

Rwanda Environment and Climate Change Analysis- 2019-06-05

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Executive Summary

This policy brief aims at presenting key environmental sustainability challenges and opportunities in Rwanda, and their linkages to poverty reduction and socio-economic development. The assignment was conducted as a desk-study, based on available reports, research papers and statistics. The lack of access to statistics in general and environmental statistics in particular is a challenge and should be considered when reading this policy brief.

The **main environmental challenges** facing Rwanda are: i) land scarcity, ii) soil degradation and soil erosion, iii) deforestation, iv) climate change, v) loss of biodiversity, vi) water pollution and access, vii) urban pollution and natural resources pressures, viii) generation of hazardous and solid waste, ix) natural resource depletion.

Coupled with these bio-physical environmental problems are pressures from the growing population; Rwanda's population size is around 12.4 million people (est. 2018). Population growth is currently 2.4% per year. This factor combined with economic growth exert pressures on the country's natural resources, most notably on the country's waters, forests, lands and biodiversity.

More than a third of Rwanda's population live in poverty (38%) and inequality is high. There is a large difference between those with high access to resources (natural and monetary capital) and those with (very) limited access to resources.

A vast majority of the poor in Rwanda's population depends directly on access to natural resources, and they are vulnerable to environment-related shocks, such as droughts, heavy rainfall, landslides and floods. Environmental degradation, lack of access to, or competition over natural resources, are environmental factors that negatively affect their livelihood opportunities. People living in poverty are also commonly exposed to higher risks such as unsanitary living conditions, often in marginal lands or displacement camps.

The potential for economic growth in Rwanda is closely linked with development of its natural resources including land, waters, biodiversity and minerals. Exploitation of these natural resources may generate large economic benefits in the short to medium term. However, in the long term unsustainable use of these natural resources increases not only environmental degradation, but decreases economic growth, increase social tensions and livelihood opportunities.

Rwanda has, for more than a decade, taken a proactive approach to improve environment and climate change issues in all of the country's policies, programmes and plans. The country's policy frameworks are by and large adequate and the institutional set-up for managing environmental challenges is quite robust. Main problems relate to implementation and enforcement of existing legislation, rules, regulations and policies. This is further hampered by a lack of good governance, including lack of transparency and accountability, and insufficient coordination across government agencies and other actors, and cross-sectoral cooperation.

The environment is inseparable from the economy, poverty, health, livelihoods and food security. This is why it is essential for Rwanda to address its environmental challenges. The country faces many serious environmental challenges of which many indeed are addressed by various actors within and outside the government. However, to attain environmental sustainability there is a need for reinforced efforts to reduce current and future environmental risks and vulnerabilities, and boost the opportunities that lie in greening Rwanda's development.

Based on the findings in this brief, the Helpdesk suggests the following environmental issues that could be relevant for Sida to support in the upcoming strategy period: promoting a greener economy by making use of more economic policy instruments and incentives to reduce pollution and natural resource depletion, enhanced environmental justice, improved and updated environmental statistics, greening industries and markets, sustainable water management, and sustainable tourism.

Chapter 1: Background and approach

This Environment and Climate Change policy brief¹, presents an overview of current environment and climate change issues in Rwanda. It has been written to assist Sida in preparing for a new development cooperation strategy with Rwanda.

The Swedish Government has identified environment and climate change as one of five perspectives to permeate Sida's activities. This is reinforced in Sida's Environmental Policy² which states that the "bio-physical environment with well-functioning ecosystems and a stable climate is the foundation for development and all human life. Sustainable management of the earth's resources is therefore a prerequisite for reduced poverty and sustainable societies – for current and future generations." The Environmental Policy further requires that environmental aspects are systematically integrated into all Sida's operations and sectors.

The **purpose of this overview** is to briefly present key environmental challenges and opportunities and how they link to poverty aspects in Rwanda and to facilitate integration of key environmental aspects into the multi-dimensional poverty analysis (MDPA) and Sida's strategy process for Rwanda. The assignment was conducted as a desk-study during three weeks in (May-June 2019). It is based on available reports, research papers and statistics. It should be noted that reliable information and statistics on environment and climate change issues pertaining to Rwanda has to some extent been a challenge to attain. This should be considered when reading this policy brief.

Chapter 2: Key environment and climate change challenges

The purpose of this chapter is to provide a summary of key environmental information, problems/challenges, causes and key drivers in Rwanda. Here, environment is broadly defined and includes climate change, disaster risks, natural resources, biodiversity, ecosystems and their functions and services. An additional purpose of the chapter is to present relevant environmental indicators, and wherever possible also trends.

Rwanda is a small landlocked country in east-central Africa. Total land area is 26.338 km², which is around 5% of Sweden's. It is the fourth smallest country on the African mainland after Gambia, Eswatini (Swaziland) and Djibouti. The country is hilly and mountainous with an altitude ranging between 900 m and 4.500 m above sea level. It has a tropical climate with average annual temperature ranging between 16°C and 20°C, without significant variation. Rainfall is abundant with average rainfall around 1000 mm per year in the higher altitudes. In the eastern and south-eastern lowlands temperatures are higher and can exceed 30°C in February and July-August. In these regions rainfall is less abundant ranging between 700 to 970 mm per year, and are thus more affected by droughts. Despite some irregularities, rainfall is generally well distributed throughout the year. In the northern and western regions rainfall is more abundant and causes erosion, flooding, and landslides.

Key environment and climate change challenges include³: i) land scarcity, ii) soil degradation and soil erosion, iii) deforestation, iv) climate change, v) loss of biodiversity, vi) water pollution and access,

¹ This Environmental Policy Brief was written as a desk study during May-June 2019 by Anders Ekbohm and Emelie César at Sida's Helpdesk for Environment and Climate Change, at the request of Åsa Bjällås, Sida. The views expressed in this Environmental Policy Brief are those of the author and do not necessarily represent the views of Sida

² Sida, 2017

³ This list is not exhaustive; it does not represent a ranking or an order of priority. It is based on a broad review of the literature and does not represent any official statements on the state of environment in Rwanda.

vii) urban pollution and natural resources pressures, viii) generation of hazardous and solid waste, ix) natural resource depletion.

Coupled with these bio-physical environmental problems are pressures from the growing population; Rwanda's population size is around 12.4 million people (est. 2018). Population growth is currently 2.4% per year. These factors combine to exert pressures on the country's natural resources, most notably on the country's waters, forests, lands and biodiversity.

Land use and land scarcity: Rwanda is among the most densely populated countries in Africa, with nearly 400 inhabitants per km² overall and more than 520 per km² on agricultural lands. The current population of more than 12 million people is expected to be approximately 22 million in 2050 with an assumed population growth rate of nearly 2%. The scarce land is predominantly used for agriculture, which dominates Rwanda's employment and contributes with about 55 % of the export earnings. It meets about 80 % of the country's food needs, although there has been a small decline in its contribution to GDP in recent years⁴. The rapid population growth has led to land fragmentation and created severe environmental challenges by causing farmers to push into marginal lands, clear forests, and cultivate steep hillsides without proper soil and water conservation⁵.

