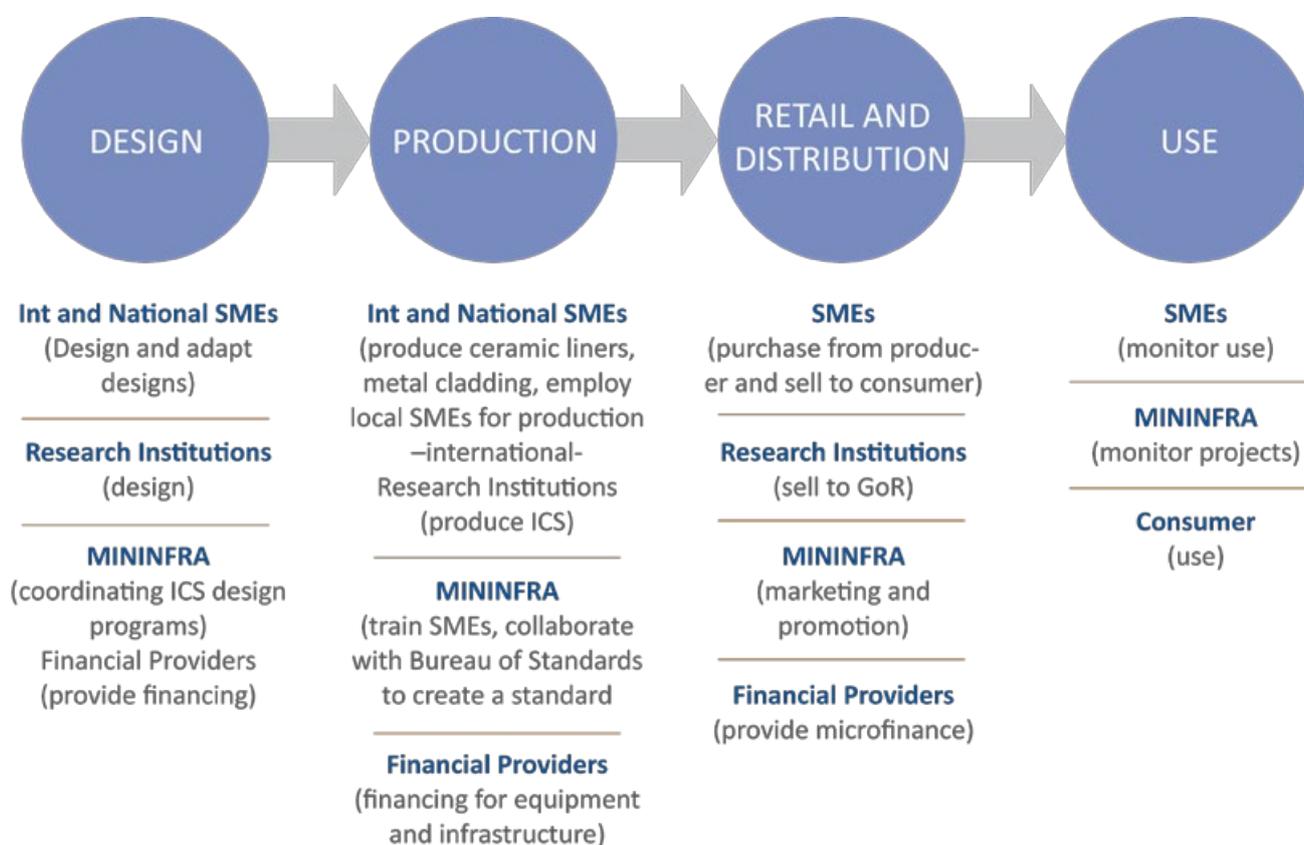


Figure 4. Improved cookstoves value chain

the urban and 63% of the rural market by 2020. Currently, the ICS value chain is composed of four steps as follows (Blodgett, 2011).

According to SNV's report *Charcoal Value Chain and Improved Cookstove Sector Analyses* (Blodgett, 2011), there are a number of inefficiencies in this value chain that can be addressed and provide opportunities for businesses. For example, there is insufficient coordination and lack of standards for the design of ICS. On the production side, some businesses are informal, the quality is low, there is a lack of cooperatives, financial resources are scarce, there is insufficient infrastructure and material costs are high. Financial service providers have the important role of providing loans, which are currently limited, especially to SMEs. There is also limited communication between research institutions, the Ministry of Infrastructure, and SMEs, which is critical for long-term coordination.

For retail and distribution, roughly 60 informal and seven international businesses purchase ICS from producers to sell them to consumers; however, there is lack of proper marketing for the products, including the differences between them and their potential benefits. Research Institutions sell cookstoves mainly to the institutions of the government, such as ministries and prisons, which is also an obstacle for SMEs. Financial service providers should provide microfinance loans to consumers, but there is an absence of low interest loans.

There are no long-term studies or monitoring and evaluation of the use of ICS in Rwanda, and there is a lack of awareness and understanding of the benefits among the 72% of Rwanda's urban population that use these stoves.

Rwanda has a high penetration rate for ICS; however, only 50% of the households in the country have an ICS, and only 48% of them use them regularly (partly due to quality issues) (World Bank, 2012a). Thus, there are significant opportunities to introduce new highly efficient

stoves. According to the *Rwanda Market Assessment Sector Mapping* report compiled by Accenture, the potential demand for cookstove intervention as of 2012 is approximately 2.4 million households (ADP, 2012). Innovative finance tools exist in the impact investment sector to potentially support greater ICS use in Rwanda. For example, INYENYERI, a for-profit social enterprise which aims to create sustainable social impacts while increasing access to financial capital lends Rwandans ICS for free. The company makes its profit by contractually requiring that pellets are bought or exchanged for dry, clean biomass in one of INYENYERI's locations. Attracting impact investors such as INYENYERI can create business opportunities for local technicians, researchers and manufacturers. Other impact investors could provide access to credit for SMEs via microfinance or loan guarantees – filling an important gap not covered by the Rwandan financial sector.

As seen in the value chain, lack of quality is one of the main obstacles to greater use of ICS. Thus, independent standards and labels that certify safety and efficiency of ICS are critical (World Bank, 2012a). This standard elaboration will create jobs and capacity, as technical support is required to certify the stoves, to assist producers in manufacturing improved models, and to be able to cope with increased demand. All these must be accompanied by access to credit for SMEs, education, and public campaigns that raise awareness on the different benefits provided by a high quality, certified ICS.

There are a number of interesting ICS initiatives on-going in the country that provide opportunities for local investment partners. These are summarized in Table 6.

Green charcoal – investment opportunities

The widespread utilisation of charcoal, its importance to the national economy, and current supply chain inefficiencies offer important business opportunities. By improving efficiency

Table 6. On-going cookstove projects

Project developer	Description
Atmosfair	Use of Sae80 stoves initially in Kigali and potentially expanding to rural areas
Uganda Carbon Bureau	East Africa programme of activities (POA) for all cookstove types
INYENYERI	Use of World Stove and construction of biomass pellet factories
Impact Carbon	Use of locally made or Ugandan efficient charcoal and wood stoves
CO ₂ Balance	Stove type unknown
Manna Energy	Developed locally made industrial EE cookstoves
Wonderbag	Use of Wonderbag cookstoves
MININFRA	Write policy recommendations for the Government of Rwanda, test and select best canamake stoves, train entrepreneurs in production of selected canamakes, promotion campaign for ICS use
Global Environment Facility Sustainable Energy Development Project	Promotion campaigns to support urban and rural cookstove programme, introduction and market testing of high efficiency cookstoves, support professionalism and semi-industrialisation of stove producers
Millennium Village Institutional Cookstove Project	Install institutional cookstoves in five new schools in Bugesera District
CARE CASE Project	A 2008 market survey for charcoal and cookstove use was conducted for the four districts where the project works. CARE has been conducting on-going trainings on ICS making and workshops to raise awareness about ICS use
Vi-Life RESAPP Project	Training population to install ICS
Sustainable Energy through Woodlots and Agroforestry in the Albertine Rift (SEW)	Assist in distribution of ICS; link fuel and ICS sellers

Source: Blodgett, 2011.

and participation in the value chain, Rwanda could increase charcoal income in a sustainable way that does not cause deforestation. Forest plantations can potentially be seen as being in direct competition with food security, especially in a country with extreme poverty and land scarcity issues such as Rwanda. This challenge can be turned into an opportunity, as farmers could implement agroforestry practices that allow them to grow shorter yield crops along with fuelwood trees. This includes, for example,

horticulture and bee keeping. The Sustainable Energy through Woodlots and Agroforestry in the Albertine Rift (SEW) programme (*The New Times*, 2013) demonstrated that smallholders can save existing trees and plant new ones without threatening food production by strengthening the soil and soil fertility. The programme also decreased tree consumption by improving the organisation of the fuel and charcoal value chains, making the carbonisation process more efficient, and introducing ICS and

improved brick and tile production methods that consume less fuelwood.

It is important to mention that charcoal producers (called ‘masters’) are responsible for the relationship with local permitting authorities; permits are required for plantations over 0.5 ha. Key challenges include non-standardised permits, rates and durations throughout the districts, as well as long terms (two months) and lack of clarity on duration. Farmers applying for exploitation permits face restrictions and requirements that significantly delay operations while increasing transaction costs and the risk of corruption. Additionally, tight time frames force farmers to exploit wood that is not ready, causing further inefficiencies.

The charcoal transformation process usually starts with one to two weeks of processing. This process can also be inefficient due to the widespread use of traditional methods, such as a mound kiln or a rectangular hillside kiln. Once processed, the charcoal cools down, and is bagged and taken to the closest roadside to be sold. Final prices vary due to numerous factors, including the type of wood used. Acacia is more expensive than eucalyptus by at least 20% (World Bank, 2012a).

Carbonization with modern kilns produces better quality charcoal, and sellers closer to roads are able to offer charcoal at lower prices. Charcoal prices during the dry season

are typically higher than the rest of the year. Production efficiency is influenced by wood moisture content, type of kiln used, and tree species used; the most suitable species for charcoal production in Rwanda is eucalyptus (Nahayo, et al., 2013a).

There have been many methods proposed to improve the value chain that can also provide opportunities for businesses. The World Bank, in its report *Establishing a Green Charcoal Value Chain in Rwanda* (World Bank, 2012a), proposes a modernization of the value chain that takes Rwanda from a traditional phase to an industrial phase where the supply chain is formalised and has the following characteristics:

- Integrated energy planning for wood fuel supply,
- Certified management of woodlots,
- Formal out-grower schemes or contracts are in place, and
- More elaborate products are produced (charcoal and woodchips, for example, instead of only fuelwood/charcoal).

In order to achieve this, the World Bank proposes a set of recommendations to improve the value chain and generate further income (World Bank, 2012a). Among the recommendations are to: engage in more sustainable wood production (e.g. improved forestry plan, more secure land tenure); improve the charcoal production process (e.g. simplifying the process to acquire permits;

Box 1: Potential corruption in the charcoal value chain in Rwanda

Rwanda has one of the lowest levels of perceived corruption in both Africa and the world – 3rd in the region and 49th among 175 countries (Transparency International, 2013). Even though corruption is not a particularly pressing issue in Rwanda, it is relevant to point out some corruption-related risks that could potentially harm the charcoal system (World Bank, 2012a).

- Restrictive and burdensome requirements for exploitation permits increase transaction costs and risk of corruption.
- Introduction of centralised depots could potentially lead to corruption.
- Complex forestry taxation collection systems and weak law enforcement institutions make the system susceptible to corruption.

introducing semi-industrial kilns); improve transport efficiency (e.g. organising commercial networks); and improve the overall framework (e.g. proper forest taxation, innovative financing such as the Clean Development Mechanism [CDM] and REDD+). The World Bank proposes that these value chain interventions be piloted for three years and with a budget of US\$ 20 million.

Sustainable woodlots – investment opportunities

Plantations in Rwanda are commonly monocrops, with eucalyptus covering at least 59% of total plantation area, and *Pinus* plantations accounting for more than 28% (World Bank, 2012a). According to the World Bank, private plantations account for roughly 26% of forested land (World Bank, 2012a), while according to GIZ, that figure is closer to 35%. Most (89%) of woodlots are smaller than two hectares in size. Woodlots in Rwanda are primarily of two types. Traditional woodlots are characterised by wood production that competes with food production in the same space, while rotational woodlots utilise interrelated phases to alternately grow trees and crops. Traditional woodlots have the potential to undermine sustainability, particularly on small farms without adequate land to meet both food

and fuel needs. While rotational woodlots are beneficial to wood productivity, they can be detrimental to soil health and fertility over time. In either case, large farms with enough land are able to dedicate a portion of land exclusively to woodlot cultivation, but generally only when woodlot products are market-driven and not subsistence-based (Ndayambaje, et al., 2013).

Rwanda's NFP specifically targets the promotion of on-farm forestry, but woodlot promotion at the national level is constrained in the following ways:

- Information on the relative efficiency of woodlots as a land-use strategy in the Rwandan context is unavailable or inadequate. This includes data on biophysical parameters and detailed and up-to-date information on socio-economic conditions driving wood use and extraction rates.
- There have been no more than a handful of studies conducted on when, where, or why agricultural households in Rwanda choose to plant woodlots on their property, and what species are needed or desired (Ndayambaje, et al., 2013).

Post-war financial and human resources for formally promoting woodlots have been limited,

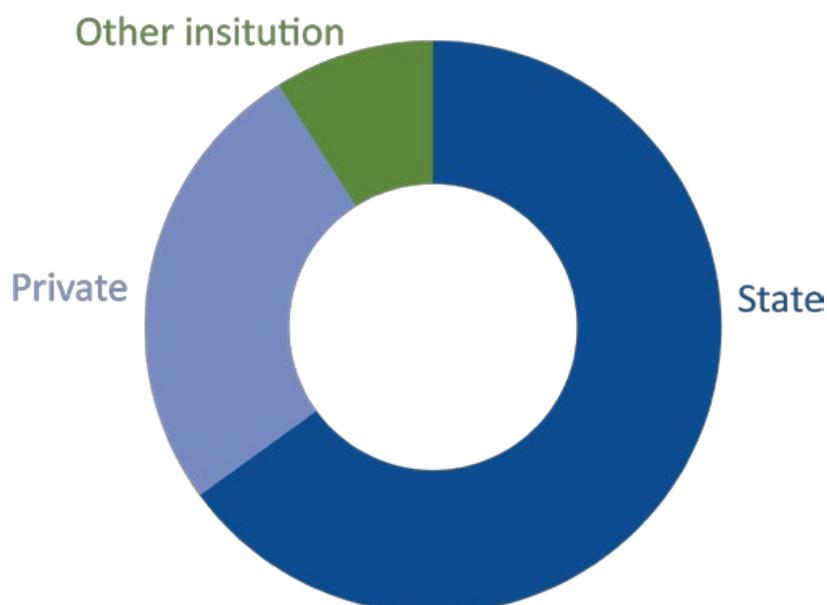


Figure 5. Ownership of plantations in Rwanda (World Bank, 2012a)

and Rwanda's first major forestry project, the US\$ 11.5 million Rwandan Reforestation Project, did not begin until 2002. Currently, the Government of Rwanda relies on its own budget for financing woodlot promotion, with some support received from NGOs and development partners in Belgium and the Netherlands. These donor-backed initiatives have provided direct investment toward reforestation activities and capacity building at the central and district levels within both public and private forests.

Despite the many advantages of promoting woodlots in a country where population pressures and land scarcity limit or prevent forest expansion, there appear to be very few organised efforts to promote woodlots. Production in woodlots is highly inefficient, mainly because woodlots are primarily owned by small farmers with less than two hectares of land; more than 60% of households cultivate just 0.7 ha or less. As many as 15 different crops may be cultivated on parcels of this size, and fields are typically not left fallow (World Bank, 2012a).

There is no adequate system to document forest business transactions, taxing and fines, which creates obstacles to understanding the sector and restricts financing for forest programmes. Furthermore, most seeds used in Rwanda are supplied by the Tree Seed Center of the Rwanda Agricultural Research Institute. There has been evidence of genetic degradation of germplasm¹², which has primarily affected eucalyptus and has resulted in decreased plantation yields (Nduwamungu, 2011). As such, productivity is currently low, at 18-30% efficiency. Site quality is also low, mainly due to inappropriate management practices during planting, thinning and harvesting.

Forest plantations – investment opportunities

Plantations in Rwanda constitute over 42% of all forests, and are predominated by *Eucalyptus spp.* (AFCN, 2012), which produce low quality timber due to poor species choice and poor management. Currently, good quality timber and finished wood products are imported from China, Dubai, Uganda or the Democratic Republic of Congo. Improving the quality of domestic timber and wood products could be an important income opportunity. For this to be possible, it is necessary to: (i) support plantations that promote indigenous species, (ii) improve the quality of seeds, and (iii) improve processing facilities¹³ and stacking techniques.

Indigenous species grow more slowly but consume less water than eucalyptus and pine, and are better adapted to local conditions, improving pest and disease resistance. Higher quality timber is more valuable, and indigenous species can be part of multi-use agroforestry systems. In addition, these native species support alternative activities such as bee keeping, ecotourism and horticulture. Some adequate indigenous species that can be considered for plantations include:

- *Entandrophragma excelsum* – The wood is used for construction, furniture, toys, and carvings.
- *Podocarpus falcatus* – A high quality wood used for building timber, floors and roofing, furniture, and shelving. The ripe fruit is edible.
- *Markhamia lutea* (or *M. platycalyx*) – It provides good bee forage. The trees are a source of fuelwood and produce good charcoal. The wood is used for furniture, poles, posts, tool handles and boat building. The leaves are considered to have medical applications.

12 Germplasm management for agricultural crops is essential for preserving genetic diversity, production of better adapted varieties for changing environments, and combating pests and diseases.

13 Currently, wood is mainly sawn manually with pit saws, machetes and/or chainsaws, leading to low quality and high wood waste.

The establishment of seed suppliers and nurseries as small businesses can help drive commercial investment. Decreasing quality of genetic stock represents an important opportunity to source pure seeds and use stricter seed selection to enhance yields for farmers. New and improved seed suppliers and nurseries could be managed by small businesses enabled by loans using microfinance or equity schemes from impact investors or the government.

There are no large plantations that are in the position to offer high quality timber or timber products, and thus there is little potential for investment in existing plantations without processing improvements. This would require investment in modern sawmills, wood based panel plants, timber treating plants, training, and introduction of certification systems. Investments can be enabled by loans, equity, and loan-to-rent schemes, which can be part of private impact investment initiatives in the case of cooperatives and/or small farmers. The CDM and voluntary markets offer income opportunities for projects that use waste woodchips and sawdust for biomass.¹⁴

There is an opportunity for the government to increase the budget for forest activities if taxation and royalties are more explicitly allocated. Today, taxes from harvesting operations and fines go to a common 'bag' and cannot be differentiated from other taxes or fines in other sectors. Rwanda should leverage the NFP, which provides for a phasing out of the government from forestry activities, shifting management to the private sector.

Deforested land → Improvement or restoration of natural forests

A tumultuous recent history and increasing population pressures have resulted in the loss of the vast majority of Rwanda's natural forests.