Land scarcity and population pressures in Rwanda have not triggered institutional innovations to encourage investments that ensure more intensive and sustainable land uses. Instead competition for land is widespread and expansion of non-agricultural income opportunities has been slow. This has resulted in illegal land sales, pervasive land disputes, and 'land grabbing' that exacerbated inequality, landlessness, and social tensions⁶.

Soil degradation and soil erosion: Rwandan soils are naturally fragile and erosive. The combination of solid and downstream cultivated lands, rivers and water reservoirs. It also increases the risk of crop destruction and siltation of marshes and plains. From a recent survey based on 25,144 plots countrywide it was shown that 88% of the plots were subject to low degree of soil erosion (splash erosion, wind erosion), followed by moderate (diffuse overland flow erosion) and severe soil loss (rill erosion, gully erosion, mass movement of soils and landslides.⁷ Large shares of Rwanda's soils are exhausted due to continuous farming, soil degradation and soil erosion, and little use of fertilizers that can compensate for the loss of nutrients caused by soil loss.

Deforestation: Rwanda has four major types of forest cover: montane tropical forest; lowland tropical rainforest; savanna/gallery forest; and tree plantations. The forest ecosystems play important roles in water catchment, carbon storage, climate regulation, hosting and maintaining biodiversity and direct provisioning of subsistence resources for surrounding communities. Natural forests, savannah woodlots and gallery forests are the most important ecosystems that support so called wild foods and resources. Such wild foods and resources include plants used in traditional human and veterinary medicine, fodder, honey, wild fruits, tree seeds, essential oils, wild mushrooms, ornamental plants, game and fish. They also promote ecotourism, contributing about 9.1 % of GDP in 2014⁸.

Rwanda depends heavily on its forest resources for timber and fuelwood, where fuelwood provides 90% of the country's energy. Rwanda's deforestation is largely due to the cutting down of trees for fuel, need for additional agricultural lands, or lands for cattle grazing, or new infrastructure.

⁴ Nimusima et al, 2018

⁵ Ayalew Ali et al 2014

⁶ ibid, 2014

⁷ NISR, 2019

⁸ Ndayambaje, 2016

Deforestation in Rwanda has resulted in soil degradation, erosion, landslides, reduced water quality, and loss of biodiversity.⁹

Climate change: Rwanda as a whole is vulnerable to climate change. If realized as projected, climate change will exacerbate Rwanda's existing environmental, social and economic problems. Based on analyses of 19 Global Circulation Models (GCMs) and 15 GCMs respectively, Rwanda as a whole is expected to have an increase in mean precipitation between 0-10% until 2080, and an increase in mean temperature <2-4 degrees Celsius until 2080. The uncertainties are large and are also expected to vary significantly across the country. Projected percentage changes in yields under three major climate change scenarios until 2080 indicate that crop production will decline in Rwanda for maize (-6 to -10%), rice (-1 to -2%), wheat (-13 to -20%) and sorghum (-15 to -25%). Soy bean yield is projected to increase (+35 to +39%) until 2080. This yield gain for soybean is attributed to the projected beneficial increases in temperature, which would bring growing season temperatures closer to optimum temperature in temperate/tropical highlands for this crop. Specifically, the projected maize yield percentage reduction translates into a loss of around 40 kg/ha. Despite large variations in projected impact on maize yield, there is a general consensus that climate change will adversely affect maize yield and other major crops in East Africa including Rwanda. Moreover, the wheat yield percentage reduction translates into a loss of some 70 kg/ha for Rwanda.¹⁰

Climate change is also projected to have health effects of various kinds. One evidenced impact is on Schistosomiasis (also called snail fever or bilharzia) where there is widespread agreement between scenarios and climate projections that infection risk may increase between 10-30% in Rwanda as well as in other neighbouring countries, Burundi, and over most of Uganda, Tanzania and south-west Kenya over the next 20 years.¹¹

Loss of biodiversity: Rwanda's landscapes and natural forests in particular are very rich in biodiversity including numerous species that are endemic. Rwanda's biodiversity has, over the years, been subjected to various threats causing loss within species richness, population sizes and ecosystems degradation. The most important direct threats behind changes in biodiversity in Rwanda include poaching, boundary encroachment, fires, alien invasive species, predation, deforestation, illegal mining, illegal grazing, human-wildlife conflict, damming, declining water levels, commercial fishing, lack of proper regulations, infrastructure development, water extraction, plant extraction, drainage of wetlands outside parks, plant and animal diseases transmitted from livestock to wildlife, and climate change. Rwanda's natural forests, and in turn its biodiversity resources, have diminished considerably in size and genetic varieties since the 1970s.¹²

Regarding livestock, there is general concern that the genetic variation within indigenous cattle in Rwanda is disappearing through breed substitution, indiscriminate crossbreeding and the absence of breed development programmes. The gradual disappearance of indigenous breed that are able to survive in extreme environments undermines food and livelihood security and the capacity of people to survive in marginal areas.¹³

Major changes that have taken place with implications for Rwanda's biodiversity (status and trends) are: conversion of savannah natural forests into farming, grazing lands and other economic activities; massive logging of buffer zone forests for charcoal and timber production; forest reserves degradation due to mining exploitation; water hyacinth invasion into lakes, e.g. Bugesera, Gisaka, Nasho and other water bodies, especially in Nyabarongo-Akagera rivers system and Akagera wetland

⁹ Ordway, 2015

¹⁰ Adhikari et al, 2015

¹¹ McCreesh et al 2015

¹² Dawson and Martin, 2015; Ndayambaje, 2016

¹³ Ndayambaje, 2016

complex; underutilization and disappearance of landraces and local breeds due to crop intensification.

Despite several negative trends listed above, there are several positive changes that can be reported. They include among others: an increased number of primates troops and ungulates populations in Akagera National Park; an increased mountain gorilla population in the Virunga Mountains. Conservation of Rwanda's primary forest has been key to maximise biodiversity and the provisioning of ecosystem services to the wider populations, locally, nationally and internationally.¹⁴

Water pollution and access: Rwanda's water resources are generally still of relatively good quality, with generally neutral pH values. However, increasing pollution from agro-inputs, including ammonia, nitrate, phosphate and pesticide residues (through leaching and erosion) is affecting groundwater locally and the ability of ecosystems to naturally purify water is a concern. There are also localized problems from high sediment loads; toxic and acidifying materials, including heavy metals, from mining; and untreated domestic sources that cause micro-biological pollution and threaten human and ecosystem health.