Presently, Rwanda maintains just 8% natural forest cover in the following areas (MINIFOM, 2010), with a majority of these natural forests existing within the borders of its national parks:

- Congo-Nile Ridge
 - Nyungwe National Park
 - Gishwati Forest
 - Mukura Forest Reserve
- Volcanoes National Park (VNP)
- Savannah and gallery forests of Akagera National Park
- Remnants of gallery forest in:
 - Bugesera District
 - Gisaka

FLR interventions for natural forests with the greatest opportunity at the national level are limited to just two, with approximately 1% of the total national land area, or 14,000 ha, potentially suitable for one or both. These interventions are:

- Establishing a 100 metre buffer of newly planted forest around existing closed natural forest, and
- Restoring degraded natural forest inside of reserves and national parks

The area within Rwanda with the greatest opportunity for establishing buffers around closed natural forest is in the West Province, which contains Mukura, Gishwati, and a portion of Nyungwe National Park. The greatest opportunity for restoring degraded natural forest is in the West and South Provinces inside Nyungwe. Table 7 provides the area of land in each Province potentially suited for natural forest restoration interventions.

A 2003 survey on biodiversity and protected areas conducted by IUCN found that Rwanda's nature reserves, wilderness areas, and national parks comprised a total area of 102,000 ha, or roughly 7.7% of the country's total area. Since 1962, the total national area of Rwanda occupied by protected areas has decreased by

14 Currently, wood processing is very inefficient at 18-30% efficiency, resulting in large amounts of waste. Source: MINIFOM, 2010.

Table 7. Opportunity areas for natural forest restoration interventions by province

Intervention	Unit	Province					National total
		East	West	North	South	Kigali	
100 m buffer of closed natural forest	Area (ha)	557	2,085	499	315	-	3,456
Restore degraded forest in parks/reserves	Area (ha)	-	3,629	-	6,848	-	10,477

half, from 411,500 ha to 207,300 ha. In Gishwati, for example, just 700 ha of natural habitat remain, while in Mukura Forest Reserve, just 800 ha of degraded natural habitat remain.

Investable opportunities for expanding and restoring Rwanda's natural forests are limited, given the very small amount of natural forest left and the extent to which population and land pressure have almost entirely eliminated the availability of land for expansion of natural forests. This implies a need to interact closely with the communities living in the periphery of national parks and/or areas containing natural forest. The RDB plans to diversify attractions in VNP and create new attractions at Nyungwe National Park. Suitable FLR interventions aimed at habitat restoration could potentially mesh with private sector interests in maintaining and expanding their offerings. Meanwhile, the creation of buffers can serve as an investable opportunity through the production of NTFPs and the creation of purchase agreements between local landholders and hotels and other businesses.

Ecotourism – investment opportunities

Rwanda's national export and tourism policies both outline objectives related to the expansion of ecotourism in the country, particularly around Rwanda's remaining natural forests and national parks and reserves. Masozera (2008) used the contingent valuation method to determine that the estimated biodiversity conservation value conferred to ecotourism operators in the vicinity

of Nyungwe National Park is US\$ 2 million per year; by comparison, the total recreation and tourism value in Nyungwe is approximately US\$ 3.34 million annually. Tourism revenue is the primary source of funding for the Rwanda's national parks and reserves, so a synergistic relationship between the parks and those who use them is essential. Simple interventions and partnerships between local communities and the ecotourism sector could promote an expansion and maintenance of buffers and wildlife habitat that can also serve as a source of NTFPs.

Potential for greater tourism revenue through the expansion of habitat for chimpanzees, birds and other wildlife has been identified in Gishwati, Mukura and Nyungwe. The conservation of these areas often comes at the expense of local communities that are unable to utilize or benefit from the natural resources they contain. Fires contribute to the spread and propagation of bracken ferns (*Pteridium aquilinum*), whose fire-resistant roots and airborne spores prevent the successful establishment of tree seedlings. The promotion of improved forest management or improved vegetation management practices have been found to be useful in stimulating accelerated regeneration in fire-affected areas overtaken by bracken ferns. For example, in buffer zones around national parks and other areas disturbed by wildfire, cutting of ferns once per quarter over three years allows tree seedlings to eventually grow taller. In five years, areas treated with quarterly cutting exhibited

a five-fold increase in the density of trees/ha when compared with untreated plots. In addition to expanding habitat for wildlife and creating other opportunities for ecotourism, improved vegetation management could also help improve tree growth and yield in Rwanda's plantations (Nadel, 2009).

Rwanda's most desired and likely segment for ecotourism expansion is avitourism, showcasing Rwanda's numerous permanent and migratory bird species, a handful of which are rare. Some of the important bird areas (IBAs) identified by BirdLife International coincide with Rwanda's areas of natural forest. These include the natural forests of Nyungwe, Gishwati and Mukura, as well as areas of natural forest just west of VNP (BLI, 2009). These IBAs can have important implications for other aspects of managing and improving Rwanda's biodiversity in that birds are often strong indicators for the presence of other species, and the criteria used to qualify an area as an IBA are a subset of the criteria for determining key biodiversity areas (KBAs). Country-wide, there are seven key sites covering approximately 10% of the total area, or 274,535 ha, which are considered IBAs (RDB, 2011).

The creation of three new "birding routes" in Bugesera, Nyabihu and Rugezi wetlands in mid-2011, as well as additional on-going promotion of avitourism in the country, is expected to generate US\$ 12 million annually (RDB, 2011). Due to the inability of Rwanda to support mass tourism given its small size, 'high value' tourists will need to be targeted. It is also important to note that birders visiting Rwanda may have interest in visiting areas others than those identified as most appropriate for FLR transitions in and around national parks and/or protected areas. There appear to be a very limited number of private tourism operators currently offering bird-related activities, and fewer still offer avitourism independently of more 'traditional' ecotourism opportunities, like gorilla tours. Those that offer an avitourism component may not even offer these tours

in areas best suited for FLR. Two notable operators are Birding & Educational Tours Ltd. and Wildlife Tours – Rwanda, both of which are Rwandan owned and operated. The latter reports that as much as 90% of its revenues go back into local communities, setting a strong precedent for community-based avitourism in the country.

NTFPs in/around protected areas – investment opportunities

Knowledge of NTFPs in Rwanda appears to be widespread, and some of Rwanda's most common NTFPs include medicinal plants, honey, bamboo, fruits, and tree seeds. NTFPs are an important component for rural economic growth because they can be marketed and provide cash income without deforestation. In a survey of households surrounding VNP, it was found that bamboo, beekeeping and medicinal plants are the most common NTFPs, with 44.8%, 43.3% and 34.3% of respondents benefitting, respectively. One kilogram of honey can command a price of up to Rwf 3,500 (US\$ 5), while a chair produced from bamboo and sold to a nearby hotel can be worth Rwf 5,000 (US\$ 7.30). Together, honey and bamboo are responsible for 60% of the value of NTFPs produced in some districts (Nahayo, et al., 2013b). Most of Rwanda's NTFPs are produced within buffer zones, providing additional benefits when buffers are created and restored around natural forests and national parks. NTFPs are also important during the dry season, when a larger number of poor households use them as an income source.

NTFPs differ from traditional agricultural products due to the importance of wild harvesting in the production process, which inherently limits yields for individuals or households. The development of some type of organizing or oversight body is essential to ensure a supply substantial enough to make subsequent processing and distribution steps economical. In instances where NTFPs are harvested from common land, community organizations are typically well positioned to

manage these activities. In instances where NTFPs are harvested primarily from smallholder plots, cooperatives are more likely to form to reduce costs and improve bargaining power. Purchase agreements between ecotourism operators and/or urban retailers and community groups engaged in the production of NTFPs could provide an income source for households. Hotels in Rwanda have already begun sourcing furniture crafted from bamboo, the cultivation of which is being promoted in Rwanda.

Deforested land → Improvement or establishment of protective forests

Evidence of soil erosion is exhibited in 50% of Rwanda's agricultural land (Andrew & Masozera, 2010). Protective forests on ridge tops and steep and very steep sloping hillsides have the potential to prevent 9-31 tonnes of erosion per hectare per year. From the perspective of erosion control, reforestation of these areas has far greater reduction potential than agroforestry or the conversion of woodlots from poorly managed to well-managed. In fact, erosion control is one of the few 'investable' opportunities related to watershed management in Rwanda. Watersheds are, in many ways, the limiting factor for many of Rwanda's industries. Without the services they provide, Rwanda's agricultural, energy, and export sectors would be severely jeopardised, and smallholders would face even more challenges in meeting subsistence and domestic needs in the face of an unpredictable climate and competitive water use scenario.

Rwanda's Water Strategy (2011-2015) lists the rehabilitation of critical watersheds alongside the restoration of basic ecological functions as a strategic action. The current budget for activities intended to achieve these outcomes is

just under US\$ 17.5 million through 2015, which represents just half of the total budget required to address both the supply-side (watershed protection and erosion control) and demand-side (increased water abstraction for production) of Rwanda's water equation (Andrew & Masozera, 2010).

Erosion control is also central to national disaster risk reduction strategies, which prioritise the mainstreaming of disaster management into national programmes, including those related to environmental protection, forests and water management. The Strategic Plan of Action for the National Disaster Management Policy (MIDIMAR, 2012) includes three phases, two of which are relevant to protective forests (not to be confused with protected forests): prevention and/or mitigation of risk prior to disaster occurrence; and, rehabilitation after a disaster takes place. Risk factors related to protective forests identified in the National Disaster Risk Management Plan (MIDIMAR, 2013) include Rwanda's hilly topography, high annual precipitation, which has markedly increased over the last decade, deforestation, inappropriate hillside farming practices, and the effects of climate change.

Protective forests play an important role in maintaining ecosystem services, particularly as they relate to watersheds. Protective forests planted on ridge tops and sloping hillsides help to prevent erosion and mudslides by acting as a buffer and promoting soil health and stability, thereby safeguarding rivers and wetlands from the harmful effects of siltation¹⁵ and sedimentation.¹⁶ In Rwanda, these forests fall into five categories of intervention representing these two types of landscape restoration activities: first, protective forests on ridge

15 The increased concentration of suspended, fine particulates in the water column and increased accumulation of fine sediments on the bottom. In rural areas, climate change and poor land management practices commonly contribute to siltation of waterways.

16 The tendency for particles in suspension to settle out of the fluid in which they are contained and come to rest against a barrier. Sedimentation is particularly problematic in the context of hydroelectric plants.

tops and steep or very steep slopes provide watershed protection through erosion control; and second, 'other' watershed management-related interventions help Rwanda achieve its objectives under an integrated water resource management approach as prioritized in its National Adaptation Programme of Action on climate change. The five specific categories of intervention are:

1. Planting of protective forests on ridge tops and hillsides with very steep slopes, categorised as having slopes greater than 30 degrees, or a 55% incline.
2. Planting of protective forests on ridge tops and hillsides with steep slopes, categorised as having slopes between 12-30 degrees, or between 20-55% incline.
3. Creation of 20 m buffers planted with native tree species along non-forested river courses.
4. Replacing existing *Eucalyptus spp.* with native tree species within 20 m of river courses.
5. Planting of native species to be used as buffers within 50 m of wetlands.

The greatest opportunities for planting protective forests on ridge tops and hillsides with steep and very steep slopes are within the North, South, and West Provinces; in total, there are roughly 42,000 ha, or 2% of Rwanda's total area, that are potentially suited for the

creation of protective forests. Opportunities for activities under the watershed management categories exist nation-wide, and Rwanda's extensive network of rivers, streams, and wetlands represents an important opportunity for mitigating the flow of sediment into these crucial water bodies.

The potential for 20 m buffers of native tree species along rivers and streams in non-forested areas or the replacement of existing *Eucalyptus spp.* stands is 23,000 ha in total, or 1% of Rwanda's total area. The level of opportunity is roughly equal across all five provinces, although there is a slightly higher concentration in the South Province. Opportunity for the establishment of 50 m buffers of native species around the perimeter of wetlands totals approximately 57,000 ha. Parts of all five provinces show potential, but the East and South Provinces have the greatest area available for these interventions.

Table 8 illustrates the landscape restoration potential for protective forests across all five provinces. Table 9 illustrates the landscape restoration potential for water resource management-based interventions across all five provinces.

In order to address on-going issues of land degradation and deforestation in a changing

Table 8. Opportunity areas for protective forest interventions by province

Intervention	Unit	Province					National total
		East	West	North	South	Kigali	
Protective forests on ridge tops with very steep slopes (>30°/55%)	Area (ha)	462	4,968	2,374	2,762	180	10,745
Protective forests on ridge tops with steep slopes (12-30°/20-55%)	Area (ha)	5,702	9,842	4,385	11,266	501	31,695

Table 9. Opportunity areas for watershed management interventions by province

Intervention	Unit	Province					National total
		East	West	North	South	Kigali	
20 m riparian buffer – replace eucalyptus with native species	Area (ha)	151	873	592	1,454	82	3,152
	Length (km)	35	207	146	378	22	788
20 m riparian buffer – reforest non-forested areas	Area (ha)	3,861	4,802	3,334	6,873	716	19,586
	Length (km)	997	1,141	834	1,731	159	4,863
50 m buffer of wetland perimeters	Area (ha)	23,337	3,522	5,052	22,844	2,606	57,362

climate, investable opportunities that reduce pressure on forest resources must be promoted alongside other watershed protection activities. For the purposes of this assessment, investable opportunities in protective forests and riparian zones will be approached as two sub-goals within the larger goal of achieving watershed protection. Rwanda has prioritised an integrated water resource management approach in these areas, and topographic and hydrologic conditions found in Rwanda's riparian zones do not differ greatly from those of its hillsides and ridge tops.¹⁷ In the quest for increased and improved watershed protection, there are a few key areas with investment potential in the rural energy value chain, as well as in the ecosystem services themselves, which are enabling and safeguarding the value chains of other sectors.

Small-scale hydropower – investment opportunities

With an overwhelming percentage of Rwanda's households reliant on fuelwood as a primary energy source, an immediate step toward mitigating this over-reliance on forest resources

and the resultant land degradation could be investment in small-scale hydropower (SSHP) schemes; often classified as *micro* (typically defined as producing up to 100 kW, but can be as much as 500 kW/0.5 mW in the Rwandan context) or *pico* (typically defined as producing less than or equal to 5 kW, but up to 20 kW). Micro- and pico-hydropower provides a renewable alternative for energy production, powering light bulbs and televisions in hundreds of homes without negatively impacting forest resources. Currently, just 10-11% of Rwandan households are electrified; of these, at least 60% are in Kigali (Hove, et al., 2011). Despite one in ten households having access to electricity, just 2% of Rwandans are able to afford, and therefore use, this service (Masozera, 2008).

Rwanda's *National Energy Policy and Strategy* (MININFRA, 2011) aims to close this gap in access through the electrification of 50% of Rwandan households by 2017. Hydropower is absolutely critical to Rwanda's energy strategy and represents the most cost-effective,

17 The lowest incline constituting a 'steep' slope in the context of FLR on hillsides and ridge tops in watersheds is 20%. In many of Rwanda's wetlands, such as Rugezi, riparian zones exist with inclines in excess of 35%, making differentiating between these unnecessary for the purposes of protective forest restoration for watershed protection.

domestically sourced option for electricity generation. Africa as a whole contains nearly 30% of the world's total hydropower potential, but 93% of that potential currently remains unexploited. In East Africa, hydropower is expected to provide 79% of total new additional generation capacity (Quirke, 2012). Africa's hydroelectric production costs are the lowest in the world, and SSHP is one of the few energy sources able to confer multiple benefits to communities, the environment, the government and the private sector alike.

Rainfall and topography are two key determinants of a country's hydropower potential, and 'the Land of 1,000 Hills' is very well suited for SSHP in particular. Rwanda receives an average of 1,100-1,200 mm¹⁸ of rainfall annually, and the steeply sloping hillsides that make up the country's landscape are typically between 1,500 m and 3,000 m in elevation.¹⁹ Despite these figures, Rwanda remains a water-scarce country due to a combination of poor land-use management practices, including: deforestation on hillsides and ridge tops protecting watersheds; population pressures that have resulted in human encroachment and agricultural cultivation in delicate riparian zones up to the very edges of water bodies; inefficient water use in irrigation and large-scale hydropower (LSHP) systems; and competing extractive uses of water that are largely unregulated. The strategy employed by the Government of Rwanda to address water scarcity has mainly focused on law enforcement and the expansion of infrastructure, with little to no inclusion of environmental management instruments aimed at water and soil conservation. As of 2008, Rwanda's available per capita renewable water

was 977.3 m³/year, less than a quarter of the average per capita amount of 4,008m³/year for the whole of Africa (MINIRENA, 2011).

SSHP represents a unique opportunity to promote a renewable alternative to biomass for rural Rwandan communities alongside activities that will promote conservation of the country's waterways as an energy source while restoring and reforesting forest landscapes in Rwanda's watersheds. In further conjunction with payments for watershed services (PWS), which should include riparian zone restoration, investment in SSHP can help Rwanda achieve its myriad poverty reduction, economic development and landscape restoration goals.

Importance of SSHP in meeting development goals and reducing landscape degradation

Compared to other countries with similar hydrologic and topographic potential for SSHP, such as Nepal,²⁰ Rwanda's current rural electrification rate is just 1.3% (Bensch, et al., 2010). Electricity is a critical component for rural development. It allows for a greater diversification of livelihood activities, supports efficient agriculture value chains, promotes literacy and education, and helps reduce the outflow of youth and young adults to urban areas by creating new opportunities in their home communities. While market penetration of SSHP in Rwanda is still fairly limited, the adoption of this technology in similar geographies has resulted in four-fold increases in personal incomes²¹ due to the ability to power productive enterprises, such as mills, welding shops and woodworking enterprises.

Electricity generated from renewable micro-hydro schemes can reduce land degradation

18 Precipitation is highest in the west, averaging 1,400 mm annually, while the eastern part of the country averages closer to 1,000 mm per year.

19 Rwanda is a high-altitude country in general; its lowest elevation point, the Rusizi River, is 950 meters above sea level.

20 Nepal's current rate of rural electrification is 15%.

21 Rural labourers in Nepal saw incomes increase from US\$ 2/day to US\$ 8/day as a result of the electricity provided from micro-hydro (Yee, 2012).

caused by a heavy reliance on forest resources for fuel, providing a more flexible source of energy for cooking, income-generating activities and more, when compared to cookstoves. A clean energy source also reduces the health risks associated with burning biomass, particularly for women and children. SSHP schemes are also the most environmentally friendly means of generating electricity as they are typically 'run-of-river' and do not significantly alter the flow of waterways. There are also few large rivers in Rwanda capable of providing a sustainable, year-round supply of water to LSHP plants; however, smaller rivers and streams are less vulnerable during times of drought and other climatically-induced irregularities in precipitation, providing a more reliable and diffuse source of hydroelectric potential. This can also provide a large cost-savings to the Government of Rwanda by avoiding the high cost of emergency power when large dams fail due to drought or when production must be halted to maintain turbines clogged with sediments.

Perhaps the greatest benefit of SSHP as a strategy for reducing deforestation while improving rural livelihoods is the low capital requirement. For example, a 5 kW system, which could drive an electric mill and provide light for a community of 500 people, costs approximately US\$ 5,200-7,800 to establish (Quirke, 2012; Meier & Fischer, 2011). Capital requirements for establishing SSHP in Rwanda are also less than many other countries that employ micro- and pico-hydropower. The cost of establishing such a system in Rwanda is approximately 20% less than the cost of establishing the same system in Indonesia, for example (Meier & Fischer, 2011). Though SSHP does not benefit from economies of scale the way LSHP does, it clearly confers greater benefits toward achieving national energy security and rural electrification of

diffuse communities. Because the value placed on electricity is so high in these rural areas, technology transfer occurs quickly, and SSHP schemes are more likely to be 'do-it-yourself' because they can be created from common, and often recycled, materials. In fact, several of Rwanda's private SSHP 'success stories' are from self-taught entrepreneurs that created marketable solutions to meet the everyday needs of their communities. In general, rural Rwandans in non-electrified areas exhibit a high willingness-to-pay, particularly since household connection fees, ranging from just US\$ 33-90²² in some areas, are below the subsidised costs of connection to the national grid. Monthly payment plans make SSHP accessible to poorer households and, in many cases, community members have successfully formed cooperatives, raising as much as 50% of the cost of a pico-hydropower plant (Meier & Fischer, 2011).

Investable opportunities in SSHP in Rwanda

While rehabilitation and reforestation of protective forests on steep and very steep hillsides and ridge tops does not generate a positive return on investment in and of itself, micro-hydropower can reduce pressure on these areas, allowing them to regenerate both naturally and with the help of local communities via activities promoted alongside micro-hydropower. All the while, it creates a return for investors through the sale of energy to the Government of Rwanda and private third parties. The Ministry of Infrastructure Rwanda (MININFRA) has identified over 333 sites for SSHP (micro- and pico-) with a combined installed capacity of 96 mW (Hove, et al., 2011) in its Hydropower Atlas. However, it seems likely that this figure does not reflect the true SSHP potential in Rwanda, particularly in places where pico-hydropower or a cascade of several pico-hydropower plants could be developed. It is possible that this is related to the distance

22 Household connection costs related to SSHP in Rwanda are highly variable, and may be as high as US\$ 400 per household.

of the potential SSHP sites from the grid, with smaller plants at a distance of greater than four kilometres omitted from the Atlas. Though site-specific feasibility studies on economic and technical viability have not been conducted for all sites, Rwanda has strong potential markets for SSHP plants that are both on- and off-grid.²³

Based on manufacturing capabilities within Rwanda, low hydraulic head²⁴ pico-hydropower may be a strong route for initial investment, both from a cost perspective, and because low-head systems do not require the creation of dams or other diversions of flow that could have negative environmental impacts. In a case study by Meier and Fischer (2011), 91 potential sites were identified with an average capacity of 11 kW, or a total power potential of 1,000 kW. These sites have the potential to serve 20,000 households or 92,000 people, roughly 1% of the population of Rwanda. With an average unit cost of US\$ 5,200, which includes the cost of distribution, a total investment of US\$ 5.2 million would be required to develop these 91 sites over roughly six years. In this scenario, the average connection cost per household would be approximately US\$ 260, or US\$ 55 per person, for an average household connection of 50 kW.

Rwanda has started to attract private investment in SSHP. There are currently at least seven private sector site developers operating approximately 30 pico-hydropower sites. They are primarily Rwandan entrepreneurs, and the first efforts have been made to attract private commercial participation in micro-hydropower in the country. The first effort to engage the private sector has been through the Private Sector Participation in Micro-hydropower Project (PSP Project), supported by the Dutch-German energy partnership 'Energizing Development',

implemented by GIZ, and in partnership with MININFRA and the Energy, Water and Sanitation Authority (EWSA). The project's objectives were to provide more people with electricity via micro-hydropower projects, and sector development with the aim of creating a self-sustaining SSHP sector. In 2006, when the project began, there were no private companies working in renewable energy in Rwanda.

The project was structured in such a way that subsidies for private sector participants, primarily independent power producers (IPPs) that are responsible for the construction and operation of SSHP plants but are not themselves utilities, were below 50% of the investment costs, enough to make the individual SSHP projects profitable while still closing the viability gap.²⁵ In addition to the creation of new, privately-owned and operated SSHP plants, MININFRA is also interested in the privatisation of all SSHP plants with a generation capacity of 2,500 kW or less, opening up additional opportunities for private sector engagement in the SSHP space. At least five micro-hydropower plants are currently slated for privatisation, and the first proposals from private sector companies have already started to come in.

The PSP Project issued two rounds of tenders for SSHP projects to be included under this co-financing arrangement, and memorandums of understanding were signed with the district in which a project was to take place, MININFRA, and RBD. The companies that were ultimately included in the project were ENNY, CALIMAX, SOGEMR, REGREPOWER, RED/REPRO, and REPRO, and direct and indirect support provided by the PSP Project will support the generation of nearly 15,000 kW across 20 sites. Rwanda's first-ever privately owned and

23 "Off-grid" potential is greatest for systems with a potential to generate 50 kW or less.

24 Though low hydraulic head is generally considered to be a fall of 20 m or less, in the Rwandan context, SSHP may be applicable to a head of 40 m.

25 Viability gap funding is the provision of a grant, either one-time or deferred, which is intended to support infrastructure projects that are economically justifiable but fall short of financial viability.

operated micro-hydropower plant, the 96 kW Murunda project, was opened in March 2010 and has been operating continuously ever since.

There are effectively three ways of generating a return on investment for IPPs operating SSHP plants, both of which were utilized under the PSP Project. The first is a power purchase agreement (PPA), which EWSA negotiates with and issues to private sector operators. PPAs are likely to be ‘take-or-pay’ arrangements, in which the Government of Rwanda is obliged to purchase the power produced or pay a penalty to the IPP. PPAs decrease risks for developers and are a convincing mechanism to obtain debt financing from banks. Under the PSP Project, *Banque Rwandaise de Developpement*, *Banque Commerciale du Rwanda*, and *Banque de Kigali* have all given commercial loans and/or turbine leases to micro-hydropower project developers. Conditions are flexible for both parties, and a standard tariff is applied for nine years, renewable annually. There are no penalties for failure to deliver a minimum quantity of electricity. The PPA precedes the issuance of a company’s power generation license, which is granted by the Rwanda Utilities Regulatory Agency. Operators with PPAs may distribute power on isolated, localised ‘off-grid’ grids, which may be the most cost-effective option for bringing electricity to dispersed rural communities. IPPs may also distribute some or all of their electricity via the national grid. Initial analysis indicates that private sector IPPs in Rwanda would gain the most economic benefit from using both distribution mechanisms simultaneously (Pigaht & van der Plas, 2009).

Related to PPAs is the establishment of a feed-in tariff, in which IPPs receive compensation about retail and, as the percentage of adopters increases, the feed-in tariff is reduced to the retail rate. This scheme was first introduced in Rwanda in February 2012 as part of the Renewable Energy Feed-in Tariffs Programme.

The third vehicle for generating return on investment is known as a wheeling agreement,

whereby IPPs generating electricity in their privately owned and operated SSHP plants are able to sell electricity to private third parties while using the national EWSA grid. Rwanda’s first wheeling agreement, and possibly the first wheeling agreement in sub-Saharan Africa (Attigah, 2012), was between *Energie Nyaruguru* and a local tea factory situated near the Mazimeru plant, which was connected to the grid in April 2012.

The Government of Rwanda is committed to a 100% private sector-driven approach in the hydropower space. At the conclusion of the PSP Project in 2013, the following advantages of the private sector approach to the provision of SSHP versus the public or community approach were identified:

- Amount of public subsidies reduced;
- Private sector capital can be leveraged – 75% of investment costs are provided by the individual IPPs, on average;
- Operation and maintenance of plants is more efficient and sustainable;
- Local capacity is more readily built and utilized;
- Private companies have the resources and technical expertise to build additional SSHP sites on their own, and with their own resources; and
- Up-scaling is possible.

Landscape restoration activities that can be promoted alongside the implementation of micro-hydropower systems in Rwanda could include, but are not limited to the following list. Support for these activities could come from a variety of funding sources related to SSHP, such as tariffs charged by operators of pico-hydropower plants or from money generated from buy-backs that are part of PPAs. These activities could also fall under the umbrella of PWS:

1. **Targeted hillside and ridge top reforestation initiatives in key watersheds.** This particular activity was undertaken in Rwanda as part of the Kirehe Community-Based Watershed

Management Project, and was intended to address erosion risks related to degraded landscapes and guarantee increased wood production for communities, with a 'first round' target area of approximately 1,500 ha.²⁶ While it is recommended that appropriate tree species are determined through close consultation with communities, the project assumed reforestation with a mix of 30% *Acacia mearnsii*, 40% *Eucalyptus spp.*, and 30% *Pinus spp.* at a density of 1,111 plants per ha. As part of soil and water conservation measures, reforestation could be supplemented with progressive and/or bench terraces, as well as the creation of hedgerows. These initial targeted reforestation initiatives would ideally be promoted alongside the following listed activities.

2. Production of tree seedlings and/or nurseries. Since Rwanda's remaining natural forests are relegated to just a few areas around the country, and because micro-hydropower will reduce pressure on but will not eliminate the need for tree-based forest products for fuel and other needs, it is likely that any hillside reforestation initiatives will still need to incorporate, at least partially, reforestation with hardwoods and/or agroforestry-appropriate species such as fruit trees. Rwanda has a history of annual community tree planting and reforestation activities, which have been largely unsuccessful in achieving lasting landscape restoration due to a low survival rate of planted seedlings. Of particular importance for riparian zones is the creation of a source of seeds or seedlings for deeply rooted trees, such as *Grevillea robusta*, which provide soil stabilisation and which can replace water-intensive species like *Eucalyptus spp.* These may or may not include species

suitable for agroforestry, but would ideally be promoted in conjunction with perennial crops. The creation and maintenance of nurseries for reforestation efforts has been mainstreamed in other SSHP projects, such as the Namche Bazaar Small Hydro and Rural Electrification Project in Nepal.

3. Farmer-managed natural regeneration (FMNR). FMNR is a technique that utilizes existing stumps, roots and shrubs on farmers' land, as well as seeds and seedlings to enhance restoration. It offers a low-cost, low-risk opportunity for farmers in Rwanda to meet their own productive needs while restoring forested landscapes and their biophysical conditions in watersheds. Like SSHP technology, FMNR has the advantage of being easily spread via word of mouth and replicable without any formal training. In Niger, for example, FMNR has spread, largely through informal channels, to encompass more than five million hectares of agricultural land (Reij, et al., 2011). FMNR can utilize existing stumps, roots and shrubs on farmers' land, as well as seeds and seedlings produced as a separate restoration activity, and FMNR-related practices such as coppicing allow for use of biomass without irreversibly damaging entire trees. FMNR can also provide a strong basis for community-managed forestry activities, particularly since land holdings in Rwanda tend to be quite small and fragmented.

4. Promotion of and/or value addition to NTFPs. Because of a near-universal reliance on firewood as an energy source, it is typically the most commonly utilised NTFP. However, in the interest of promoting protective forests and watershed protection in general, the promotion of non-firewood NTFPs will be essential. Of particular importance for watershed protection in Rwanda's riparian zones

26 Total area with potential for hillside and ridge top reforestation in the Kirehe district is approximately 7,000 ha.

could be the cultivation of bamboo. Three bamboo species in Rwanda potentially suited for these activities and identified by Ntirugulirwa, et al. (2012) include *Bambusa vulgaris*, *Arundinaria alpina*, and one native species – possibly *Yushania alpina*. For more information on how bamboo can help achieve the targeted landscape restorations described above, see below on PWS and riparian zone restoration.

Drawbacks and limitations of LSHP in advancing Rwanda's development agenda

While LSHP may be a more traditional investment vehicle, there are numerous reasons why it is not suggested as a key component for funding landscape restoration. There are constraints to and externalities associated with the creation, operation and maintenance of LSHP projects. In addition to the high initial capital and start-up costs, which must often be vetted by international lenders and are frequently funded in a foreign currency, dam and reservoir construction can result in mass displacement of communities and the flooding of vast swaths of arable land. Beneficiaries are often located miles away from the rural areas where LSHP plants are constructed, with power produced in rural areas directed to urban centres, and costs associated with transmission are high. A return on investment for investors is not guaranteed, and dams are a 'useless asset' unless fully constructed and operational (Everett, 2014).

Creation of reservoirs also negatively impacts a country's greenhouse gas (GHG) emission reduction strategies. Decomposing organic material in reservoirs, from soil erosion and plant matter and other debris that enter waterways, results in the emission of methane and carbon dioxide. Globally, studies have attributed as much as 4% of anthropogenic GHG emissions

to large hydroelectric infrastructure, with tropical reservoirs contributing more than their temperate counterparts (McCully, 2007; Lima, et al., 2008). Degradation of wetlands and deforestation of hillsides, ridge tops and riparian zones have resulted in further soil erosion, landslides and flooding, contributing to a loss of energy generation potential and leading to power shortages and water scarcity. Further shortages occur when operators are forced to shut down plants for maintenance to address the damage and degradation to turbines resulting from sedimentation. These factors have resulted in an incremental reduction in watershed services over the last 20 years, and some of Rwanda's LSHP plants are now operating at just 20% of their energy generating capacity.²⁷

LSHP installations are also increasingly at odds with other uses of water, particularly as the impacts of climate change increase competition for limited water resources. This makes LSHP a poor choice for addressing Rwanda's energy and energy security needs, at least in the short and medium term. Many large waterways that were once counted on as being perennial during periods of normal precipitation are no longer reliable as rainfall becomes more unpredictable. More frequent and prolonged periods of drought, and the severity of flooding events, makes capturing water for electricity generation more challenging. Communities downstream from hydroelectric plants that are not 'run-of-river,' thereby requiring dams and reservoirs to generate the necessary hydraulic head for energy production, may face water shortages, the impacts of which are further exacerbated by the effects of climate change. LSHP plants are generally not multipurpose, and are thus unable to help smallholders appropriately manage water and cope with the effects of drought, most notably crop failure

²⁷ Rwanda's Ntaruka plant is now generating 2.5 MW of power, down from 11.25, while its Mukungwa plant is generating 5 MW, down from 12.45 MW.

and the other consequences of being forced to choose between water for basic survival and subsistence agriculture. Rwanda's water-intensive commercial sectors, such as the tea industry, also jeopardise a steady supply of water for power generation from large plants, as they are able to utilize Rwanda's 'free' water resources to any extent necessary, including the construction and operation of their own hydropower systems.

Rwanda's current energy profile results in high environmental and economic costs. The limited availability of electricity overall, coupled with chronic power shortages that result from water scarcity, have caused the retail price per kilowatt-hour to increase from US\$ 0.05/kWh to US\$ 0.21/kWh in less than ten years. The household tariff is even higher, at US\$ 0.24/kWh, as the domestic electricity supply is supplemented by a high proportion of diesel-generated energy (Pigaht & van der Plas, 2009). It is anticipated that the price per kWh for energy generated from LSHP will continue to increase due to reductions in energy production and increased water scarcity resulting from an increased demand driven by economic and population growth.

Payments for watershed services by major beneficiaries – investment opportunities

The annual economic value of watershed protection services provided in Nyungwe National Park alone is nearly US\$ 118 million (Masozera, 2008). Despite the huge cost savings to Rwandan industry, local communities tend to pay the price for the provision of these services, primarily in the form of opportunity costs related to conservation. Non-market economic valuation techniques are often employed to evaluate the economic impact of the presence or absence of ecosystem services. The avoided cost method is used to determine the cost to industry

and other users in the absence of watershed protection services. The applicability of this method was applied in the context of Rwanda's IPPs and tea industry, and is discussed later. The top three most valuable 'uses' of watershed services are:

1. Tea production (US\$ 804/ha/year),
2. SSHP supply potential (US\$ 164/ha/year),
3. Flood prevention for tea estates and hydropower producers (US\$ 137/ha/year) (Masozera, 2008).

Therefore, it is not unreasonable to assume that tea producers and IPPs may represent two private sector interests to serve as investors in watershed services. Beyond benefits to industrial sectors, investments in watershed management are capable of producing a 30% increase in household incomes from agriculture, and investors can expect a return of 7% per year. In fact, for every dollar invested in watershed management in Rwanda now, three dollars will be generated by 2020 (REMA, 2012). However, information on activities related to watershed management and protection is limited. Case studies conducted by the Rwanda Environment Management Authority (REMA) have identified a handful of potential investable watershed interventions: riparian zone protection and restoration, bench terraces on watersheds, construction of gabions²⁸ along widened river channels, and the installation of three additional gauge stations for purposes of enhanced hydrologic modelling.

Two fundamental barriers exist to establishing PWS in Africa: the financial health of institutions benefitting from watershed services, and a lack of 'consumers' of ecosystem services with the ability to pay (Andrew & Masozera, 2010). As detailed above, there are effectively three types of private sector interests that would not only benefit from promoting PWS, but which are not inhibited by these barriers in Rwanda. For

28 Caged containers containing rocks and concrete and used for erosion control.

these private sector actors, PWS will become an essential part of maintaining and expanding their operations, and sustaining revenue in the medium and long term.

Riparian zones, defined as the interface between land and a river or stream in which channels, corridors, and/or vegetation are typically present, are critical to the country's development agenda. These zones are critical for the provision of vital watershed services; reducing soil erosion and the resulting siltation (and eventual sedimentation) of waterways, increasing infiltration capacity of soils, flood prevention, drought mitigation, and recharge of ground and surface water that are central to maintaining and increasing Rwanda's hydroelectric potential, safeguarding its agricultural productivity, and improving the quality of Rwanda's freshwater resources. These key areas have become degraded over time due to the deliberate draining and cultivation of wetlands and riparian zones, and population pressure has resulted in human settlements extending to the very edge of waterways and wetlands.

The promotion of NTFPs in buffers around Rwanda's waterways is a potential opportunity for safeguarding watershed services and improving community livelihoods. A survey regarding knowledge and use of NTFPs around VNP found that bamboo was the single most commonly utilized NTFP, with 44.8% of households producing goods from bamboo, and that NTFPs are most commonly produced within barriers around waterways. By supporting the creation of fast-growing bamboo buffers in riparian zones, investors also enable the production of a valuable NTFP that has further value when transformed into furniture or other uses. Limited information is available on riparian zone restoration and the use of bamboo in Rwanda.

A bamboo promotion project in the Burera District is being carried out by the Rwandan Association of Ecologists (ARECO). With

nearly €400,000 in support provided by the European Union, the project, which runs through January of 2015, is intended to build on a national policy established by the Government of Rwanda promoting bamboo for its economic potential. Additionally, the riparian zones around the Rugezi Wetlands have been prioritised for environmental protection alongside VNP, with the hope that planting bamboo in vegetative buffers will reduce siltation in the former while curbing illegal bamboo harvesting in the latter.

The importance of the Rugezi Wetlands, and the larger Rugezi-Bulera-Ruhondo watershed, was realised in light of the electricity crisis faced by Rwanda in the mid-2000s. Rwanda sought to halt the degradation of these wetlands by disallowing on-going drainage activities in Rugezi, as well as banning agricultural and pastoral activities within and along its shores. These actions were supported through the first Environmental Policy (2004), the National Land Policy (2004), the Environment Law (2005), and the Land Law (2005) (Hove, et al., 2011). Perhaps predictably, attempts to reverse wetland degradation resulted in local communities losing access to key resources, and the wetland remains under stress due to agricultural reclamation and drainage by EWSA for hydroelectricity generation (Hategekimana & Twarabamenye, 2007).

The ARECO project is intended to combat environmental degradation in Rugezi by addressing issues related to soil conservation, poverty reduction, and climate change. The total area of Rugezi Wetland is 6,725 ha; of this area, the project aims to create 470 ha of bamboo plantations. The success of the project and the larger adoption of bamboo cultivation as a conservation and livelihood activity in Rwanda will require a variety of community-oriented interventions, ideally backed by private sector water users and/or watershed service beneficiaries. As two of the largest beneficiaries of watershed services, IPPs and the tea industry are in a position to safeguard their own supply

chains while promoting landscape restoration interventions that help Rwanda achieve its development goals.