Moreover, Rwanda's wetlands face serious sustainability challenges and are closely linked with the state and management of water resources, pollution, land use including agriculture, forest and livestock management, infrastructure development and expansion of cities. The wetlands are key to the country's abundance of biodiversity and provisioning (or degradation) of ecosystem services. Hydrologically and bio-physically, Rwanda's wetlands are closely dependent on the abundance of water resources and by the existence of marshes and aquatic lands associated with the country's lakes and rivers. Rwanda holds some 860 marshlands, which cover a total surface of 278 500 ha, which corresponds to 10.6 per cent of the total land area. However, many of wetlands and marshes are in effect seasonal.

Rwanda has seven types of swamps¹⁵ and they are classified on the basis of: relief, altitude, soil type, vegetation, hydrology and size of the swamp, slope of the watershed and population density.

Rwanda's wetlands are vulnerable but highly productive ecosystems. Some of the wetland functions benefitting local communities and the society at large include nutrient cycling, sediment and pollution retention, flood mitigation and groundwater recharge. In addition they are sources of wildlife, fish, wood and several non-timber products, and can have great agricultural potential when properly used. Main functions of wetlands in Rwanda include agriculture production, hydrological functions, biodiversity reservoirs, peat reserve, mitigation of climate change, leisure and tourism and cultural value. Specifically, rural households subject to food insecurity, poverty and vulnerability, are particularly dependent on these goods and services for their livelihoods. In particular, the conversion of wetlands to agricultural production has increased rapidly over the last couple of decades due the acute agricultural land scarcity.

Generation of hazardous and solid waste: Generation of hazardous and solid waste in Rwanda is a widespread environmental problem, with its largest environmental impacts in Kigali and Rwanda's secondary cities (Huye, Muhanga, Musanze, Nagatare, Rubavu and Rusizi). More specifically, waste management in the secondary cities is currently limited and landfills are not environmentally sound. Also, while there are some recycling businesses in Kigali, secondary cities lack recycling and composting services.¹⁶ In Kigali 44.7 % of Kigali residents use private dustbins, while the proportions are very much smaller in the secondary cities. The use of public refuse dumps is very low in all urban

¹⁴ Dawson and Martin, 2015; Barlow et al., 2007

¹⁵ High altitude swamps, volcanic Highland swamps, central plateau swamps, swamps of: Kanyaru-Nyabarongo and Akagera basins; the East; Bugarama depression, and Edge of Lake Kivu.

¹⁶ GGGI, 2015

areas.¹⁷ Having said this, between 2005 and 2011, the provision of waste collection services in urban areas increased from 23 to 30 %. Between 2010-2011 and 2013-2014, the percentage of the urban population served by such services increased to 35.8 per cent (NISR, 2016).

Although Rwanda is amongst the least urbanized countries in the world, it is also one of the fastest urbanizing ones, with an annual urban growth rate of 4.5 %. In 1990, it was the least urbanized country in the east African Community countries. But by 2030 it will be one of the region's most urbanized, with an estimated urbanization rate of 30%. About half of the country's urban population resides in Kigali. The secondary cities of Huye, Muhanga, Musanze, Nagatare, Rubavu and Rusizi together house about a quarter of the country's urban population. This will put substantial challenges on adequate environmental management, reduce urban pollution and take pressure off natural resources at risk due to this development.

Poverty is still a problem in Rwanda's cities, where migrants to the city find themselves settling in unplanned areas due to inadequate housing supply and affordability. Municipal capabilities and facilities seriously lag behind urban population growth and unplanned areas tend to lack adequate waste collection and management, and access to safe water and sanitation, electricity and roads.

Natural resource depletion: Rwanda is relatively rich in natural resources; renewable resources like forests and lands, and non-renewable resources like minerals. Specifically, Rwanda's underground contains rich deposits of minerals such as tin, titanium, wolfram, coltan (columbite–tantalite) and gold. In fact Rwanda is one of the world's largest producers of tin, tantalum, and tungsten. It also possesses and extracts gem stones for export. There are also a big number of quarries for mining of clay, sand, building stones, limestones and peat. Small-scale mining accounts for around 80 percent of the country's mineral output.

To summarize, Rwanda is subject to a range of environmental challenges including climate variability and climate change. Despite several worrying trends, such as soil erosion, land degradation, biodiversity loss and land scarcity, the government and other actors have made major efforts to prevent, mitigate, minimize and adapt to the environmental problems and changes. Moreover, Rwanda shows impressive achievements in terms of sustained economic growth (around 7% growth in Gross Domestic Product (GDP) over the last decade) and per capita economic growth (4.7% annually 2008-2018), reductions in poverty and improvements in public health. However, much of this growth is based on natural resource extraction and depletion, and is closely linked with emissions of pollutants into lands/soils, waters and the air.

Chapter 3: Who is poor and in what way? - Four dimensions of multidimensional poverty

The purposes of this chapter are i) to link environmental aspects to the different dimensions of poverty and answer the question "who is poor in the different dimensions" linked to environment, and ii) to find the profile, or profiles, of the poor and vulnerable, i.e. those living in poverty or at the verge of falling into poverty due to environmental reasons.

In Rwanda, more than a third of population live in poverty (38%) and inequality is high. In 2016 the Gini index¹⁸ for income inequality was around 0.43 (0 indicates perfect equality and 1 indicates

¹⁷ REMA, 2017

¹⁸ Gini index measures the degree of inequality in the distribution of family income in a country. The more nearly equal a country's income distribution, the lower its Gini index, e.g., a Scandinavian country with an index of 0.25. The more unequal a country's income distribution, the higher its Gini index, e.g., a Sub-Saharan country with an index of 0.50. If income were distributed with perfect equality the index would be zero; if income were distributed with complete inequality, the index would be 1. Source: CIA, 2019

complete inequality).¹⁹ This indicates that there is a large difference between those with high access to resources (natural and monetary capital) the ones with limited or no access to resources.

Below are examples on how environmental and climate change challenges are linked to poverty in Rwanda including *the resource dimension of poverty* (3.1), *the opportunities and choice dimension of poverty* (3.2), *the power and voice dimension of poverty* (3.3), and *the human security dimension of poverty* (3.4).

3.1. Environment and the *Resource* dimension of poverty

Resources are a key feature of environmental linkages to multidimensional poverty. Being poor in terms of environmental resources means not having access to, or power over, natural resources, biodiversity and ecosystem services (i.e. environmental resources) that are needed to sustain a decent living standard.

Environmental resources necessary for human wellbeing include: land and fertile soil, forests, biodiversity and ecosystems, water, energy, building material and clean air. In order for people to make use of the resources they need to be available, accessible, affordable, appropriate and of good quality.

Inadequate access to environmental resources of good quality creates a myriad of problems, particularly for people living in poverty. Degradation and overexploitation of environmental resources, e.g. pollution of water, air and soil, and natural disasters (storms, floods and droughts) aggravated by climate change challenge peoples' ability to work and secure a livelihood. This leads to reduced household income, negative effects on health, deprivation of life chances and generally constitute severe obstacles to social and economic development.