Independent power producers

Watershed services benefit IPPs primarily in the form of: (i) avoided costs resulting from sedimentation leading to a loss of generation capacity; (ii) the associated costs due to a reduction of energy production, including the inability to meet obligations under PPAs with the Government of Rwanda; and (iii) economic losses due to maintenance, which requires a temporary yet full halt in electricity generation from a plant. Case studies on watershed services in Rwanda, or lack thereof, have found staggering decreases in productivity. Masozera (2008) found that the annual cost associated with sedimentation of one hydropower plant in Gishwati is approximately US\$ 1.15 million, equating to an energy loss of 38% of total production. It could be concluded that these costs are directly tied to sedimentation resulting from deforestation of the Gishwati Forest Reserve.

In the Nyungwe watershed case study conducted by Masozera (2008), the avoided cost method was used to determine the cost savings received by IPPs and EWSA, the state electricity agency, related to water treatment and water quality. Commercial treatment of water by using reactants to remove sediments is one of the most costly steps in the water treatment process, particularly when using aluminum sulphate ($Al_2(SO_4)_3$). Without erosion control provided by watersheds, the costs of water treatment can quickly escalate. Based on variable annual average sediment loading, it is estimated that EWSA saves US\$ 30,000 or more in $Al_2(SO_4)_3$ alone each year.

Tea industry

Tea in Rwanda is primarily rain-fed bulk black tea. While the national water footprint

of one kilogram of black tea is lower than the international average²⁹ at 8.25 m³/kg, the average value of a cubic metre of water for tea production in Rwanda is higher than its Nile Basin counterparts, at US\$ 0.60/m³. When compared to the average value of a cubic metre of water for coffee and sugar production in Rwanda and its neighbours, this difference in value is even more apparent. The same cubic metre of water to produce coffee and sugar costs just US\$ 0.12 and US\$ 0.13, respectively (Zeitoun, et al., 2010). The impacts of climate change have caused a noticeable decline in precipitation over the last several years, with resulting decreases in productivity and yields of Rwanda's tea crops. Water represents a strategic commodity for the tea industry. Irrigation is now becoming increasingly imperative for maintaining yields, particularly as Rwanda aims to shift its cultivation to higher quality varieties of tea that are more competitive on the international market.

Tea estates are among the primary industrial users of water in Rwanda. Like other industries, the tea industry is largely self-supplied and is not connected to a distribution network. In addition to the water used for growing tea, water is used for processing leaves into black tea, which requires both adequate quantity and quality. The 'free' water provided by the Nyungwe watershed to tea estates and the Rwanda Tea Authority, which amounts to 58,240,000 m³ per year, provides an avoided cost of US\$ 81,536,000 annually (Masozera, 2008).

Flood prevention is also an important consideration for the tea industry. A 2007 flood affected 90 ha of tea estates, resulting in over US\$ 500,000 in opportunity costs. However, avoided flood-related costs due to the presence of approximately 100,000 ha of forests in Nyungwe were nearly an estimated US\$ 14,000,000 (Masozera, 2008).

29 The average international virtual water content of black tea is 10.4m³/kg.

4.4 Emission reductions potential

An overview of the emission reduction markets (carbon markets) is included in Section 6.7, which demonstrates that current markets are small and fragmented making investments that count solely on selling carbon credits, a difficult investment proposition. This section provides an overview of Rwanda's emissions and its ability to generate carbon credits that could potentially be financed by carbon markets and results-based payment programmes if demand is adequate.

With a growing population of more than 10 million, Rwanda's emission levels are some of the lowest per capita. However, according to the International Institute for Sustainable Development, Rwanda GHG emission baseline projection, the country has slowly become a small contributor to global GHG emissions. The electricity matrix is mainly comprised of domestically produced thermal power (32%), domestic hydropower (36%) and imported hydropower (17.8%). The rest is a mixture of biogas, off-grid hydropower (including pico- and micro-), solar and thermal. According to the Designated National Authority (DNA) of Rwanda, the weighted emission grid factor is 0.65 tCO₂e/

mWh (UNEP RISO, 2013), mainly due to the small generation capacity.

As observed in Figures 6 and 7, the agricultural and land use, land-use change and forestry (LULUCF) sectors are determinants of Rwanda's GHG emissions balance, with agriculture being the largest net source of emissions and LULUCF traditionally an emissions sink. However, in 2010, LULUCF generated emissions. Within the agricultural sector, the uncertainty and lack of data are significant; however, most of the analyses available include information on fermentation and manure management, burning of savannah, burning of agricultural residues, cultivated soils, and flooding rice.

It has been calculated in the Vision 2020 (Steibert, 2013) that population and GDP growth (projected at 6% average between 2010 and 2030 according to the World Bank) will trigger further demand for forest and woodlands by about 2.3% (see Figure 8). According to FAO, however, Rwanda experienced a forestation rate of around 2.4% per year between 2005 and 2010, but current and projected estimates of emissions in LULUCF indicate that this sector will be a net emitter over the seven years.

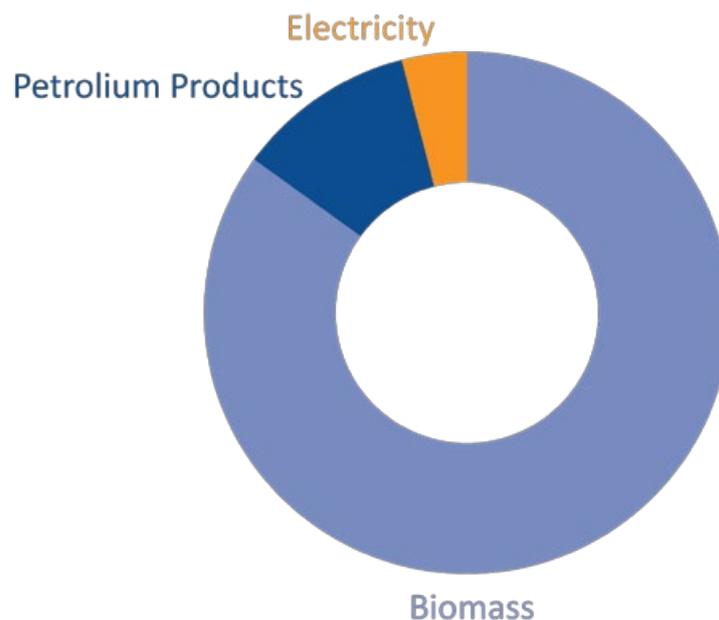


Figure 6. Energy sources in Rwanda (Source: UNEP RISO, 2013)

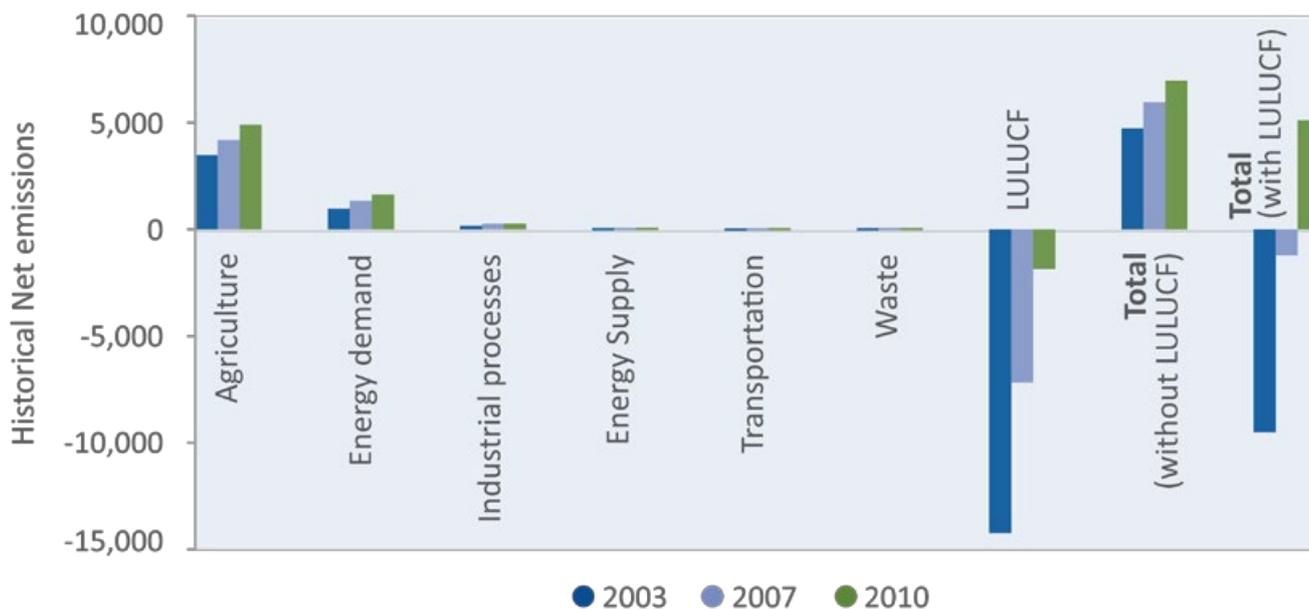


Figure 7. Historical emissions by sector (Source: Steibert, 2013)

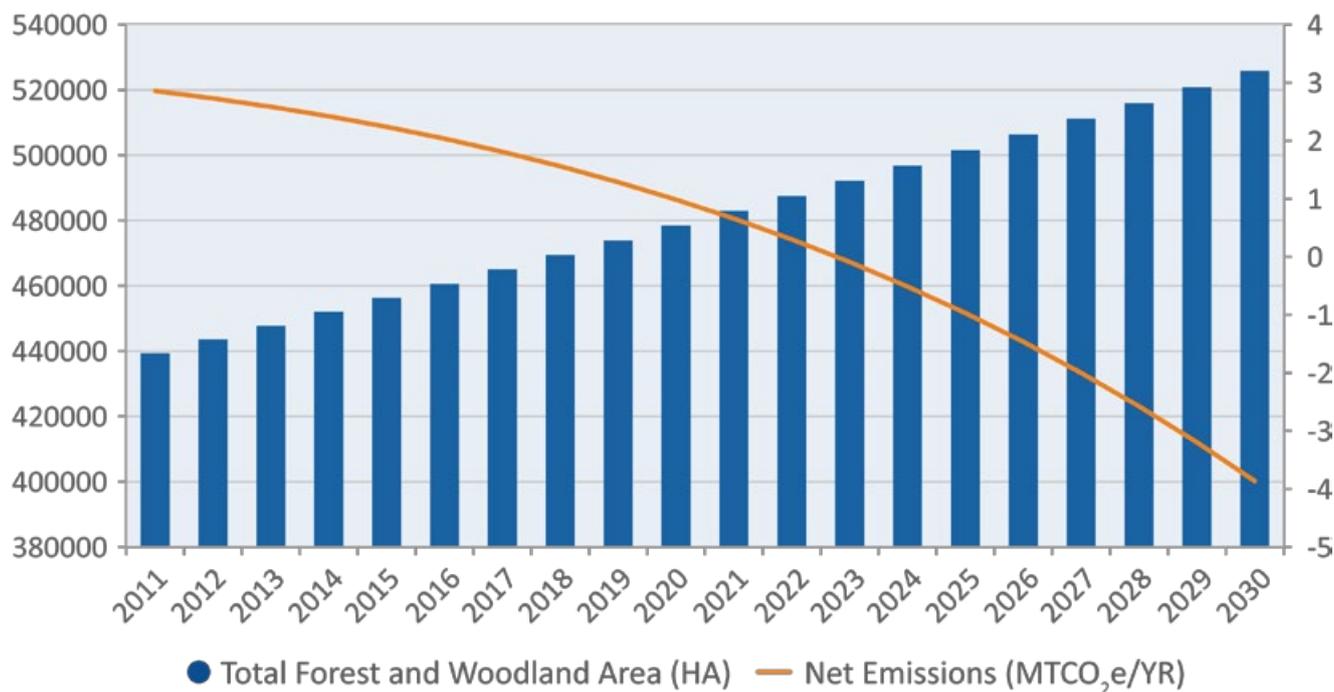


Figure 8. Forest and woodland net emissions (Steibert, 2013)

Cookstoves and green charcoal

There are currently four standalone registered Rwandan CDM projects: two solar energy projects and two household energy efficiency projects. Additionally, there are several programmes of activities (POAs) registered on energy efficiency for households: one at validation, one on energy efficiency of

households, two on hybrid renewables and two on energy efficiency services (UNEP DTU, n.d.). POAs are an interesting option, and cookstoves comprise the majority of the CDM POAs pipeline, which makes sense when considering the dominance of fuelwood and firewood as sources of energy. Rwanda counts on bilateral assistance through Multilateral

Environment Agreements in Africa, Caribbean and Pacific countries funded by the European Commission, which builds capacity to develop CDM projects and specific project activities.

One cookstove project in Rwanda is being developed by Atmosfair GmbH and is generating 60,771 tCO₂ per year. It is commonly known as the SAVE80 cookstove, a state of the art technology for efficient stoves. These stoves are portable, made of stainless steel, developed and prefabricated by a German manufacturer and assembled locally by *Energie Domestique* Ltd to create employment.

Fuelwood is the dominant energy source, especially in the domestic sector, causing forest degradation and GHG emissions. Some estimate domestic emissions contribute up to 18% of total national GHG emissions (UNEP RISO, 2013). An important opportunity exists for household energy efficiency interventions, such as ICS and other alternatives for cooking. There are some exiting government plans to install ICS in homes. By 2008, 50% of the households in the country had already been supplied with ICS. The government expects that fuelwood utilisation will go down to 40% of total energy consumption by 2020 through implementation of energy efficiency projects and fuel switching; mainly through the utilisation of biogas and briquettes produced using agricultural residues and animal waste.

Consumption of charcoal (potential to reduce more than 37,000 tCO₂/year) is major, having become the main source of fuel in urban areas and a significant source of income and degradation in rural areas. Efficiency in production of charcoal presents important emission reduction potential, as charcoal production releases methane. Projects can be implemented to reduce methane emissions during production and capture methane emissions from plants while generating additional energy. Additionally, charcoal could be sustainably sourced by allocating dedicated woodlots and replanting trees that would, at the same time, work as a natural sink for carbon

emissions. Carbon credits from cookstoves and green charcoal are an important component to include in these investment profiles.

REDD+ strategy and emission reductions from forest protection

The potential for REDD+ in Rwanda is limited, as most of the country was deforested between 1960 and 1990 (36% forest loss) and carbon stocks are limited. Moreover, the country was initially excluded from pilot projects under UN-REDD and the Forest Investment Programme, and deforestation has been significantly reduced in recent years. It has been calculated that, as of 2009, Rwanda's total forested area was 425,000 ha – approximately 17% of the total national area – of which 86% consists of planted forest, 13.4% naturally regenerated forest, and about 1.6% primary forest. The majority of the forest is humid natural forest (33%), while the rest is composed of eucalyptus plantations (26%) and degraded natural forest (15.7%) (UNEP RISO, 2013). The definition of forest in the country requires a minimum crown cover of 10%, minimum tree height of 3 m, and minimum forest area of 0.05 ha.

The main opportunity for REDD+ is on the protection of parts of national parks and protected areas that still face some deforestation and degradation threats such as the VNP, Nyungwe and Gishwati forests. REMA and the DNA consider this potential to be low as they describe these areas to be well protected already (REMA, 2012). However, there is some significant pressure on national parks; as such, the total area of national parks has been reduced since 1960, largely due to conversion to agricultural land and settlements.

The national green growth strategy (Government of Rwanda, 2011a), as one of the main priorities within its finance pillar, encourages conservation through payments for ecosystem services schemes that go beyond existing pilot projects in Gishwati and Nyungwe forests. This priority could include some REDD+ initiatives. It is worth highlighting that the relevance of REDD+

in Rwanda in terms of co-benefits, mainly biodiversity co-benefits, could be significant, as Rwanda is located in the western arm of Africa's Rift Valley. This valley is considered to have the highest species richness in Africa, with around 40% of the continent's mammal species. This includes 30% of the global population of mountain gorilla, listed by IUCN Red List of Threatened Species™ as Endangered, more than 700 bird species, around 300 reptiles and amphibians, and almost 6,000 higher plants (REMA, 2013).

Rwanda has seven identified KBAs that cover almost 3,000 km², include about 56 Mt of carbon (18 Mt of biomass and 38 Mt of soil carbon), and comprise almost 90% of the high carbon area (UNEP WCMC, n.d.). Around 2% of the land that is relevant for carbon and biodiversity is not included in protected areas, and represents a good opportunity to structure REDD+ projects with significant biodiversity co-benefits. Some of the major co-benefits and ecosystem services are: economic and livelihood support, including food security; and poverty alleviation (the value of ecosystem services provided by Nyungwe Forest alone has been calculated at US\$ 285 million a year) (REMA, 2013); ecotourism (from under US\$ 5 million in 2002 to US\$ 33 million in 2006); and research and medicine. Main threats to biodiversity are the same as those to forests: population pressure, land scarcity, conversion of natural habitats, mining, agriculture and introduction of non-native species.

According to the Carbon Market and Forestry Assessment elaborated by REMA and the DNA, the work on REDD+ at the project level has been limited so far. The approach in Rwanda is to integrate the local communities into the sustainable management of forest resources and to link the protection of the natural forests to the reduction of the poverty of the waterside populations (REMA, 2010). The Carbon Market and Forestry Assessment also cites two project idea notes that are under process of approval by the Congo Basin Forest Fund (CBFF). One

has been proposed by the National Forest Authority (NAFA), aimed at: increasing forest and tree cover in state and district forests, both in remnant natural and plantation areas as well as on private lands; conducting forest carbon assessments and the application of a monitoring system; and improving the livelihoods of forest-dependent communities. The second, proposed by the Woods Hole Research Center, aims to “develop human capacity in forest policy and management using novel applied research as a vehicle for regional training and capacity building in advanced economic, social and remote sensing methods” in four basin countries including Rwanda (REMA, 2010).

The country has not yet developed a comprehensive REDD+ strategy and some work remains to be done on elaborating a newer national forest inventory and the inclusion of carbon biomass estimates. UNEP WCMC (n.d.) calculated the country's terrestrial carbon stocks to be 130 Mt, with 67 t of carbon in ground biomass and about 63 Mt in soils, unevenly distributed over the country. REMA is developing an approval process for all voluntary projects, including REDD+, which comprises, among other things, an assessment by technical committees and a letter of approval signed by the director general of REMA. Furthermore, REDD+ projects will be coordinated by NAFA and the DNA, which will also be the focal point for all projects. Projects in national parks require coordination with RDB, and the Ministry of Forestry and Mines should also be kept aware of all project activities.

Regarding ownership of carbon credits and revenue sharing, REMA establishes that:

- If the project takes place on government land where the land was leased for free, the government is entitled to a 40% share of the carbon credit revenue for the first 10 years and 50% thereafter.
- If the project takes place on government lands leased for a fee, there must be discussions between the government and

the developer. Revenue sharing will then depend on individual conditions such as the price of lease, taxes and the use of the revenues by the developer (whether they will be reinvested in the country or not). The agencies leading these negotiations with the developers will include RDB, REMA, NAFA and the National Land Centre (REMA, 2010).

Afforestation, reforestation and revegetation

Rwanda's Vision 2020 seeks to increase forest cover from 17% to 30% by 2020. As such, great efforts need to be made in order to reach this goal. This represents an important opportunity to implement afforestation, reforestation and revegetation (ARR) projects with the additional benefit of reducing emissions. It has been estimated that there is the potential to reduce more than 109,700,000 tCO₂/year via the ARR methodologies under the CDM, Nationally Appropriate Mitigation Actions and voluntary schemes. Although the government has engaged in tree planting, there is still room for improvement and financing is still an issue, which make a case for the additionality of potential projects. The main obstacle for ARR projects is the lack of demand in the carbon market, as ARR projects are not accepted for compliance within the EU Emissions Trading System.