The examples below illustrates the environmental challenges in Rwanda and its implications for people living in poverty:

Air pollution: Globally, health effects of air pollution are serious – one third of deaths from stroke, lung cancer and heart disease are due to air pollution. According to WHO (2018) nine out of ten people in the world breathe polluted air, which kills 7 million people every year.²⁰

In Rwanda, rural households living in poverty often use open fires for cooking. This causes indoor air pollution and result in respiratory diseases. Indoor air pollution hits the poorest the most, particularly women and children. Over 12 500 people die every year in Rwanda due to indoor air pollution.

Table 1. Estimated deaths and DALYs caused by environmental degradation

WHO estimates	Water, Sanitation and Hygiene (Diarrhoea)		Indoor air pollution		Outdoor air pollution		
	Country	Deaths/year	DALYs/1000 capita/year	Deaths/year	DALYs/1000 capita/year	Deaths/year	DALYs/1000 capita/year
	Burundi	14 700	64	10 200	45	300	0.8
	Kenya	23 000	23	14 300	13	600	0.2
	Rwanda	16 700	62	12 500	46	300	0.6
	Uganda	27 200	33	19 700	23	100	0.1

Source: WHO (2009)

¹⁹ World Bank, 2016 <https://data.worldbank.org/indicator>

²⁰ WHO, 2018

Moreover, outdoor air pollution is a growing problem in Rwanda due to a high urbanization rate, economic growth and insufficient pollution control. Pollutants come mainly from the transport and energy sectors.²¹ Outdoor air pollution is causing over 300 deaths in Rwanda per year. Opposite to indoor air pollution, Rwandan men are more affected by outdoor air pollution than women.²²

Lack of water and sanitation: About 76% of the population in Rwanda have access to improved water sources (72% of rural, 87% of urban population). Only 62% of the total population have access to improved sanitation.²³ Water supply and sanitation play critical roles in preventive healthcare and socioeconomic development in Rwanda's rural and poor peri-urban areas. Ready access to water reduces the time spent searching for water and may improve health status and educational outcomes. Evidence suggests that women/girls bear more of the cost of distant water sources in Rwanda.

The access to improved sanitation is relatively low both in rural and urban areas. Only 59% have access to improved sanitation in rural areas and 63% in urban areas respectively. WHO estimates show that over 16 700 people die every year due to lack of access to safe drinking water and sanitation. Climate change may impact both quantity and quality of water resources. It may thus worsen the situation if no adaptation measures are introduced. Deaths due to diarrhea are larger compared to neighboring countries e.g. Kenya and Uganda (See table 1). The table shows figures for Rwanda, Kenya and Uganda and Burundi for comparison.

Soil erosion: Land is one of the few productive assets owned by the rural poor, and almost all such households engage in some form of agriculture.²⁴ Land degradation and soil erosion have severe consequences for all agricultural activities but especially on poorer households. In Rwanda, around 90% of the country lies on slopes which accelerates soil loss, erosion and decreasing soil fertility. It is estimated that 1.4 million tonnes of soil per year are lost, accounting for a loss of 320.000 US dollars. The pressure of a growing population also has a negative effect on land availability. As a result, land holdings are becoming more and more fragmented.²⁵

Deforestation: Rwanda is today ranked 89 out of 180 countries in terms of tree cover loss.²⁶ Deforestation is a challenge especially due to the fact that a majority of the population is dependent on fuel wood as the main energy source. A growing population requires more fuel wood and more agricultural production which increase needs for new farmland, which accelerates deforestation and forest degradation. The implications of forest loss are many. The resource is crucial for economic development but also for human well-being, as forests provide vital ecosystem services such as climate regulation.

Access to energy: In Rwanda access to electricity is mainly concentrated in the urban areas (67%). Electrification of the rural areas is limited. Only about one out of twenty households (5%) in rural areas have access to electricity. Typically the poorest households lack access to energy. It is also a large disparity between urban and rural households. Around 42% of the electricity is derived from fossil fuel sources, and 58% comes from renewable sources (51% hydropower and 7% other renewable sources e.g. solar power).²⁷

Pollution from waste: Like many other environmental problems, it is the poor who suffer the most as a result of improper solid waste disposal. Municipal waste collection services is generally lacking,

²¹ REMA, 2017

²² WHO, 2016

²³ World Bank, 2017

²⁴ Edward and Hochard 2018

²⁵ FAO, 2019

²⁶ Yale, 2018

²⁷ CIA, 2019

especially in slum areas or areas characterized by poverty, putting the residents of such neighborhoods’ at relatively greater risk of health hazards due to improper solid waste management.

Climate change: Overall level of exposure to climate change impacts are greatest in Eastern Province, mainly due to projected changes in temperature and heat episodes, and shifts in rainfall patterns. Further, overall levels of sensitivity to climate change impact is highest in Southern Province due to lower family income levels, less diverse household incomes, higher levels of dependency within the household, less water capture and dependence on rain fed agriculture, lower soil fertility and greater changes in the natural environment.²⁸ Generally, Rwanda already faces significant climate variabilities and is not adequately adapted to existing climate change risks, in particular in rural areas and across various land uses.²⁹

Rwanda has a high level of environmental burden of disease. Over 48000 people die every year due to poor environmental management. See table 2 for comparison to neighboring countries.

Table 2. Health statistics in Rwanda and neighbouring countries

Environmental burden of disease	Deaths/year	DALYs/1000 capita/year (World - lowest: 13; highest: 289)
Burundi	43 300	193
Kenya	102 500	101
Rwanda	48 100	183
Uganda	107 300	137

Source: WHO, 2009

3.2. Environment and the *Opportunities and Choice* dimension of poverty

As indicated above, Rwanda is one of Africa’s most densely populated countries. Around 12.2 million people live in the country, out of which 17.2% live in urban areas.³⁰ Urbanisation rates are high at 2.86%. The human development levels have increased somewhat during the last decades but are still at a low level. UNDP through the Human Development Index ranks Rwanda 158 out of 189 countries and territories. Moreover, according to the global Environmental Performance Index (EPI) Rwanda is ranked 148 of 180 countries in terms of environmental achievements.³¹

The global 2018 SDG assessment ranks Rwanda 120 out of 154 countries. Figure 1 below shows an overview of all SDG targets for Rwanda. The targets are marked with colours which indicates how far a country has come in reaching the specific target; green indicates an achieved target and red indicates that the target is far from being achieved. For Rwanda, 9 out of the 17 SDG targets are far from being achieved, namely; 2) Zero hunger, 3) Good health and well-being, 4) Quality education, 6) Clean water and sanitation, 7) Affordable and clean energy, 9) Industry, innovation and infrastructure, 10) Reduced inequalities, 11) Sustainable cities and communities and 16) Peace, justice and strong institutions.³²

²⁸ REMA, 2015
²⁹ Adhikari et al 2015
³⁰ CIA, 2019
³¹ Yale, 2018
³² UNSDSN, 2018



Figure 1. Rwanda SDG assessment overview of the 17 Agenda 2030 goals

Being poor in terms of opportunities and choice means that people generally lack possibilities to use available environmental resources and ecosystem services for their own benefit to lift themselves out of poverty. Poverty in this dimension can take the form of limited access to markets, few opportunities for livelihood diversification, inability to invest in improved agricultural technology, low access to education, or barriers to change to clean energy sources. The numbers above shows that Rwanda on a macro level faces many challenges. At the household level these challenges are strongly linked with lack of opportunities and choice.