The CDM process for this particular type of project is complex, and the certified emission reductions (CERs) awarded to them are only temporary as a way to address non-permanence risk. Currently, there are no ARR CDM projects in the country, and the opportunity and potential remain significant. According to the emissions profile elaborated by UNEP RISO (2013), increasing forest coverage from 17% to 30% could translate into more than 100 million tonnes emission reductions per year. As for REDD+, for ARR projects to be successful, there needs to be more clarity and simplicity regarding carbon credit ownership and revenue sharing, stronger institutional arrangements that increase transparency, and a

demonstration of additionality.

Agricultural land management

As previously mentioned, most of the Rwandan population participates in agriculture (almost 90%), as such, along with energy it is the largest source of GHGs. Emissions from agriculture come mainly from soil cultivation (N₂O), enteric fermentation (CH₄), and land-use change due to expansion of crops for food and biofuels, and pasturelands (UNEP RISO, 2013). Under Vision 2020, the government expects to move towards a comprehensive approach that includes productive market-based agriculture compatible with the protection of the environment and resource management. This plan acknowledges the importance of the sector for the country's welfare and the economy; however, it has also raised concerns over increased CO₂ emissions due to extensification and use of fertilisers. Furthermore, Rwanda faces a problem of agricultural land scarcity and deteriorated land fertility due to demographic pressure. Extensification will require improved nutrient management, low impact farming practices, improvement of soil carbon retention, and reduction of CH₄ emissions from the livestock sector. There are important opportunities in climate-smart agriculture as promoted by the World Bank and FAO, sustainable extensification (e.g. agroforestry), and sustainable agricultural land management.

4.5 Role and value of standards and certifications for value chain activities

Standards and certifications play a significant role in promoting more sustainable land-use practices and encouraging greater quality in the agricultural value chain; and for emission reductions for woodlots, charcoal production, ICS and other land-use related mitigation activities. For example, under the CDM of the Kyoto Protocol, AFF, and ICS projects, may be eligible through applying approved methodologies to receive carbon credits

called CERs that can be sold to industrialized countries to meet emission reduction limitation targets.

A major limitation of the CDM is it does not allow for projects that reduce emissions from slowing deforestation. In addition, there has also been low demand for credits from forestry CDM projects, due to the temporary nature of the credits. Thus, voluntary market standards, such as the Verified Carbon Standard (VCS), and the Gold Standard (primarily for cookstoves) are attractive alternatives. Buyers purchase credits in the voluntary market to offset emissions on a voluntary basis or prepare for future regulatory schemes, as opposed to those who buy credits from CDM projects to comply with Kyoto Protocol targets. The VCS, combined with the Climate, Communities and Biodiversity Standards (CCB Standards), which certifies land management projects that deliver net positive benefits for local communities and for biodiversity in addition to climate change mitigation, is currently the most credible standard available in the voluntary market.

In Rwanda, there are currently a number of voluntary market forestry projects planned. This includes: two projects in the Gishwati Forest, two projects in the Eastern Province, a project in the VNP and a project in the Nyungwe National Park. Currently, there are no records of Rwandan projects validated by the VCS, a preeminent standard for REDD+ projects.

The DNA Secretariat, which coordinates carbon market projects, is based within the REMA and supports the required approvals under the CDM. REMA maintains CDM project approval procedures and a technical committee is nominated to review each project (REMA, 2010). REMA is currently working on voluntary market project approval procedures to ensure that all voluntary market projects in Rwanda contribute to sustainable development and apply an established voluntary carbon standard, such as the VCS and CCB Standards. These procedures would apply to all voluntary forest

carbon projects in Rwanda, including REDD+. The projects will be assessed by forestry related technical committees with the final letter of approval signed by the Director General of REMA (REMA, 2010).

In addition to standards that certify emission reductions, there are a number of standards that could be used to demonstrate sustainable and value-added forest product or agricultural supply chains. For national-level standards, the Rwanda Bureau of Standards (RBS) is a public institution that undertakes all activities pertaining to the development of standards, quality assurance and metrology in the country. It is the only body that has the power to define national standards. Public and private firms must present their standards to RBS for adoption at the national level. While the RBS has been focused on ensuring safety in the food value chain, other standards and certifications are taking shape. For example, systems and structures are underway that will see RBS mainstreamed as a key player in the honey value chain, positioning RBS to vet, certify and standardize honey, including that intended for export. RBS has outlined the desired properties by which honey producers, refiners and exporters will have to adhere to acquire certification (SNV, 2009).

There are a whole host of international and some regional standards that apply to forestry and agricultural supply chains and value-added products. The EAC developed the East African Organic Products Standard which Rwanda has adopted through joining the EAC. This organic standard covers plant production, animal husbandry, and beekeeping, the collection of wild products, and the processing and labelling of the products (ITC, 2007). Other standards specific to sustainable forest management include those under the Forest Stewardship Council and the Canadian Standards Association. Some of the barriers and potential solutions to increased adoption of organic standards are summarized in Table 10. As mentioned earlier, there is also a significant

Table 10. Barriers and solutions to increased adoption of organic standards

Barrier	Solution
High costs of certification	Bundled certification through farmers' cooperatives and farmers' groups that have helped reduce the certification costs.
Proliferation of standards	Larges organic markets, such as the European Union, the United States and Japan, vary in acceptable standards; thus producers must be knowledgeable about their target to adopt certification standards relevant to that market.
Technical hurdles	Organic agricultural production and processing require knowledge and equipment (particularly for processing); thus investments must be made to ensure successful production and certification.

opportunity to improve quality within the charcoal and cookstove value chains through the introduction of standards. For example, there is no standard on the quality of charcoal being produced and sold, and there is no standard on the weight of charcoal bags. Further, there is no standard for ICS, which often results in poor quality stoves and

hampers consumer trust in ICS. While there are currently no plans for the RBS to introduce such standards, there is an ICS standard being developed by Practical Action, a non-governmental organisation contracted under MININFRA.

5. Public funds and risk mitigation instruments for Rwanda FLR

SECTION HIGHLIGHTS

In most cases, Rwanda's FLR activities will only become commercially viable with initial, and possibly on-going, public funding that is concessional in nature. This section reviews the sources of domestic, multilateral and bilateral ODA funds in Rwanda, which could support making FLR activities commercially viable and should be directly leveraged. It also provides details on return-motivated public funds from DFIs that have made direct FLR related investments, or indirect investment into private funds that could support FLR.

The Government of Rwanda has succeeded in spending more than 10% of its national budget on agricultural development. However, there is still a large financing gap of as much as ten times the annual national budget that is needed to meet its estimated agricultural spending to implement its policy objectives. Moreover, this allocation is broadly applied to agriculture and does not specifically focus on FLR. Recently, ODA funding has grown; a third of which is allocated to agriculture. Some of these programmes could potentially be oriented towards attracting matching private investment funds. DFIs have provided a limited amount of grant funding and Overseas Private Investment Corporation (OPIC) and International Finance Corporation (IFC) have provided political risk and weather insurance products for private investors. If scale can be developed to create investment packages of at least US\$ 10 million, DFIs could be a valuable source of funding for FLR.

Although there is ample evidence of increasing investment in developing country agriculture and forestry, it is difficult to quantify the exact amount of investment due to the lack of reliable data. For 2007 and 2008, the annual FDI flows were estimated at US\$ 922.4 billion (FAO, 2013). Of this total, FDI into agriculture, including hunting, forestry and fisheries, represented only 0.4%, or US\$ 3.6 billion globally (FAO, 2013).

5.1 Public grants and concessional sources of funds for FLR

The information below provides an overview of key sources of public funds currently supporting FLR-related activities in Rwanda.

Public funds are grants that are concessional in nature, meaning that they do not require repayment or have non-market terms for returns and repayment. These sources of funds include Rwanda's government budget, official development assistance (ODA), and private donors. These sources are very important, as in many cases they must be leveraged to create commercially viable investment opportunities. One challenge in typifying these funding sources is that grant and concessional funds providers often refer to them as "investments," though these are not the same as private investments, which require repayment of principal and generation of risk-adjusted investment return. While these public sources are presented separately in this section, creating investment grade opportunities that support smallholder FLR will require innovative combinations of

these sources to attract private investment at any scale.

Rwanda's government budget

Rwanda's main source of government funds come from taxes, budgetary/capital grants, and loans, with a total estimated annual budget of US\$ 2.4 billion in 2013/2014. Rwanda's debut US\$ 400 million, 10-year Eurobond was issued in May 2013, and was eight times oversubscribed. It fetched one of the best yields for countries of the same category, at 6.875%. Bond issuance can provide new sources of upfront funds for investment in infrastructure and income producing activities, potentially including FLR.

The Government of Rwanda has surpassed the Comprehensive African Agricultural Development Programme requirement for investing more than 10% of the national budget in agriculture, and estimates a 45% growth in spending per annum in the next three years (MINAGRI, 2012). The government committed in 2013/2014 to spend RwF 52.4 billion (approximately US\$ 80 million) to support the agricultural sector by: multiplying and improving

distribution of seeds, breeds and fertilizers, promoting irrigation schemes, protection of soil erosion, as well as facilitating commercialised agriculture and the creation of farmers' cooperatives (MINECOFIN, 2014).

However, the government estimated that in agriculture specifically, there was a financing gap of US\$ 324 million (MINAGRI, 2012) for the three-year period from 2009-2012 that was needed to fund their key programmes (see Table 11).

In the forestry sector in 2012/2013, there was RwF 16 billion (US\$ 23.5 million) (MINECOFIN, 2013a) spent by the government in forestry, including land registration, plantation of forests, and protection of river and lake borders.

Official development assistance to Rwanda

Total ODA aid to Rwanda in 2011/2012 grew to US\$ 1.19 billion (MINECOFIN, 2013b), a 22% growth over 2010/2011. The four largest funders were the World Bank, the United States, The Global Fund (health only), and the United Kingdom. The majority of ODA was

Table 11. Agricultural funding gap in Rwanda

Agriculture programme	Estimated budget (US\$)	Funding gap (US\$)
Programme 1 – Physical Resources and Food Production: Intensification of Sustainable Production Systems.	624,821,658	273,062,818
Programme 2 – Producer Organization and Knowledge Systems: The Professionalization of Producers and Other Economic Agents	41,960,157	14,683,189
Programme 3 – Creating an Environment Conducive to Entrepreneurship: A Framework for Commodity Chains, Horticulture and Agribusiness Development	127,822,126	23,018,152
Programme 4 – Institutional Development: Strengthening the Public Sector and Regulatory Framework for Agriculture	20,831,000	13,568,838
Total	815,434,941	324,332,987

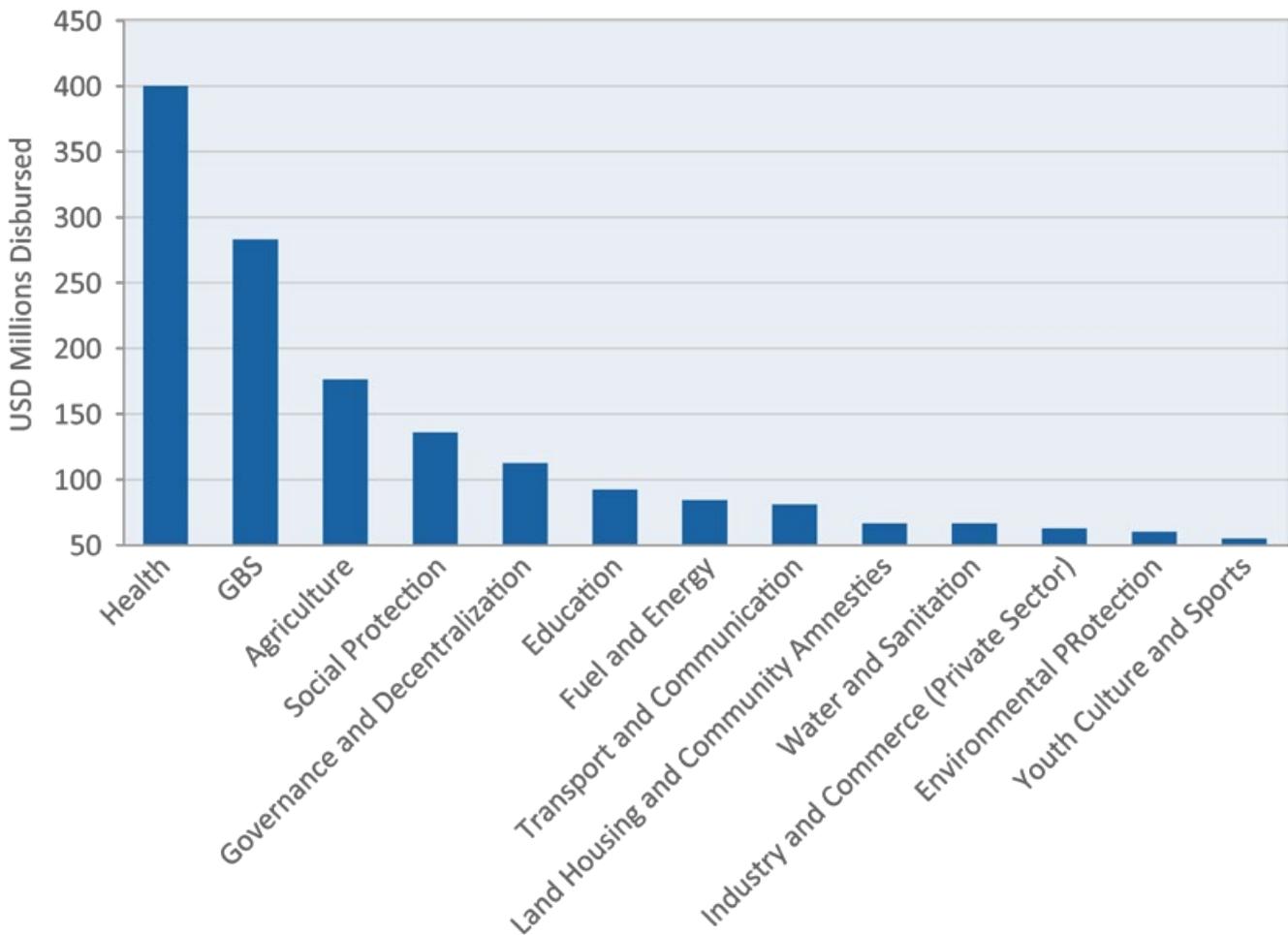


Figure 9. ODA to Rwanda in financial year 2011/12 by sector (MINECOFIN, 2013b)

in grants versus loans, and the agricultural sector received the third largest allocation (US\$ 133 million) compared to other sectors (see Figure 9). The majority of agricultural support came from the US (US\$ 50 million), African Development Bank (AfDB) (US\$ 32 million) and the World Bank (US\$ 26 million). Most of the ODA estimates do not include funds provided by development finance institutions (DFIs), which represents an additional source of funds that can be leveraged (see Section 5.2).

An important role of ODA helping to attract private investment is project risk mitigation. Often the long development phase and high upfront costs make FLR projects un-investable. In addition, emission reduction projects are particularly lengthy in their development phase as they need to go through many steps: a national process of approval; a process of validation by third parties; registration with the

CDM executive board or other certification body; verifications by a third party; issuance by the CDM executive board in the case of the CDM; validation with one standard or more; plus periodic verifications by third parties and credit issuance in the case of voluntary projects. These emission reduction projects also require stakeholder consultations and free, prior and informed consent (FPIC), as well as data gathering and payments before the income from credits starts to flow. All these processes are lengthy and can be expensive, and do not guarantee successful implementation. In the case of pure agricultural projects, the process also usually involves capacity building and investment in infrastructure that needs to be made upfront, but generating adequate yields can take five or more years for most crops.

Concessional public and private funds can implement cost-sharing mechanisms, whereby

all or some of the project development and/or upfront costs can be covered with public funds. Sharing initial capital expenditures, the risk to the investor at the most uncertain stage is mitigated, and the investment into implementation is incentivised. Furthermore, governments can simplify and expedite processes such as approvals and licensing so that starting a project is not as lengthy and expensive for the investor.

Multilaterals and bilaterals

The following section provides an overview of the key publically funded projects that could provide strong leverage possibilities for private investment.

World Bank

The World Bank has a project called the Third Rural Sector Support Project, which runs from February 2012 to October 2017, for US\$ 85,000,000, and is structured as a highly concessional form of credit. The objectives of the project are to: (i) Increase the agricultural productivity of organized farmers in the marshlands and hillsides of sub-watersheds targeted for development in an environmentally sustainable manner, and (ii) strengthen the participation of both male and female beneficiaries in market-based value chains (World Bank, 2012b).

The target beneficiaries are 100,000 people and include extension approaches to support intensification of rain-fed hillside production, including the establishment of fruit tree nurseries and adapted fruit tree management techniques (grafting, pruning, root pruning, fertilisation).

While not all aspects of this programme will promote increasing the number of trees on the landscape, Sub-component 1.2: Sustainable Land Management on the Hillsides, with a budget of US\$ 18.6 million, supports: (i) grass strips, contour bunding and improved terracing, (ii) pasture improvement through trees and grass planting, (iii) dam and canal buffer zone protection, and (iv) afforestation of critical

hillside ecosystems unsuitable for intensive agriculture and animal production. Public investments under this component will be high, at US\$ 7,000/hectare.

Under Sub-component 1.3, an investment of US\$ 5 million will be made to improve value chains, which could help to support businesses and cooperatives in becoming bankable. These activities include collection centres, storage facilities, input facilities (seeds, organic and inorganic fertilizers), processing, agribusiness centres, including half-bulk markets, drying areas, and storage facilities. The investments made under this component will be driven by community demand and directly linked to the establishment of a business plan developed by cooperatives. Contributions from the community are also required; either in-kind or through linkages with rural finance.

The other large funder in Rwandan agriculture that could be leveraged for private investment is the Global Environment Facility (GEF), under the World Bank umbrella. The recently approved Landscape Approach to Forest Restoration and Conservation Programme has US\$ 9.5 million in GEF financing and represents US\$ 53.5 million in available matched funds (GEF, 2013). Of the US\$ 53.5 million in matched funds, US\$ 33 million are from the Third Rural Sector Support Project. In addition, under the memorandum of understanding signed by the Government of Rwanda, IUCN and the United Nations Forum on Forests, the Government of Rwanda announced in the beginning of 2011 that it would integrate FLR into Rwanda's national development plans.

IUCN will leverage additional funding from other bilateral and private sector organisations, given their active and diverse network of donors in the region estimated at US\$ 2.33 million. The objectives of the Landscape Approach to Forest Restoration and Conservation Programme are well suited to support FLR, particularly under Component 2, which includes two key activities that will promote the improvement or restoration

of natural forests: (i) establishing biological corridors; and (ii) community-based sustainable forest management systems established for at least 5,000 hectares.

USAID

USAID leads the US Government's Feed the Future initiative (FTF), which grew out of the 2009 G8 Summit where US President Obama called on global leaders to reverse the decline in investment in agriculture and strengthen global efforts to reduce poverty, hunger and under-nutrition. The US pledged US\$ 3.5 billion to this effort over three years, and helped to leverage an additional US\$ 18.5 billion in support from G8 members and other donors.

In response to the food security challenges in Rwanda, as well as the Government of Rwanda's demonstrated commitment to strengthening the agricultural sector, the FTF began working in Rwanda in 2010. The programme is working throughout the country to achieve the following impacts:

- Assist more than 700,000 vulnerable Rwandan women, children and family members – mostly smallholder farmers – in escaping hunger and poverty;
- Reach nearly 190,000 children to improve their nutrition to prevent stunting and child mortality; and
- Reach significant numbers of additional rural populations to achieve improved income and nutritional status from strategic policy engagement and institutional investments.

To achieve these goals, core investments are being made in: driving systems transformation in targeted staple and high-value crop value chains by developing sustainable market linkages and undertaking complementary infrastructure and nutrition investments; delivering innovations to enable sustainable agricultural growth and improved nutrition; and advocating for improved food security policy. All FTF investments are aligned with the Government of Rwanda's PSTA-II, Agriculture

Sector Investment Plan, and National Multi-sectoral Strategy to Eliminate Malnutrition in Rwanda (FTF, 2011).

Currently, there is an anticipated FTF project in Rwanda called the Private Sector Driven Agricultural Growth Project that is expected to increase smallholder incomes by promoting private sector investment internationally and domestically that contributes to the objectives of Vision 2020. The objectives of the project are to: (i) assist the Government of Rwanda in increasing private sector investment, and (ii) facilitate increased private sector investment in upgrading agricultural value chains (USAID, 2013).

DFID

The Department for International Development (DFID), the international development agency of the United Kingdom, has provided significant bilateral support to Rwanda in terms of funding and technical expertise to increase investment and invigorate the private sector, improve access to health and education, increase the accountability of the state, and address potential causes of conflict and fragility. DFID's Rwanda Operational Plan 2011-2015 (DFID, 2013) indicates most of DFID's support has been delivered through the Government of Rwanda. However, DFID's approach over the past four years has shifted from almost exclusively supporting the government to increased support to private sector and civil society, including increased engagement of the private sector to promote economic development, regional trade and integration (DFID, 2013). The projected DFID support for 2014/2015 is estimated to be nearly US\$ 100 million, of which approximately 30% is for agriculture (Stone, et al., 2011).

In 2011 DFID and MINAGRI commissioned Oxford Policy Management to develop an effective Rural and Agricultural Financial Services Strategy aimed at improving access to and use of financial services in rural areas in Rwanda (Stone, et al., 2011). The report

focuses heavily on the challenges faced by the agriculture sector, particularly relating to financial services – bottlenecks in the financial sector that cause these challenges, and the strategy options for overcoming bottlenecks. The main strategic options proposed include linking banking and other product innovations, collateral management and warehouse receipts, dealing with information gaps, remote access banking, and longer-term finance. The proposed strategy includes an implementation framework.

In addition to the support provided by DFID, the United Nations and US Government have jointly supported a programme called Building Inclusive Financial Sector in Rwanda (BIFSIR), a programme set within the strategic framework of the National Microfinance Strategy that aims to contribute to poverty reduction and achievement of the MDGs. The main objective of the programme is to contribute to building capacity of the various stakeholders at the macro-, meso- and micro-levels to support the development of sustainable, quality, and diversified services accessible by less advantaged Rwandans.

In 2011, the BIFSIR programme was expanded with an additional US\$ 2,239,758 from the Korea MDG Trust Fund, which would increase BIFSIR's programming reach to the client level and contribute further results. In total, the programme now has a budget of US\$ 7,099,258 over five years (2010-2014), with joint funding from the United Nations Development Fund (US\$ 2,000,000), United Nations Capital Development Fund (US\$ 2,400,000), One UN Fund (US\$ 459,500), and the Korea MDG Trust Fund (US\$ 2,239,758). The additional funding increases BIFSIR's scope; as such, the programme has been renamed the BIFSIR Expansion. This increased scope provides entrepreneurial capacity building, financial education, and financial linkages to target groups (e.g. women and youth), including vocational training for graduates (MINECOFIN, 2013c).

Others

The Belgian and Dutch-backed SEW project produced nearly a million seedlings for woodlots and agroforestry, with an additional 2,000 ha of agroforestry sites created during the period from 2009-2013. In 2010, SEW prepared 2,967,100 seedlings for woodlot trees in Rwanda, and established 4,000 ha of woodlots during a three-year period.

Private donors

The Gates and Rockefeller foundations are two notable private donors for Rwandan agriculture. In 2011, the Rockefeller Foundation provided US\$ 288,600 in support of a project with the Rwanda Meteorological Service and the Walker Institute of the University of Reading to improve the climate risk modelling capacity of Rwandan agricultural scientists, produce a national climate change risk map, and evaluate adaptation strategies that could improve the resilience of smallholder farmers in Rwanda to climate change (Rockefeller Foundation, 2011). While the specific size of grants may not compare to ODA, private donors have flexibility and could prove valuable in catalysing further private sector investment through the support of innovative financial structures.

5.2 Public return-motivated sources of funds for FLR

DFIs are supported by public money, and their missions lie in servicing the investment shortfalls of developing countries and bridging the gap between commercial investment and state development aid (Dickinson, n.d.). However, a majority of the funds provided by DFIs are structured to resemble private investments, and are expected to repay principal and generate a return. The large DFIs include: IFC, European Bank for Reconstruction and Development, European Investment Bank, OPIC, Government Employees Pension Fund, and the European Development Financial Institutions (EDFI).

EDFI is a group of 15 bilateral investment organizations, including BIO and BMI-SBI (Belgium), the CDC (United Kingdom), COFIDES (Spain), DEG (Germany), Finnfund (Finland), FMO (Netherlands), IFU (Denmark), Norfund (Norway), OeEB (Austria), Proparco (France) and SIFEM (Switzerland), SIMEST (Italy), SOFID (Portugal), and Swedfund (Sweden).

DFIs offer an array of financing and risk reduction instruments, including debt/loans (senior and subordinated), equity (direct investments through pooled funds), debt/loan guarantees, and political risk insurance. Some provide limited technical assistance grants on a concessional basis. As DFIs operate much like institutional private investors, they expect that projects will be fully commercialized, and a large proportion of funds are allocated for larger infrastructure projects. Given their development-oriented mission, they play a key role in agricultural and forestry investing – European DFIs, as a group, invest 7% in agribusiness (King & Wood Mallesons, 2013). In Africa, they have also been instrumental in supporting the growth of African private equity funds, and have accounted for nearly half of the investment capital in private equity funds investing in sub-Saharan Africa (IFC, 2011).

African Development Bank

The AfDB provides the standard array of DFI financing instruments, which in recent years has included US\$ 12 million to the Bank of Kigali to allow it to provide loans in key sectors, including agribusiness. As of 2011, AfDB's public sector lending operations in Rwanda amounted to US\$ 966 million across all sectors (AfDB, 2011a). AfDB provided over US\$ 7.6 million for sustainable management of plantations and restoration of natural forests in Rwanda through the CBFF (AfDB, 2011b). The project is expected to increase the forest cover in eight districts in the southern part of the country, improve management of public and private woodlands in these districts, increase household incomes of communities near natural forests, and establish the basic conditions necessary to enable

Rwanda to benefit from carbon markets and payment for ecosystem services.

Overseas Private Investment Corporation

Like AfDB, OPIC offers a suite of financing instruments that can be applied to FLR, including risk mitigation instruments. In 2011, OPIC stated its intention to expand its involvement in Rwanda in energy, agriculture, construction and tourism (USDS, 2011). At the time of writing, it has one insurance contract but no loans to Rwanda.

Other DFIs

IFC provided a grant to MicroEnsure, its microinsurance arm, in November 2010 to incentivize MicroEnsure to: (i) design new and affordable index-based insurance products, (ii) develop an effective distribution network that expands outreach to low income farmers, and (iii) scale-up agricultural index insurance to cover 24,000 farmers by the end of December 2013. IFC also has vehicles to support investments in SMEs, and provides guidance on the criteria for and importance of investing in biodiversity and high conservation value areas.

Political risk insurance

Political risk insurance can cover a number of risks in two broad categories: expropriation and political violence. Expropriation covers any action a national government undertakes that deprives a project or investor of their fundamental rights. For OPIC, traditional expropriation coverage protects against nationalisation, confiscation, and creeping expropriations, which result in a loss of the total investment. They also include government interference in a project in other forms, including:

- Abrogation, repudiation, and/or impairment of contract, including forced renegotiation of contract terms;
- Imposition of confiscatory taxes;
- Confiscation of funds and/or tangible assets; and
- Outright nationalization of a project.

Political risk insurance can be used to protect investors in FLR activities that involve agroforestry, forestry and emission reductions. For example, OPIC underwrote US\$ 1.9 million in insurance on a tea importer in 2012 (OPIC, 2012), and US\$ 19.4 million to insure the Rwanda Trading Company, a subsidiary of Little

Rock, Arkansas' Westrock Coffee Holdings LLC, to support its investment in modernising a coffee milling and processing plant in Kigali (OPIC, n.d.). The Multilateral Investment Guarantee Agency has also provided political risk insurance and has insured a renewable energy project in Rwanda.

6. Potential private funding sources for Rwanda FLR

SECTION HIGHLIGHTS

IUCN and WRI, working with the Government of Rwanda, have developed a set of targeted FLR interventions that work within the mosaic of different forest land uses, including: agriculture, agroforestry, plantations, and natural forests. This section reviews Rwanda's Bonn Challenge commitment of planting two million trees and the specific land-use transitions that are recommended by IUCN and WRI in the Restoration Opportunity Assessment for Rwanda. For each of the four recommended land-use transitions, the potential FLR value chain activities that could attract private investments have been identified.

Promoting the transition from **traditional agriculture** to **agroforestry** will require smallholder farmers to adopt crops grown in integrated agroforestry systems. For these productive systems to be investable, they will need to combine fast growing crops that can produce high value exports. There are numerous companies in Rwanda that can be leveraged to promote commercially viable agroforestry practices with farmers. Promoting the **improved management of woodlots and plantations** can be addressed through enhanced silviculture practices for woodlots, as well as reducing the demand for wood through fuel-efficient stoves and green charcoal. Investment opportunities in this area, however, may be limited unless they target larger wood/charcoal producers. Forest plantations could offer attractive long-term investment opportunities by replacing imported wood with local sources. For **improved management of natural forests**, there are two potential investment opportunities, including expansion of ecotourism to avitourism and NTFPs of honey and bamboo in the buffer zones. The **improvement or establishment of protective forests** can be achieved through investment opportunities such as: the installation of SSHP, which delivers cost-efficient energy to rural communities to reduce wood energy usage, and FLR activities that produce emission reductions for voluntary and compliance markets. Table 12 provides a high-level assessment of the investment potential for each of these FLR activities.

There is great importance in properly aligning financing sources with the appropriate producer value chain investment opportunities (DGDA, 2011). Table 12 matches the scale of FLR enterprises with the typical use of funds, funding sources, and funding amount.

6.1 Local communities

Smallholder farmers remain, by far, the largest investors in agriculture, and must remain central to any strategy for increasing investment in

this sector (OECD, 2013). Their investments are crucial to enhance capital accumulation, labour productivity and farm incomes, thereby reducing rural poverty. It is imperative that communities are part of the financing chain that promotes larger private investments in FLR. Without having 'skin in the game,' there is a disconnect between the farmers' outcomes and the investors' outcomes. Farmers make individual investments by providing labour, but they are also formal investors through accessing microfinance credit facilities. Farmers organising

Table 12. Scale of FLR enterprises and funding sources

Scale of FLR enterprise	Uses of funds	Funding sources	Typical funding amount
Smallholder farmers	Inputs, pre-processing infrastructure (transport, equipment)	SACCOs, other microfinance organizations	Under US\$ 25,000
Cooperatives	Inputs, pre-processing infrastructure (transport, equipment), small-scale processing	SACCOs, other microfinance organizations, rural banks	US\$ 25,000 - 2 million
Contract farmers	Start-up (land leases, entities establishment), and working capital	Domestic banks, private equity	US\$ 25,000 - 2 million
Large-scale commercial farming	Start-up, working capital, infrastructure	Domestic banks, private equity, DFIs	Over US\$ 2 million

themselves around agricultural production-related activities may join cooperatives or multipurpose associations, which allow them access to credit facilities. Sustainability of cooperatives largely depends on the income-generating capacity of production, access to value chains, and management capacity of the cooperatives (Wennink & Heemskerk, 2006).

In Rwanda, cooperatives have grown significantly over the last 20 years, and it is estimated that there are well over 5,000 now registered. The largest of these cooperatives represents as many as 2,000 farmers, like the Abikudakawa Coffee Farm in Northern Rwanda. The investments made by smallholder agricultural cooperative members and the benefits that cooperatives can bring to private investors make them a critical part of the solution to Rwanda attracting private investments.

A key component of FLR investments should include promoting farmers' investments by providing technical assistance and/or extension services to farmers, which make them more 'bankable' by supporting higher yields and/or incomes from value-added crops. Smallholder

investment is typically in-kind. Providing inputs is often the role of an aggregator, who also purchases from cooperatives or individual farmers using off-take agreements (formal or informal), that in turn secure smallholder loans. These aggregators become entrenched in the local community, and farmers will sell their produce to them, usually because the aggregator has provided credit, inputs, and/or advice (IFC, 2012). There must be a strong relationship built between the producers and the aggregator to ensure that 'side selling' does not occur. Additionally, farmer investments must also be supported by a functioning and effective supply chain to ensure that products can be processed, transported and sold effectively, delivering value to both producers and aggregators.

6.2 Domestic financial institutions

Commercial banks

Domestic banks can play a key role in financing FLR by providing loans to finance activities along the value chain. However, based on reports from 13 banks (BCR, BK, ECOBANK RWANDA, FINA BANK, ACCESS BANK, COGEBANQUE, KCB, BPR, EQUITY,

AGASEKE, UNGUKA, URWEGO and BRD), as of June 2013, only 3% of the loan portfolio was provided to the agricultural, fisheries and livestock sector (BNR, 2013).

Banks and microfinance institutions (MFIs) focus on lending to individuals, but these loan providers seem to have concluded that a group guarantee is insufficient compensation for the extra administrative cost of dealing with a group, especially in the set-up phase (Stone, et al, 2011). Banks are reluctant to lend to smallholder agriculture and livestock producers. However, the *Banque Populaire du Rwanda* has a loan programme to finance any type of agricultural activity, including production, processing, distribution, purchase of farm inputs, tools, machines, agro-processing, livestock farming, and other farm-related expenses (BPR, n.d.). These loans are made under the Rural Investment Facility and have up to five-year terms and flexible collateral requirements, including for those farmers/projects qualifying for a special guaranteed fund; they may not even need to provide any collateral.

For small and medium-size farmers, mobile banking can serve as a viable link between rural

areas and formal banking services (IFC, 2012). They also support MFIs, which at times have large deposits but are unable to access banks to place these deposits, thus exposing them to high risk and theft. Most main commercial banks in Rwanda offer mobile banking, an initiative aimed at reaching underserved clients, particularly in the rural areas where mobile penetration rates are relatively higher when compared to those of formal financial institutions.

Microfinance

Microfinance will play a key role in Rwanda for promoting FLR due to the very nature of smallholders and the need to invest in new growing practices. The most popular uses of microfinance in Rwanda include livestock (animal husbandry), organic fertilizers, agricultural expansion, the purchase of a piece of land, construction and housing, accrual of lump sums for emergency needs, the purchase raw materials, business improvements or diversification, and the purchase of equipment (ES Global, 2005).

Rwanda has growing microfinance sub-sector with 28.7% growth in assets in 2013 (BNR,

Table 13. Microfinance institutions – borrowers and loan balances

Microfinance Institution	Number of Active Borrowers	Gross Loan portfolio (national currency)	Reports to MIX (2009)	Participated in MFTransparency Pricing Initiative (2010)
Amasezerano Community Bank	2,225	747,483,674	Y	Y
COOPEDU	15,283	2,111,647,837	Y	Y
Coopérative de la jeuneuse pour d auto d'emploi et de développement	1,049	1,022,162,074		Y
Duterimbere	51,000	2,793,628,305	Y	Y
Goshen Finance	2,076	2,378,245,166		Y
IMF INKINGI	2,648	1,659,754,210		Y
Rwanda Microfinance Limited	2,858	1,255,802,510	Y	Y
Union of Savings and Credit Cooperatives	1,031	576,723,471	Y	Y
Urwego Opportunity Bank	32,690	6,225,428,134		Y
Vision Finance Company	14,226	2,223,773,287	Y	Y

Source: MFIs according to MFTransparency data 2011 & MIX data 2010

2013), for a total asset base of US\$ 180 million. The National Microfinance Policy, released in August 2013, states “increasing investment in small enterprises and agriculture” as one of the five priority areas to increasing financial inclusion in Rwanda. Due to the high density of microfinance providers, it is estimated that 90% of the Rwandan population lives within five kilometres of a microfinance outlet (MINECOFIN, 2013d). The small, rurally focused MFIs will play a key role in both providing investment capital to smallholders and serving as aggregation vehicles for larger investments.

Table 13 provides details of the larger microfinance providers in Rwanda (MF Transparency, 2011).

Some MFIs in Rwanda have a track record for smallholder agricultural lending to support cash crop production, including Opportunity International, which is one of the largest MFIs in the world. Opportunity International has started agricultural lending under the “Informed Lending” Production Finance Model. “Informed lending” is a parametric lending model anchored on: (i) the exact mapping of the borrower farm’s plots (plot sizes, altitude, access to water); (ii) a diagnostic of the borrower’s household profile (demographics of the family, breakdown of all farm enterprises such as crops/land used, other sources of income/activity, access to water/roads/banks, mobile phone use); and (iii) the crop profile, including costs of inputs and labour, and returns based on yield and price data. Opportunity International seeks to secure loan recovery by concentrating on cash crops with regulated output, reducing the risk of side-selling through advanced cash provision to farmers during the lean season, when farmers are most likely to succumb to the temptation of side-selling (IFC, 2012).

6.3 Impact funds

Impact investment funds could be an important source of funding for smallholder-driven

FLR, as they prioritize improved livelihoods as part of their investment mandate. Getting information on the impact funds that are (or will) invest in Rwanda’s FLR will require a thorough review of an emerging but fragmented sector of impact investors. The Global Impact Investment Network provides a valuable source of information on impact investments through its Impact Database, which is available to subscribers and lists impact funds and their areas of investment. Impact funds make investments in companies, organisations, and funds with the intention of generating measurable social and environmental impacts alongside a financial return. Impact investment usually brings together a diversified group of actors: supply side (private foundations, impact investment funds, financial institutions, etc.); demand side (charities, social enterprises, cooperatives, etc.); and enabling actors (governments, standard setting bodies, NGOs, consultants, etc.). The suppliers of funds are often high net-worth individuals, family offices, foundations and endowments.

Some impact funds use microfinance-type loans that are offered to producers and SMEs and are secured by future purchases of value-added crops. That is the case of Root Capital; in eight years, they have provided nearly US\$ 2 million to a coffee cooperative in the northern highlands of Rwanda called Musasa, which represents over 2,000 smallholders farmers, 80% of whom are women. The cooperative was able to attract premium prices for their coffee, and used the increased profits to purchase mini coffee processing-stations and a vehicle to transport beans to a central facility. Other impact funds use convertible and mezzanine debt investments in local companies, as evidenced by the Acumen impact investing firm’s US\$ 1.2 million convertible debt investment to KZ Noir that sources smallholder coffee. Impact investments in coffee are most common because it is a high-value cash crop. In some cases, these investments will include promotion of FLR, and could be targeted to prioritise shade-based growing systems.

Equity investments are also made by impact funds, where they gain some form of ownership in the business or land being financed.