A vast majority of the poor in Rwanda's population depends directly on access to natural resources, and they are vulnerable to external environment-related shocks, such as droughts, landslides and floods. Environmental degradation, lack of access to, or competition over natural resources, are environmental factors that negatively affect their livelihood opportunities. People living in poverty are also commonly exposed to higher risks such as unsanitary living conditions, often in marginal lands or displacement camps.

Other external shocks, such as failed harvests, price drops on the global market and political instabilities compound with and aggravate environmental shocks and affect households in poverty relatively more than the more well off in Rwanda. Typically, households in poverty live with small margins, fewer opportunities and are more vulnerable to shocks. Reoccurring natural disasters have both immediate and long-term impacts; direct effects include e.g. damage on properties and on humans, and secondary effects include crop loss in agriculture production, and failing revenues. This is especially true in Rwanda. Despite significant progress since the genocide, Rwanda is still highly vulnerable to disasters at the same time as the coping and adapting capacities are relatively low. Rwanda has during recent years been hit by many severe weather events and such events are expected to become more frequent due to climate change. Women, children and elderly are the most vulnerable to natural disasters.

To lack opportunity and choice can also hamper people to sustainably manage available natural resources and ecosystem services in both a short- and long-term perspective. Stress over resource scarcities and livelihood opportunities typically result in overexploitation of agricultural lands and forest resources. People with limited opportunities can also have harder times to adapt their livelihoods to climate change and strengthen community resilience.

In Rwanda around 72% of the working population is employed in agriculture. Due to the strong link between agriculture and poverty, the challenges in the agriculture sector are also drivers of rural poverty. Moreover, rural households are highly dependent on agriculture for their livelihood as over 89% of the rural households practice small-scale agriculture. Almost one fifth of the Rwandan population experiences food insecurity and levels of stunting among children remain very high, at 35%. Climate change and climate variabilities in the form of changing and insufficient rainfall, droughts and floods, and scarcity of land and natural resource degradation (e.g. pollution of waters and soils), pose significant threats to food security and decent livelihoods in the rural population, and in particular among those living in poverty.

Rural women in Rwanda, especially the poor, are highly vulnerable to these environmental problems. They often need to walk long distances to collect water, fuelwood, wild foods, medicinal herbs, and materials for different household uses. In urban areas, waiting in line for long hours at communal water points is common. The time spent to collect these natural resources leaves women with less opportunities and choice (than men) for other productive, social and educational pursuits.³³

Poverty as a lack of opportunity and choice can also be manifested in inability to invest in e.g. education. Rwanda has numerous educational initiatives for building awareness of environmental issues, and to build a future workforce with capacity within the field of environmental management. These include a strategy for Environmental Education for Sustainable Development (EESD) and a five-year Action Plan.³⁴ However, overall national investments in the education sector is low, and poverty is closely correlated with level of education. On education expenditures Rwanda is ranked 134th in the world with 3% of GDP spent on education.³⁵

Lack of information and knowledge of rights, in combination with poor governance and corruption, exacerbate the problems mentioned above.

3.3. Environment and the *Power and Voice* dimension of poverty

Being poor in terms of power and voice means that people lack the ability to articulate their concerns, needs and rights in an informed and meaningful way, and to take part in decision-making that affects these concerns. Often people in poverty are deprived of these abilities, but if circumstances were conducive people can develop these abilities. Promoting power and voice contribute to ensure that people's knowledge and concerns are listened.

Human rights principles and governance, how decisions are made and power exercised, have strong effects on environmental actions and outcomes. Achieving sustainable management of the environment is a complex task and many perspectives need to be taken into consideration. Rwanda has a relatively comprehensive and progressive legal framework. However, monitoring, enforcement and follow-up are insufficient. There is thus a need to strengthen institutional capacity on all levels and improve coordination among government agencies.

All people should have the possibility to participate meaningfully in public consultations, planning and political processes that affect their environment and livelihood opportunities without being discriminated. Power and voice are often related to access to information, ability to participate and hold duty bearers accountable. One major challenge in Rwanda related to this is access to environmental statistics and information. Lack of access to information hampers the public's ability to form opinion and to be part of consultations. For instance, farmers in rural areas often lack access to information about grains, risks and opportunities with pesticides and crop pricing that would help them optimize their actions in marketing their goods.³⁶

The Rwandan Government, through the strategy for Environmental Education for Sustainable Development, promotes capacity building of the media to report and communicate sustainable development by providing information required to address pertinent sustainable developmental challenges. However, it should be noted that the Freedom house ranks Rwandan press as not free. The government imposes legal restrictions and informal controls on freedom of the press, and most media outlets practice self-censorship. Moreover, openness and transparency is assessed to be low³⁷; Rwanda is ranked 48 out of 180 countries in the world in terms of perceived corruption. This is far

³³ REMA, 2015

³⁴ REMA, 2015

³⁵ CIA, 2019

³⁶ REMA, 2015

³⁷ Freedom house. 2018

lower than many of its not neighbouring countries but it still poses challenges for poverty reduction and sustainable development.³⁸ The government indeed takes measures to limit corruption, however, use of politician's authority for personal gains does occur and few independent organizations or media outlets are able to investigate or report on corruption issues due to fear of government reprisals.³⁹

3.4. Environment and the *Human Security* dimension of poverty

Being poor in terms of human security, describes how violence and insecurity constrain a person's, household's or community's ability to move out of poverty. Natural disasters can have a negative impact on human security when people's houses and assets are destroyed and people are injured or even killed. Women, children and elders are the most vulnerable to natural disasters. In Rwanda, human security is thus low, especially among the poor, due to the fact that droughts, floods, storms earthquakes and landslides and other types of nature related risks are quite frequent and makes the poor highly vulnerable socially as well as economically. During the last decade, the frequency and severity of natural disasters, particularly floods and droughts, have significantly increased, with an increase of human casualties as a result, as well as economic and environmental losses. Public and local safety nets do exist but are insufficient to significantly reduce security among the poor. Over the past two decades, floods and droughts have affected over 2 million people.⁴⁰

Rwanda's high population growth combined with increasingly small agricultural landholdings put additional strains on the rural households' ability to grow crops, ensure food security and access to clean water⁴¹. Moreover, resource scarcity and limited access to sufficient lands are risks for conflicts and human security. In addition, climate change and the impacts of potential changes in rainfall will adversely affect agricultural output and food security. The change in climate will also impact the land availability for certain crops (e.g. tea and coffee) which in the future may result in more frequent and aggravated land use conflicts.⁴²

Chapter 4: The development context

This chapter presents a wider perspective, providing information of poverty at a structural level and a description of the development context including information on the linkages between environmental aspects and the four development context areas; i) economic and social context, ii) political and institutional context, iii) peace and conflict and iv) environment (Note: the environmental context of Rwanda is described in chapter 2).