6.4 Private equity investors

Private equity funds are generally sector and/or regionally focused. Their fund structures vary, but are structured with long tenures (8-12 years) and make investments using a myriad of financing structures. These funds are often referred to as 'private equity,' but they include funds that invest through: (i) equity, (ii) debt, (iii) debt and equity, (iv) microfinance (at wholesale level), (v) the provision of guarantees, and (vi) other financial structures. It is estimated that globally in developing countries, private equity funds targeting agricultural investments have a capital base of about US\$ 3.7 billion (FAO, 2010). While not agriculture specific, private equity investments in sub-Saharan Africa as a region are expected to outpace all other emerging markets, with expectation of returns greater than 16% (EMPEA, 2013).

Based on FDI data, only 0.4% of private equity funds committed to sub-Saharan Africa are investing in agriculture and forestry. Attracting private equity funds to FLR will require a detailed evaluation of which of these funds have investment mandates that can support FLR, and promotion of, and education about, the investment opportunities in FLR in Rwanda specifically. This process will take time, and will require that high quality FLR opportunities are presented and that a compelling proposal can be made for why these investments should be supported over other opportunities. There is evidence that investments will be made in smallholder agricultural systems in sub-Saharan Africa. One investor, active in Africa, highlighted the fact that his group was able to invest in downstream entities that provide off-take agreements to local farmers, who previously were limited to selling their products in the cash market to local buyers. The scale and reach of this downstream entity helped to jump-start the integration of local communities into the

wider market economy. While private equity funds are return motivated, most recognize the importance of strong and lasting relationships with local populations and local governments.

The New Forest Company, a UK-based sustainable and socially responsible forestry company, announced its first sustainable forestry operations in Rwanda in April 2013. Under the concession and lease agreement signed with the government, the company will have access to over 10,000 ha of mature planted timber, and about three million tonnes of mature wood. This provides the right to harvest pine, cypress, eucalyptus, and acacia planted as a buffer zone around the Nyungwe National Forest in the southwest of the country (Hanna, 2013). This type of investment requires true sustainable management to protect the remaining natural forests in key protected areas.

A full list of potential private equity investors is included in Annex A.

6.5 Private company sourcing of sustainable agricultural products

With a lack of clear regulatory and market signals for GHG emission reductions, the motivation of the private sector to purchase offsets is quite low. However, numerous private companies are now recognising that sustainable sourcing of agricultural products is critical to their business' success. In some cases there may be a link to measured emission reductions, but most companies that are prioritising building sustainable supply chains are doing so for one or more of the following reasons: (i) increased revenue opportunities, (ii) reduction in costs, (iii) brand building, and (iv) risk reduction. Some corporations trying to green their supply chains or make them resilient to climate change have expressed interest in participating in projects that reduce emissions and use carbon as a measure, but that are in line with their corporate objectives. In this way, carbon becomes a

secondary aspect and a way to measure results, but not the primary goal of the project.

A major effort in building global support for sustainable supply chains is called the Tropical Forest Alliance 2020. It is led by USAID, which brings together governments and the Consumer Goods Forum (more than 400 companies with sales of over US\$ 3 trillion a year) to invest and work together to improve management and planning of forest conservation, agricultural land use and land tenure, share best practices, work with smallholder farmers and producers on sustainable agricultural intensification, use degraded lands, and reforest. The rationale behind this initiative is compelling for the private sector and for governments that see a complementarity that allows for conservation to happen while still allowing for economic development to take place. This effort is primarily focused on the four major commodities that are leading deforestation globally: palm, cattle, soy, and pulp and paper. However, a number of the private companies that are committed to the sourcing of sustainable agricultural products (i.e. sustainable land use, smallholder livelihood improvement and organic), could have interest in Rwanda's exports, and this market should be explored.

6.6 Capital markets

The Rwanda Stock Exchange started its operations in January 2011. Although it operates in close association with the Nairobi Stock Exchange, the Dar es Salaam Stock Exchange, and the Uganda Securities Exchange, the level of operations in Rwanda is still very small (Stone, et al., 2011). This limits investors' ability to raise money through the issuance of equity, which is instrumental for funding agriculture expansion and new ventures.

Outside the domestic capital markets, interesting debt mechanisms that could be explored for Rwanda are Impact Bonds, Green Bonds or Social Bonds. These bonds are financial instruments that consist of issuance

of debt from a sovereign entity or a company in order to fund certain activities in exchange for the payment of a periodic coupon, and return of the principal at the end of the tenure. Bond buyers or capital market investors (e.g. pension funds and insurance companies) are usually looking for stable returns over the long-term. Institutional investors are often limited in the allocations to private equity, so in this context, bonds are becoming an increasingly attractive option for investors who seek longer-term fixed income, and who want to make an impact on society and the environment.

According to the *Bonds and Climate Change 2013 Report* (Climate Bonds Initiative, 2013), there are currently US\$ 364 billion in outstanding climate-themed bonds globally (including: transport – 76%, energy – 11.8%, finance – 9.2%, buildings and industry – 1.4%, agriculture and forestry – 0.4%, and waste and pollution control – 1.2%), compared to US\$ 174 billion in 2012. Most of the bonds included in the report were issued by either state owned corporations, or are backed by governments through guarantees. In 2012 alone, 79% of bonds were backed by governments. As of 2013 there were at least 1,200 bonds from 260 different issuers that classified as climate change bonds, with an outstanding value of more than US\$ 34 billion. Unfortunately, the agriculture and forest sector has the smallest share of the pie, with only US\$ 1.5 billion. There is no record of climate bonds that have been issued in Africa, and no record of a REDD+ and/or climate resilience bond.

There is an important opportunity for Rwanda to raise funds directly through sovereign debt to finance its FLR activities, or to back sub-regions or companies to do so themselves. Rwanda issued its first ten-year bond in the international market early in 2013. The issuance was a success, with buyers showing confidence in the resurgence of Rwanda. The country raised almost US\$ 3 billion in orders for an issuance of US\$ 400 million, which brought down the yield (and the cost for the government) from the

initial 7.5% to 6.8%. An interesting part of this issuance is that part of the funds raised will be used for the construction of a hydropower plant.

The Government of Rwanda could put together a portfolio of FLR projects to be issued by the government, a sub-regional entity, or a financial intermediary, to be guaranteed by the government. The bond should have the clear mandate to be invested into the portfolio so that investors will be incentivised by the yield and the environmental and social impacts of the bond.

6.7 Forest and land-use carbon markets and other payments for environmental services markets

Depending on the development of the market for GHG emission reductions, this could provide an opportunity for Rwanda to generate new funding. According to the State of Forest Carbon Markets 2013 (Peters-Stanley, et al., 2013), the global market for emission reductions generated from agriculture, forestry and other land-use projects transacted 9% more volume than in 2011, for a total of 28 MtCO₂e. However, the value of the market was lower than the previous year (8% less), with US\$ 216 million, as prices fell from an average of US\$ 9.2/tCO₂e

to US\$ 7.8/tCO₂e. The main source of demand for offsets came from voluntary buyers (95% of the market), mainly from international private sector buyers (70% of market). The remaining demand came from pre-compliance buyers from California and Australia. Remarkably, forestry was the dominant sector in the voluntary market with 34% of market share, followed closely by renewables with 33% of the market.

Buyers have different motivations, with the most common being resale to end buyers (intermediaries), followed by demonstration of corporate social responsibility and climate leadership to regulators (Figure 10).

Given the limited standing forests in Rwanda, the greatest opportunity for emission reduction generation is through reforestation, agroforestry, and sustainable agriculture. The market demand for emission reductions from reforestation projects has traditionally come from Kyoto compliance buyers (non EU Emissions Trading System) and philanthropic tree planting. However, as 2012 saw the end of the first Kyoto period, demand fell slightly compared to 2011. Prices for CDM projects in general crashed and some project developers preferred to take their projects into the voluntary market to achieve higher prices. Demand for REDD+ credits grew timidly as projects matured and availability of offsets increased. It is relevant to mention



Figure 10. Voluntary carbon market buyer's motivations (Peters-Stanley, et al., 2013)

that buyers show preference for projects with significant co-benefits with dual validation. VCS and CCB Standards comprise 71% of market share of all forestry projects.

According to the State of the Forest Carbon Markets, developers expect to generate between 37-73 MtCO₂e/year across all forest project types (Peters-Stanley, et al., 2013). Even though demand for REDD+ credits has increased, it is insufficient when the projected supply is taken into account, and project developers are having a hard time financing and selling their ERs. REDD+ projects, for instance, only contracted 25%-29% of their potential yearly volume in 2012, when they needed to sell at least five years of potential emissions to finance upfront costs and activities. Reforestation projects, for instance, needed to sell 11.5 years of credits in order to have their financial needs covered; unfortunately, they contracted less than a year's worth of ERs on average. For improved forest management the case is similar; they had to sell at least five years' worth of ERs to cover their needs, but managed to sell just under a year's worth.

As observed (Figure 11), projects cannot be financed solely by selling offsets; therefore,

some additional finance sources are identified, particularly those that involve private sector participants.

Some sources anticipate that jurisdictional REDD+ activities could be the key to bring together public interests and private demand, as jurisdictional REDD+ projects are managed by governments and can be financed by private funds (or a mix of public and private). This has incentivized project developers to synchronize and coordinate with governments to make sure projects can eventually be nested into national/subnational schemes. If international REDD+ were to be accepted for compliance in the California market, for instance, only jurisdictional projects would be accepted, as recommended by the REDD+ offsets working group in June 2013.

6.8 Leveraging public-private partnerships

By their very nature, public-private partnerships (PPPs) involve sources of funds with different primary return motivations. However, PPPs play a pivotal role in promoting sectors for which the risk profile is perceived as high. Some relevant options have been identified through which the

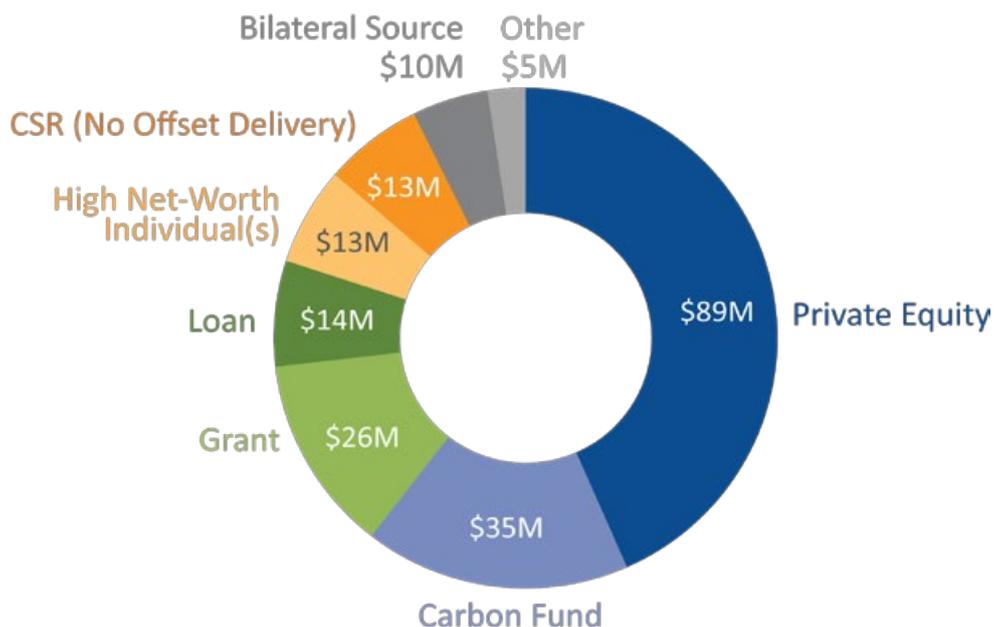


Figure 11. Sources of finance for forest carbon projects (Peters-Stanley, et al., 2013)

Government of Rwanda could partner with the private sector to mitigate the risk and incentivize its active participation in landscape activities.

Advanced market commitments

This is a private sector favourite and seeks to ensure some degree of demand in low or non-demand scenarios. For the basic mechanism to work, two parties are necessary – the administrator (e.g. the government) and a private investor, and a project or a portfolio of projects (emission reductions or productive landscape projects).

The private investor commits to investing a determined amount of capital that enables the development and/or implementation of the identified project or activity. Usually, the investment consists of upfront payments on the back of a future delivery of goods and/or services to be generated by the project (e.g. voluntary carbon units in the case of REDD+ projects or a specific commodity in the case of agroforestry). In case of lack of demand for the goods or services or lower-than-expected prices, the administrator, in this case the government, makes a commitment to buy back the goods or services at an agreed price that protects the investor from major losses.

It is as if the investor had a put 'right to sell' on the credits at a strike agreed with the government. One of the most appealing aspects of this type of partnership is that, just like in a put option, if the investor does not need to exercise its option, then the government will not have to disburse (buy back) any amount. The mechanism can be set in such a way that if the market price is favourable for the investor, it will be required to share the upside with the government, and profits will be reinvested into similar activities.

Loan guarantees

Through this mechanism the private investor provides a loan to a company or community that is usually perceived as high risk/not credit worthy. The government provides a

full (100% of the loan or losses) or a partial (a percentage of the loan or losses) guarantee in case the borrower defaults fully, or in part, on its obligation for pre-agreed reasons (e.g. lack of demand for the final product, inability to complete implementation of project activities, or changes in the foreign exchange rate).

This mechanism has been widely used globally by USAID's Development Credit Authority to encourage lenders to finance development mainly in the agricultural sector. To date, it has awarded more than 330 guarantees in 64 countries, mobilising more than US\$ 3 billion in capital (USAID, n.d.).

Cost sharing – public-private partnerships

Governments can opt to support or incentivise investment by assuming part of the costs incurred in the development and/or implementation of the activities. As such, the government can decide to pay for early stage feasibility studies, FPIC and technical assessments that will provide assurance to the investor of the feasibility of the project while alleviating the economic burden and mitigating early stage risk.

Some donors provide specific platforms to promote public private partnerships. USAID, through their Global Development Alliance, in partnership with SC Johnson, has provided support for the development of the pyrethrum production value chain and links to international markets. The USAID Global Development Alliance facility and other PPP programmes provide an excellent model for engaging private companies in Rwanda to establish linkages between Rwandan farmers and the international markets. The government's promotion of PPPs with the private sector for agriculture-related infrastructure could include warehouse facilities for improved storage of commodities, cold storage, irrigation infrastructure, basic processing of certain products, and food commodities for local consumption.

7. Attracting investments for FLR: Barriers and recommendations

SECTION HIGHLIGHTS

This section identifies barriers and provides recommendations on ways that Rwanda can achieve its goal of attracting new sources of investment capital for FLR activities, and how best to leverage public money to attract and structure these investments.

Without promoting the aggregation of smallholders into investable entities with compelling investment risk and return profiles, Rwanda will face a significant barrier to attracting private investment for FLR. The current focus on agricultural policy and investment does not explicitly promote FLR, thus, dedicated technical assistance and financing sources need to be specially allocated to FLR. To attract private investment for FLR, Rwanda will need to implement a set of four recommendations:

1. Identify and promote commercially viable FLR practices and partners;
2. Support the commercialization and preparation of the business cases;
3. Secure private investment for FLR; and
4. Design and operationalise a Rwanda FLR-dedicated PPP entity.

7.1 Barriers to attracting private investment in FLR

Attracting investments to Rwanda's FLR activities will present challenges similar to those experienced for smallholder agriculture and forest conservation-based activities in other developing countries. There are barriers that are both value chain and country-specific. The former barriers must be addressed for each FLR investment opportunity, while the latter must be addressed in order for private investors to favour investing in FLR in Rwanda over other countries. The value chain-specific barriers, causes and solutions to be addressed for each FLR investment opportunity are outlined in Table 14. Not all the desired FLR activities can be supported by private sector investments, as a business case cannot be made that offers an attractive risk return. These activities are most appropriately funded

with public or other concessional funds, and in some cases, it may be possible to integrate them with other investment-worthy opportunities, even at the risk of diluting returns.

Successfully attracting private investment to FLR will require overcoming these barriers. The solutions in Table 14 are generic for smallholder FLR, but Rwanda will need to have a detailed set of prioritised interventions designed for each specific FLR value chain investment opportunity identified in Section 4.3. A high-level needs assessment for some FLR value chain activities (macadamia, ecotourism, honey, essential oils) is provided in the *SME Product Clusters in Rwanda* report which, through sectoral and regional analyses, has identified 20 priority clusters of SMEs by value chain and region (MINICOM, 2012). The Government of Rwanda, in addressing these needs, should evaluate how

Table 14. Value chain specific investment barriers

Barriers	Causes	Solutions
Lack of investment opportunities	Either too small or not commercially oriented	<ul style="list-style-type: none"> Promote stronger aggregation entities with institutional arrangements that can support commercial viability
Risk and return not attractive	Level of risk that is too high as a result of poorly prepared investment materials, a lack of physical or contractual collateral, or limited business management capacity	<ul style="list-style-type: none"> Provide support to develop professional business plans and financial projections Promote contract farming SMEs that can provide collateral Build financial and management capacity of SMEs and cooperatives Leverage publically funded start-up programmes with private capital
Capital pools do not match scale of investment	Eligible pools of capital that are too small or inaccessible to those needing funding	<ul style="list-style-type: none"> Address financing supply and demand imbalances inherent in specific FLR activities (i.e. map financing needs and sources) Structure financial instruments/ investments that match demand/ economic profile of investees
Inability to generate sustainable financial returns	Limited ability to manage and grow operations to generate financial returns	<ul style="list-style-type: none"> Train for 'business' managers who receive private investments Promote risk reducing instruments for weather risk and price instability

its investments could be matched to attract private investment.

In addition to addressing value chain-specific barriers, Rwanda will need to convince investors that the country is an attractive place to make investments in FLR. Private investors have limited capacity to engage in a large number of countries, and are likely to focus on the countries they believe will provide the most attractive risk and return. Investors will consider the country's investment profile (Section 3), and the country-specific criteria in Table 15 when considering whether to invest in a specific country's FLR activities.

Table 16 provides an assessment of Rwanda against these country-specific criteria. The

government should focus on improving conditions where barriers are highest; including building more attractive investment opportunities through promoting scaled aggregation schemes, and expanding the capital markets to provide liquidity for investors in local SMEs.

Many of the value chain-specific barriers can be overcome by providing financial expertise partnered with local, commercially oriented SMEs and cooperatives to bring together the two worlds of smallholder opportunities and institutional-style capital (i.e. filling the 'missing middle' of rural agricultural finance) (Doran, et al., 2009). Other country-specific barriers, such as building capital markets, are harder to address and could take time and significant

Table 15. Country-level criteria for private investments

Investment criteria	Investors will consider
Investment opportunities	Are there sufficient profitable opportunities in which to invest (returns, break-even years, scale of a specific investment, and scale across the country as a whole)?
Supply chain connectivity	Are supply chains connected to allow for transfer of products (this may be an opportunity or a cost inefficiency)?
Infrastructure	Is there sufficient 'hard' infrastructure, such as roads and other transportation networks, power, and irrigation systems; and 'soft' infrastructure, such as customs procedures or government cooperation, to support investments?
Land rights	Are land and water rights in place to incentivise landowners to promote investments in enhancing land productivity?
Adoption effectiveness	Will adoption levels be adequate (i.e. is human capital available and/or landholders inclined to support the FLR activities)?
Regulatory and political risk	Do regulations and processes support investment and avoid excessive red tape that undermines investment by increasing costs and delays for investors, and result in higher corruption levels among public officials, as shown by the World Bank's 'Doing Business' reports?
Macroeconomics	Is there a supportive macroeconomic environment, in which inflation is contained and exchange rates are stable?
Capital markets	Are capital markets well-developed enough to offer investors exit options for equity-type investments?

investments on the part of the government to overcome.