4.1. Environment and the *Economic and Social* context

The 1994 genocide substantially reduced Rwanda's economic growth, increased poverty and reduced the country's ability to attract (private and external) investments. Since then Rwanda has made significant progress and during the last 15 years the annual GDP growth rate has been high, at 6-8% per year.⁴³

³⁸ Transparency International, 2018

³⁹ Freedom house, 2018

⁴⁰ REMA, 2015

⁴¹ CIA, 2019

⁴² REMA, 2015

⁴³ CIA, 2019

The **agricultural sector** is the backbone of the Rwandan economy; it contributes to around 30% of the total GDP and employs over 75% of the labour force.⁴⁴ Land degradation and soil erosion are among the main challenges affecting agriculture. Other challenges include the distribution of land, strong dependence on rainfall and vulnerability to climate variability and climate change. The agricultural sector is also constrained by low levels of productivity for both crops and livestock due to low and sub-optimal input use, poor or inadequate production techniques and inefficient farming practices, weak processing capacity and limited supply of higher value-added products on local and international markets.⁴⁵

Alongside the agricultural sector, the service sector is the largest economic sector, contributing to half of the total economic growth. Rwanda is moving towards a more diverse economy attempting to move beyond agriculture and encouraging other industrial investments. For instance there are plans to establish and expand plants pertaining to pharmaceuticals, chemical fertilizers, and industries for production of construction materials such as steel, iron and cement. All of these activities pose significant environmental risks to air, soil and water due to potential pollution and natural resource depletion, unless they are managed in environmentally sustainably ways based on sound and sufficient environmental management systems.

It is foreseen during the coming five years that economic growth will be driven primarily by the **services and industry sectors**, with 9.3% and 13.0% average growth per year, respectively. Still, the agricultural sector is important for the Rwandan economy, employment and food security. Economic growth in the agriculture sector is foreseen to contribute to 5.7% average growth per year until 2024.⁴⁶

Rwanda's **mining, oil and gas potentials** are still to be fully exploited given that preliminary studies indicate potential significant reserves in rare earth minerals, petroleum and gas. The plan is to upscale mining by completing exploration of potential mineral areas and increase export earnings from USD 800 million by 2020 and USD 1.5 billion annually by 2024 from USD 373 million in 2017⁴⁷. Again, this poses important economic opportunities but also significant environmental and social risks, unless they are managed in sustainable ways based on competent environmental and social impact assessments and full implementation of associated mitigation measures.

Furthermore, with the completion of several industrial parks, growth rates in the agro processing and textiles sectors are expected to be around 9 % - 14 % per year from 2020 to 2024, respectively, contributing to industrial growth.⁴⁸

The government of Rwanda is planning to double **tourism** revenues from USD 374 million in 2016 to USD 800 million by 2024. This will be achieved through e.g. increasing investment in tourism infrastructure and positioning Rwanda as a world class ecotourism destination⁴⁹. Maintaining and conserving Rwanda's rich ecosystem and species diversity is critical to its goals to green the economy, reduce poverty and foster resilience to climate change impacts.⁵⁰

Moreover, the Rwandan government works towards building a **knowledge-based economy** focusing on supporting innovation and technology industries, and establish new centres of excellence with a focus on science, technology and innovation.

⁴⁴ CIA, 2019

⁴⁵ FAO, 2019

⁴⁶ Government of Rwanda, 2017

⁴⁷ Government of Rwanda, 2017

⁴⁸ Government of Rwanda, 2017

⁴⁹ Government of Rwanda, 2017

⁵⁰ REMA, 2015

One of the priorities for the Rwandan government during the upcoming five years is to create 1.5 million decent jobs for economic development and poverty reduction and to accelerate sustainable urbanization from 18.4% (2016/17) to 35% by 2024.

In view of this, the potential for economic growth in Rwanda is closely linked with development of its natural resources including land, water, biodiversity and minerals. Exploitation of these natural resources may generate large economic benefits in the short to medium term. However, in the long term unsustainable use of these natural resources increases not only environmental degradation, but decreases economic growth, increases social tensions and decreases livelihood opportunities.

Climate change, land degradation, pollution to soils, water and air, lack of access to water, and reoccurring natural disasters pose significant risks to Rwanda and its possibility to attain sustainable development. In addition, driving forces such as extremely high urbanisation rates, the population's aspirations for higher living standards, and economic growth put additional pressures on the country's natural resources and environmental quality. However, rightly managed, economic growth also constitutes an opportunity to reduce environmental pressures and social tensions, and a source of financing for environmental investments. The green fund FONERWA poses one such opportunity for the country.

Moreover, to reach the above mentioned high ambitions and to continue to move towards a green economy it is crucial for Rwanda to enhance enforcement and follow-up of its environmental legislation, promote green investments, and to implement sound environmental economic instruments. Harmful subsidies need to be reduced and taxes and fees on pollution and precious natural resources need to be implemented to make sure that polluters indeed pay, and that polluting industries are cleaning up or are being phased out to give place for greener and more profitable alternatives. There is thus a need to develop and implement incentives for investments in greener, low-polluting technologies.

Urban growth, pollution and resource pressures: Although only 16.6 % of Rwanda's population lives in urban areas, the country has one of the highest annual urban growth rates in the world. It is estimated at 4.5 % annually, which exceeds the worldwide average of 1.8 % by far. This puts hard pressures on the urban areas to provide adequate low-carbon housing, electricity and energy more generally for heating and cooking, safe access to and clean water and sanitation. Hitherto, the provisioning of these services are all better in towns than in rural areas. Nevertheless, living conditions among low-income households in the country's urban areas are still relatively poor. Access to modern fuels remains extremely low with almost 95% of urban households using solid fuels, such as charcoal, for cooking. About 60% of Kigali's urban households live in unplanned areas. Many of them are located in fragile ecosystems where land is cheap, e.g steep slopes and swamps. Typically, they lack access to safe water, sanitation, electricity, health services, waste management and reliable roads.

Untreated domestic wastewater and industrial effluents expose residents to diarrheal and other water-borne diseases. Currently, Rwanda lacks sufficient treatment plants for industrial effluents and storm-water drainage systems. Humans and receiving peri-urban environments are exposed to heavy metals, such as lead and chromium; and nutrients from organic material and soil runoff. Rwanda's urban population are also exposed to air pollution due to the increasing number of vehicles, poor traffic management, old and poorly maintained cars and indoor smoke from burning wood fuel and charcoal.

Poverty and hardships in rural areas will most likely force subsistence farmers to migrate to informal urban settlements in Rwanda's main cities Kigali, Huye, Muhanga, Musanze, Nyagatare, Rubavu, and Rusizi. Despite significant achievements to accommodate newcomers, urban management and service provision in Rwanda have significantly lagged behind urban population growth and the needs for resources and pollution pressures they exert. There are still many people living in unplanned settlements and high-risk zones with poor environmental conditions. In 2014, over half of urban

residents in the East Africa Community (EAC) lived in slums, as shown in the figure below (where slums are characterized by the lack of access to improved water and sanitation; fragile, poor-quality housing; and inadequate living space (World Bank, 2016). Except for South Sudan, Rwanda is by and large on par with its neighbouring countries.

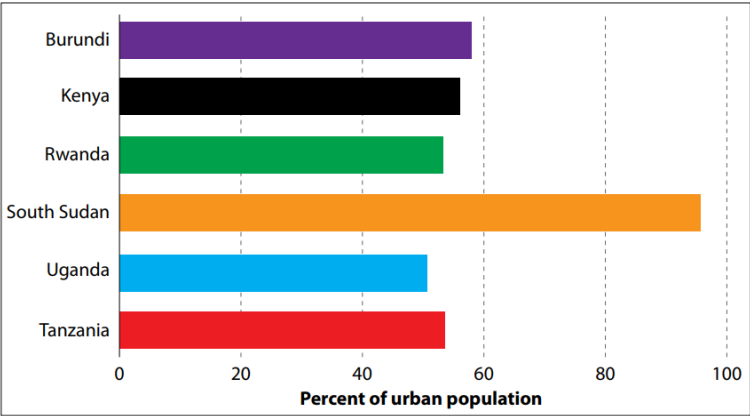


Figure 2. Population living in slums (% of urban population) in the East Africa Community (EAC)
 Source: REMA, 2017

4.2. Environment and the Political and Institutional context

The country’s policy frameworks are by and large adequate and the institutional set-up for managing environmental challenges is quite robust. Main problems relate to implementation and enforcement of existing legislation, rules, regulations and policies. This is further hampered by a lack of good governance, including lack of transparency and accountability, and insufficient coordination across government agencies and other actors, and cross-sectoral cooperation.

For more than a decade, Rwanda has taken a proactive approach to address environment and climate change issues in most of the country’s policies, programmes and plans. For instance, the country’s commitment can be seen in the conservation of the environment through the protection and restoration of degraded ecosystems such as wetlands, lakes and natural forests.⁵¹ Moreover, Rwanda was one of the first countries in the world to ban plastic bags. To become a climate-resilient, low-carbon economy by 2050, Rwanda has initiated Green Fund (FONERWA). The purpose of FONERWA is to provide technical and financial support to the best public and private projects that align with Rwanda’s commitment to a green economy.⁵²

Other green initiatives include e.g. the project “Developing Rwandan Secondary Cities as Green Model Cities with Green Economic Opportunities”, which includes four pillars for green growth: i) Climate resilient and low carbon city; ii) Integrated urban planning; iii) Local green economy, and iv) City governance and wellbeing.⁵³

Rwanda aspires to become a middle income country by 2035 and high-income country by 2050. This vision will be achieved through the newly implemented seven-year National Strategies for Transformation (NST1) 2017-2024. The NST1 replaces the second Economic Development and Poverty Reduction Strategies EDPRS-2 (2013-18). NST1 will provide the platform and pillars to reach the Vision 2050.

The NST1 includes three pillars 1. Economic Development; 2. Social Transformation Pillar; and 3. Transformational Governance Pillar. The Economic Development pillar includes seven priority areas,

⁵¹ Biruta, 2016

⁵² Government of Rwanda, 2016

⁵³ REMA, 2015

out of which priority 7 is focused on *Promoting Sustainable Management of the Environment and Natural Resources to Transition Rwanda towards a Green Economy*. More specifically the following areas are prioritised:

- Continue to **strengthen forest management** and ensure their sustainable exploitation working with the private sector.
- **Increase and sustain area covered by forest** through forest landscape restoration
- **Promote use of alternative fuels such as cooking gas and biogas**. Efforts will be concentrated on promoting use of cooking gas in urban areas
- Develop a project to **manage water flows** from the volcano region and other rivers to mitigate related disasters and **improve water resource management**
- **Manage and protect water catchments** to mitigate disasters in partnership with local communities.
- **Strengthen land administration and management** to ensure optimal allocation and use of land.

The main responsible organisation for this pillar is the Ministry of Environment (MINIRENA). Other responsible organisations include Ministry of Trade and Industry (MINICOM) and Ministry of Agriculture and Animal Resources (MINAGRI).

It is MINIRENA that oversees matters related to the environment, water resources, lands, forestry. The Rwandan Environmental Management Authority (REMA), under the supervision of MINIRENA, is a non-sectorial institution with mandate to work with national environmental protection, conservation, promotion and overall management, including advisory to the government on all matters pertinent to the environment and climate change.⁵⁴

In August 2018, Rwanda published a new Environment Law which regulates both EIA and SEA⁵⁵. It is yet to be fully adopted for full implementation, enforcement and follow-up. Rwanda is quite mature in its legal frameworks and use of EIA on project level – much due to the Organic Law on Environment of 2005 (No. 04/2005) - but lacks sufficient capacity on SEA at policy, plan and program levels. The Rwanda Environmental Management Authority (REMA) is the central authority responsible for implementing EIA and SEA.⁵⁶

Rwanda is moving towards a more diverse economy attempting to move beyond agriculture and encourage other industrial investments in e.g. mining, tourism, textiles, pharmaceuticals, steel and iron plants etc. For Rwanda to move towards a greener economy it is essential that these sectors are managed in environmentally sustainable ways based sound environmental management systems that are fully in place and sufficiently well resourced. In this regard the country is facing many challenges with relatively low awareness, lack of capacity, policy gaps, and limited inflow and use of new greener technologies and technological innovations.

It should be acknowledged that Rwanda is indeed making progress and new technologies are being adopted, but for this to keep pace with the pressures on Rwanda's environmental resources, there is an urgent need for speeding up its environmental management across all sectors. There are gaps between the official environmental commitments and the actual implementation measures launched to improve environmental outcomes. Furthermore, there are still few environmental economic policy instruments in place that provide incentives for investments in greener technologies, less use of

⁵⁴ REMA, 2019

⁵⁵ Environmental Impact Assessment; and Strategic Impact Assessment

⁵⁶ NCEA, 2019

environmentally harmful substances, reduced pollution and natural resource pollution. It is still too cheap to pollute and it is the poor that suffer the most from this state of affairs.