7.2 Attracting investments for FLR

The Rwandan Government has set comprehensive policies to promote private investment and established the RDB, allowing it to achieve many of the key macro-level requirements for making Rwanda an attractive country for investment. To attract meaningful levels of private investment that can finance multiple scales and a varied set of FLR value chains activities, Rwanda should focus in four main recommendations:

1. Identify and promote commercially viable FLR practices and partners,
2. Support commercialisation and making the business case to investors,
3. Identify and secure private investments for commercially viable FLR activities, and

4. Design and operationalise a Rwanda FLR public private partnership entity.

For the first three of these recommendations, Rwanda would need to: (1) prioritise the FLR activities they most want to attract private investment, and (2) implement these three recommendations from the ground-up, with multidisciplinary and multi-organisational teams. This effort would deploy dedicated teams comprised of government, local and international finance professionals, private sector business managers, industry and cooperative associations, and natural resources/agricultural NGOs; with skills ranging from local rural community engagement specialists, international investment finance experts, and other technical specialists. Equally as important as the skills of the team are that the motivations are aligned to serve rural communities who want to engage in FLR, and that the team collectively

Table 16. Assessment of Rwanda's country-level investment enabling conditions

Investment criteria	Assessment	Rationale
Investment opportunities	high barrier	<ul style="list-style-type: none"> Rwanda is a small country, and setting up local operations/partners and gaining local knowledge may not yield a large enough investment opportunity. Landholdings are very small, making gaining scale for a given investment challenging and underscoring the need for aggregation.
Supply chain connectivity	medium barrier	<ul style="list-style-type: none"> Limited information shows that Rwanda has comparatively fewer supply chain challenges for staple crops (Adekunle, et al., 2012), which can be leveraged for FLR value chains.
Infrastructure	medium barrier	<ul style="list-style-type: none"> While landlocked, Rwanda's transport times and costs compare favourably with many of its neighbours. Mombasa-Kigali is the 2nd shortest import/export time in the region. Within Rwanda, there are a few key highways running primarily north-south in the centre of the country, and are primarily paved. Only 9.4% of the population has access to electricity, which is the 3rd lowest of Rwanda's six neighbouring countries.
Land rights	low barrier	<ul style="list-style-type: none"> Land rights are clear and major investments are in place for a cadastral system, with millions of landholders recorded.
Adoption effectiveness	medium barrier	<ul style="list-style-type: none"> Adoption of marketable, high value fruits, medicine and timber has been found in Rwanda highlands. Contract farming has had some success, which supports aggregation and may provide rural finance for certain high value and export crops (<i>The New Times</i>, 2013).
Regulatory and political risk	low barrier	<ul style="list-style-type: none"> Rwanda's 'Doing Business' rank for 2014 was 32, up from 54 last year, and well ahead of the average of 142 for sub-Saharan Africa. Based on the WGI, Rwanda has the best ranking over the past five years across all six indicators when compared to its neighbouring countries (World Bank, 2013b). Perception of civil unrest risk may prevail with investors as a result of historical events.
Macroeconomics	no barriers	<ul style="list-style-type: none"> Rwanda was listed as one of the world's top ten fastest growing economies in 2013.
Capital markets	high barrier	<ul style="list-style-type: none"> Rwanda is active in capital markets, with Eurobond issuance and an over-the-counter market which was launched in 2008. The size of the over-the-counter market is relatively small at 2.2% of GDP.

defines success as the ability to source investment capital.

For the final recommendation, a feasibility analysis should be carried out to determine the viability of establishing a PPP fund dedicated specifically to attracting new sources of private investment for FLR. The country's SME policy set Rwanda's policy priorities of promoting SMEs supported by private investments, resulting in the formation of the Business Development Fund. The Fund provides a range of financial instruments, some of which can promote FLR, but it is not well capitalised and is not dedicated specifically to financing FLR activities or attracting larger pools of private investment. A properly capitalised targeted PPP fund that is designed to address FLR-specific barriers and finance only FLR investment opportunities is a critical instrument needed to promote more trees on Rwanda's landscape. While not FLR focused, there are a few examples of large-scale PPPs that can be evaluated for use in Rwanda, including a significant programme in Tanzania called the Southern Agricultural Growth Corridor (SAGCOT). This PPP is designed to catalyse over US\$ 2.1 billion of private investment over 20 years, leveraged by US\$ 1.3 billion in public investments. The targeted impact is to triple production in the target areas to 350,000 ha, all profitably farmed by smallholders (SAGCOT, 2011).

The following sections provide guidance for implementation of the four recommendations that are designed to support Rwanda's goal of attracting scaled private investment capital to fund FLR activities.

Identify and promote commercially viable FLR practices and partners

The biggest complaint from larger investors trying to identify new African opportunities is that there are not enough 'investable opportunities' (Spector, 2013), or that opportunities that do exist are too small. To overcome this barrier, Rwanda needs

a dedicated effort to identify and promote aggregation groups/entities that can be financed through SMEs or cooperatives. For private investors to engage at any scale, the activities seeking investment need to operationalise aggregation groups or entities due to the large number of smallholders in Rwanda, allowing the investors to make one larger investment to a group. Rwanda has a strong network of cooperatives, which need to be consolidated and organised by FLR value chain such that investors can evaluate them for investments, and benefit from risk reduction and scale provided by these aggregation entities.

The implementation of this recommendation also requires government support of a detailed commercial readiness assessment to identify a pool of potential investments for each of these FLR value chain activities, and that identifies specific investee entities who could be engaged with the private investors. To scope this commercial readiness assessment, the government would provide further guidance on priority locations and specific FLR activities, and identify the universe of current programmes and entities that could be leveraged to produce a curated list of specific investments that would be evaluated in detail in the commercial readiness assessment. Table 17 provides a summary of Rwanda's FLR value chain investment opportunities (detailed in Section 4.3) and initial indication of the investment potential of each.

The commercial readiness assessment would evaluate each of Rwanda's prioritised FLR opportunities using the basic criteria in Table 18.

In Rwanda, there are multiple ways to identify FLR activities that may have commercial viability. One way is to 'follow the money.' This would include evaluating the FLR entities and activities that are publically funded, contained in domestic banks and loan portfolios, received DFI investments, and are involved in international private investments. The commercial readiness assessment

would develop a detailed listing of potential investment opportunities aligned by type of FLR value chain/business, potential investee entities, target type of funding source, and stage of commercial readiness. Based on the commercial readiness assessment, each FLR investment opportunity would be prioritised to receive support to become commercially viable

and to clearly document the business case for private investment.

Support the commercialisation and preparation of the business case

This recommendation provides technical support for the specific FLR investment opportunities that are deemed to be commercially viable.

Table 17. Rwanda's summarised FLR investment opportunities and potential

Landscape transition	FLR value chain investment opportunities	Investment potential (1=high/5=low)
Traditional agriculture → Agroforestry for crops and livestock (<i>Integrated tree and agricultural cropping system</i>)	Apples, Apple Bananas, Bananas (with possible coffee intercropping)	3
	Avocados	2
	Essential Oils – Geranium, Patchouli	1
	Pyrethrum	1
	Marketable food crops grown in and around trees – Tree Tomatoes, Cassava, Taro, Chilies, and Passion Fruit	4
	Nut (macadamia) and/or shade (<i>Leucaena</i>) for coffee or tea ³⁰	2
Poorly managed eucalyptus woodlots and plantations → Improved management	Fuel-efficient cookstoves	5
	Green charcoal	4
	Sustainable woodlot production	3
	Forest plantations	2
Deforested land → Improvement or restoration of natural forests	Ecotourism	4
	NTPFs in/around protected areas	3
Deforested land → Improvement or establishment of protective forests	SSHP	1
	PWS by major beneficiaries	1
Emission reductions linked to FLR	REDD+	5
	ARR	4
	Cookstoves/Green charcoal	3

30 Has limited application to full sun varieties, but could support valued-added shade-grown systems.

Table 18. Commercial readiness evaluation criteria

Commercial readiness assessment	Evaluation criteria
Identify the specific FLR value chain businesses with commercial potential (<i>Entities and activities in a geographic region that are already being implemented at some scale and meet commercial readiness criteria with the potential to attract new sources of private investment</i>)	Businesses/activities aligned with economic opportunities in the area/region
	The business activities meet basic requirements for effective FLR investment ¹
	Business model defined (how money is made, what is the investment entity, returns can be demonstrated)
	Details available on current funding sources and uses of investment funds
¹ Basic requirements for effective FLR investment: <ul style="list-style-type: none"> • Is there established demand and a competitive advantage for revenue-generating activities (cash crops, value-added, domestic growth crops)? • Can the activity increase the trees on the landscape? • Does the downstream value chain support growth? • Is there evidence of commercial viability somewhere in the value chain, and does it provide a return profile? • Are activities biophysically appropriate for the landscape/ecosystem? • Are there positive social implications (improved livelihoods, food security)? 	

Often, potential investments lack the key elements needed to attract private investors at any scale. To implement this recommendation, a package of tailored technical support would be provided to entities/businesses that facilitate the activities in Table 19.

The final set of products for each commercially viable business would be a complete investment prospectus and due diligence questionnaire that would allow them to credibly present their investment opportunities. This would also include the development of financial and operational capacity for the managers of the investment entities to interface with investors and understand the investment structures being sought.

Identify and secure private investment for FLR

Once commercially viable investments have been identified and are fully commercialised with professional business plans and due diligence materials, the success of attracting finance will depend on understanding both the details of the investment funding requirements as well as the full landscape of potential private

investors that could provide capital. This recommendation supports the identification of potential investors for each commercially ready FLR investment opportunity. This could include sourcing private capital that would be directly invested in Rwanda's FLR activities, as well as sourcing private investments to increase capital in domestic financing entities that on-lend. To attract investments from private equity funds, DFIs, regional/international banks, and institutional investors, it is necessary to use qualified financial professionals. These investment professionals would have a strong understanding of the specific FLR investment opportunities, would understand the motivations of the targeted private investors, and would be able to represent the investment opportunity in the investor vernacular. These professionals would be able to represent the FLR investee entities in structuring/executing the transaction and meeting the due diligence requirements.

For investments that are more microfinance oriented (versus institutional scale), the support would be tailored and could include: working with lenders to offer loan products that fit smallholder needs, identifying sources of

Table 19. FLR commercial readiness technical support

Commercialisation support	Technical deliverables
Provide support for FLR investment opportunities to become commercially ready	Facilitate the establishment and operationalisation of aggregation investment entities, including enhancing operational and financing management expertise
	Preparation of high quality financial projections to demonstrate cost effectiveness and the risk and return profile
	Identification and contracting of key implementation partners
	Documentation of entities' roles, contractual arrangements, and financial flow mechanisms

Table 20. Private investment sourcing and deliverables

Investment sourcing and execution support	Technical deliverables
Identify and secure private investments for commercially viable FLR activities	<ul style="list-style-type: none"> Review each set of FLR investments for suitability for each type of target investors and develop target prospect list
	<ul style="list-style-type: none"> Develop professional quality investment pitch materials tailored for specific investors
	<ul style="list-style-type: none"> Perform screening of investment prospects' interest and map FLR investments to potential investors.
	<ul style="list-style-type: none"> Plan and conduct 'roadshows' and targeted meetings with the engagement of key implementing partners
	<ul style="list-style-type: none"> Provide support for due diligence
	<ul style="list-style-type: none"> Structuring/negotiation of transaction documents

additional capital needed in increase the pool of micro-loans, and/or introducing insurance products.

Beyond purely securing investment, it is important that the FLR investments are successful. That way capital pools for Rwanda FLR can be grown over time through providing attractive returns for private investors. Producing financial returns can be supported with technical assistance to investee entities/businesses such that they can: (i) establish performance reporting requirements to ensure effective management by leveraging existing systems and extension services, mobile and remote sensing technologies; (ii) develop

programmes for the on-going training of investees; (iii) establish programmes to promote greater and broader adoption among new smallholders for scaling investors; (iv) support the production of quarterly performance reports to investors and share success stories more broadly; (v) support the integration of risk mitigation products into the investment; and (vi) provide oversight support (board seats or external experts) for financial and operational management of investment entities.

Design and operationalise a Rwanda PPP entity dedicated to FLR

The purpose of the Rwanda FLR PPP would be to coordinate investment and mobilise

commitments for action across the broad range of actors needed to implement and fund FLR; thus initiating an environmentally sustainable, socially beneficial, and commercially viable approach with highly leveraged returns of private over public investments.

Organisational design features of the PPP would include:

- **Independent legal status** – entity is unaffiliated with any individual stakeholder and independent decision making power from the government;
- **Professionally staffed** – drawing on Rwandan and international expertise in agriculture, forestry, water resource management, finance, SME entrepreneurship, and rural development;
- **A board of directors** – oversees work, mobilises political support, receives and responds to any complaints; and
- **Accountable for results** – metrics could include: quantity of landscape investments and their impact on smallholder livelihoods, food security, and the environment.

The establishment of the PPP would follow this basic set of steps:

- Attract a nucleus of politicians, large donors and private sector companies with stakes in Rwanda who will agree to support the initiative;
- Secure funding to fully develop the PPP concept;
- Develop the concept note;

- Secure start-up funding for development of the PPP;
- Create an ‘investment blueprint’ that details the objectives, targeted results and operational management and governance of the PPP; and
- Operationalise the PPP.

Partnerships will need to be identified upfront and expanded over time to support the following:

- Conceptualisation,
- Promotion,
- Administration,
- Partnership facilitation,
- Seed funding,
- Implementation funding, and
- Private investments.

Drawing from SAGCOT and other similar PPP structures (e.g. USAID’s Private Capital Group for Africa) that empower smallholders to be commercially viable producers and reduce environmental impact while improving productivity, will provide Rwanda a framework for developing their own focused PPP which would be customised to support Landscape Restoration and to address the barriers specific to Rwanda. The formal establishment of the PPP would aid in bringing scale and focus to attracting investment. There are key activities that can be supported in the absence of the PPP or can be integrated into the PPP once operationalised and capitalised.

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Annex A - Sources of private and public (return-focused) investment for Rwanda FLR

All these funds reported investment in Africa, and in agriculture and forestry-related activities

Entity Name	Type of Institution	Location	Fund Size (US\$ millions)
Actis Africa Agribusiness Fund	Private Equity/VC	Africa	92.7
Actis Africa Agribusiness Fund (AAAF)	Private Equity/VC	SSA	92.7
Acumen Fund	Private Equity/VC	Africa	n/a
Africa Enterprise Challenge Fund - AECF	Private Equity/VC		100.0
Africa Plus	Private Equity/VC		n/a
Africa Invest Malawi (Africa Agri Fund)	Private Equity/VC	SSA	18.0
Africa Seed Investment Fund (ASIF)	Private Equity/VC	SSA	12.0
African Development Partners I, LLC	Private Equity/VC	Africa	n/a
African Agribusiness Investment Fund (Agri-Vie)	Private Equity/VC	SSA	100.0
African Agricultural Capital Fund (AACF)	Private Equity/VC	SSA	25.0
AfricInvest Financial Sector	Private Equity/VC		41.0
AfricInvest I	Private Equity/VC	Africa	51.0
Agro-Ecological / Farmland Fund	Private Equity/VC	UK	160.0
Altima One World Agriculture Development Fund	Private Equity/VC	Global	625.0
Aventura Rural Enterprise Fund	Private Equity/VC	SSA	40.0
Barak Structured Trade Finance Fund	Private Equity/VC	SSA	200.0
Beltone Private Equity	Private Equity/VC	Egypt	200.0
Citadel Capital	Private Equity/VC	Egypt	40.0
Cordiant Capital Canada Investment Fund for Africa	Private Equity/VC		212.0
Cordiant Emerging Loan Fund III	Private Equity/VC	Canada	460.0
Emergent Asset Mgmt	Private Equity/VC	Canada	600.0
GAIA World Agri Fund	Private Equity/VC	Global	n/a
Grassroots Business Fund	Private Equity/VC	Global	9.0
Gray Matters Capital	Private Equity/VC	USA	10.00
Grofin Africa Fund	Private Equity/VC		125.0
Heirs Holdings	Private Equity/VC	Africa	n/a

Entity Name	Type of Institution	Location	Fund Size (US\$ millions)
Helios Investors II	Private Equity/VC		n/a
I&P Investment Company	Private Equity/VC		25.0
Insight Global / Farmland Trust	Private Equity/VC	UK	300.0
Modern Africa Fund	Private Equity/VC	Africa	105.0
Pamoja Capital	Private Equity/VC	Luxembourg	n/a
Phatisa African Agri Fund	Private Equity/VC	SSA	300.0
RABO Farm	Private Equity/VC	Netherlands	200.0
Root Capital	Private Equity/VC	USA	200.0
Verde Ventures	Private Equity/VC	USA	7.0
Rabo Sustainable Agriculture Guarantee Fund (SAGF)	Other	Global	30.0
Royal Norwegian Embassy	Other	Norway	n/a
SNV	Other		480.0
Alterfin	MFI	Global	36.5
Banco Oportunidade	MFI		n/a
Grameen Credit Agricole Microfinance Foundation	MFI	Luxembourg	n/a
Microvest	MFI	Global	140.0
Oikocredit	MFI	Global	356.0
Rural Impulse Fund	MFI	Global	38.0
Socremono	MFI		n/a
Black River Asset Mgmt	Hedge Fund	USA	250.0
Emergent African Land Fund	Hedge Fund	SSA	2,726.2
Pharos Miro Agricultural Fund	Hedge Fund	EU	75.0
Bill and Melinda Gates Foundation	Foundation/Family Office/Individual	USA	n/a
Dunavant	Foundation/Family Office/Individual	USA	8.0
Durabilis Foundation	Foundation/Family Office/Individual	Belgium	n/a
George Soros	Foundation/Family Office/Individual	USA	n/a
Google Foundation	Foundation/Family Office/Individual	USA	70.0
LGT Venture Philanthropy	Foundation/Family Office/Individual	Switzerland	n/a
Marie and Ann Philippson Foundation	Foundation/Family Office/Individual	Belgium	n/a
Mulago Foundation	Foundation/Family Office/Individual	USA	n/a

Entity Name	Type of Institution	Location	Fund Size (US\$ millions)
Omidyar	Foundation/Family Office/Individual	USA	n/a
Transform Africa	Foundation/Family Office/Individual	USA	50.0
Triodos Sustainable Trade Fund	Foundation/Family Office/Individual	Global	10.0
African Agriculture Fund - AAF	DFI	Africa	200.0
African Development Bank	DFI	Africa	n/a
BIO	DFI	Belgium	n/a
CDC Group	DFI	UK	n/a
China Africa Development Fund	DFI	China/South Africa	n/a
Cofides	DFI	Spain	n/a
COMPETE - IIAM and USAID	DFI	USA	n/a
DEG	DFI	Germany	n/a
Development Bank of Southern Africa - DBSA	DFI	Africa	n/a
EU – Agricultural Marketing Credit Programme 2nd phase	DFI	Europe	n/a
FinnFund	DFI	Finland	373.5
IFC/World bank	DFI	USA	n/a
IFU	DFI	Denmark	n/a
JICA	DFI	Japan	n/a
Norfund	DFI	Norway	n/a
OeEB	DFI	Austria	n/a
OPIC	DFI	USA	n/a
SIFEM	DFI	Switzerland	n/a
SIMEST	DFI	Italy	n/a
Swedfund	DFI	Sweden	n/a



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