4.3. Environment and the *Peace and Conflict* context

During the 1990ies the Rwandan population was severely affected by the genocide and the associated economic crises, civil war, internal displacements, mass emigration, political transition, returning refugees, environmental pollution and destruction of natural resources. Moreover, the environmental degradation caused by the massive population displacements caused vast economic losses to the country.⁵⁷

As in many other developing countries subject to land scarcity and conflict it is shown that forest losses increased and were more spatially concentrated during conflict. In Rwanda, 96% of forest loss during conflict across the landscape occurred in protected areas. These results underscore

In view of Rwanda's relative peace and stability since the genocide, the country has become a safe haven for people fleeing conflicts and other hardships in the region. Rwanda hosts thousands of refugees from neighbouring countries in refugee camps as well as in urban settings. Rwanda accommodates around 158 000 refugees from the Democratic Republic of Congo (approx. 74 000) and Burundi (approx. 84 000).⁵⁸ In addition to social and economic hardships, poorly managed refugee camps and IDPs settlements can put pressure on scarce water resources, nearby forests (including wildlife game and biodiversity), energy and food resources (again with links to forests), uncontrolled waste disposal and hazardous leakages.

4.4. Environmental context

The Environmental context is described separately under chapter 2.

Chapter 5: Conclusions and issues to consider

The purpose of this chapter is to give some brief conclusions and issues for Sida to consider in the development of a new strategy for Rwanda. The chapter also includes a brief analysis of Swedish added value and comparative advantages.

From this brief review it can be concluded that Rwanda faces a number of serious environmental challenges. By and large they are indeed addressed by various actors within and outside government; however, to attain environmentally sustainability there is a need for reinforced efforts to reduce current and future environmental risks and vulnerabilities, and boost the opportunities that lie in greening Rwanda's development.

The Swedish support to Rwanda is already striving to contribute to a better environment, limited climate impact and greater resilience to environmental impact, climate change and natural disasters. It does so by supporting strengthened capacity of Rwanda's public institutions to contribute to environmental sustainability and greater resilience to climate change and environmental impacts (Swedish Government, 2015).

Sweden has a strong subject-matter expertise, long-standing engagement and leadership in the area of environment and climate change. This give Sweden comparative advantages and may bring added values in this field. This applies to areas of work like building strong and competent government institutions for effective environmental management, a competitive green business sector creating green innovations and green jobs, sustainable energy solutions, investments and trade in green products and services and green financial instruments like green bonds. Sweden is also strong in

⁵⁷ Munien et al, 2010

⁵⁸ UN Migration, 2019

environmental research in its various subfields like environmental science, environmental systems analysis, environmental economics, environmental management in forestry, agriculture and land use, and environmental assessment.

Currently, Sweden supports Rwanda in the area of environmental policy and administrative management and environmental research⁵⁹. Other areas of support pertaining to environment and climate change include university collaboration (with several Swedish universities) and capacity development in the area of research and higher education, portfolio guarantee aimed at facilitating increased access to finance for small and medium sized private actors focused on renewable energy solutions, and general environmental mainstreaming in a set of projects and programmes in the aid sectors: Government and civil society, Education and Social infrastructure including peace building, democracy, human rights etc.

In view of this, environment and climate change constitute a relatively large share of the Swedish aid portfolio for Rwanda. However, as this study is based on assessment of official policies and strategies, thematic reports and scientific articles, providing realistic and feasible suggestions of possible Sida-financed support would require more consultation and gathering of information from key individuals, and a stronger sense of the circumstances, opportunities and particularities in Rwanda. Therefore, the ideas presented in this section should be seen as a basis for a discussion with Sida on possible ways that the Swedish support could be designed in order to enhance the environmental agenda in Rwanda. The issues below pertain to both ongoing Swedish support and plausible new areas for Swedish support. Please note that the ideas presented below are brief issues to consider which may be discussed internally by Sida and with other relevant actors and, if preferred, in dialogue with the Sida Helpdesk for Environment and Climate change.

Green economy: Green economy is defined as an economy that aims at reducing environmental risks and ecological scarcities, and promoting economic and social sustainable development without degrading the environment. In a green economy, growth in income and employment are driven by policies and investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent loss of biodiversity and ecosystem services. Transparent revenue sharing from natural resource extraction and pollution charges, and targeting of environmental incomes may speed up poverty reduction, boost green jobs creation, and improve livelihoods for poor and vulnerable groups.

Uncertain about the status and momentum of Government of Rwanda's (implementation of its) National Strategy for Climate Change and Low Carbon Development ("Green Growth Strategy") from 2011, green economy constitutes a powerful set of tools to promote environmentally, socially and economically sustainable development. Areas of work may include:

- Support assessment of costs of environmental degradation; and assessment of economic benefits of environmental management. Such information may enhance formulation and implementation of national sustainable development strategies and policies;
- Support to capacity building related to Strategic Environmental Assessments (SEA) of policies, plans and programs.
- Support to carry out Environmental Performance Reviews (EPR), Public Environment Expenditure Reviews (PEER), or Public Environment Revenue Reviews (PERR) if requested

⁵⁹ Institutional Support to FONERWA; Scaling up Off Grid Energy in Rwanda Project; Capacity Development in Land Administration Lantmäteriet/RLMUA; Institutional Support Project to Ministry of Environment (MINIRENA) and REMA; research on tropical montane forests in a warming world.

Source: <https://openaid.se/aid/sweden/rwanda/all-organisations/general-environmental-protection/2018/>

by the Government. Such information is key for strategic guidance of the country's development pertaining to sustainability.

- Support to development of Environmental Fiscal reform, and enhanced use of environmental economic policy instruments (environmental taxes, fees, pollution charges, subsidies etc.) for environmental management and public financing.
- Support research initiatives, education and trainings on green economy.

Environmental Statistics and monitoring: One major challenge in Rwanda is the relatively limited access to environmental statistics and information. Some is provide, but there are opportunities for improvements. For instance, lack of access to reliable updated environmental statistics and information hampers the government to make well-informed decisions and prioritizations. Without correct environmental information the public does not have the ability to form opinion and to be part of consultations.

- Support Rwanda's systems for monitoring pollution (incl pollution control) and natural resource change pertaining to eg changes in air, water, and soil quality, biodiversity and ecosystem services. This is motivated by the importance of monitoring in the implementation of, and making adjustments to, Rwanda's environmental legislation, policies, strategies and operational action plans.
- Support data collection and dissemination of environmental statistics.

Environmental justice: The environment is as a prerequisite to the enjoyment of human rights. It is important to improve the understanding of the direct and indirect links between the protection of the environment and human rights.

- Support awareness raising on environmental rights and offer a neutral platform for civil society engagement and capacity building on citizens' rights related to environmental issues.
- Educate and capacitate legislators in debating and making informed decisions on issues/policies and legislation pertaining to climate change and green growth.
- Improve awareness amongst the judiciary and other key public actors for improved implementation and enforcement of existing environmental legislation.

Greening industries and markets: As green growth offers opportunities for a cleaner environment, new and greener jobs and business opportunities in new sub-sectors (sustainable transport, energy, infrastructures, health etc), it would be strategic to support new green businesses to develop.

- Investigate opportunities for promoting environmentally sustainable small and medium size firms;
- Support urban/peri-urban actors that may benefit society's poor to engage in small-scale green industries or circular economy business models, eg re-use, re-cycling, re-furbishing of goods that can strengthen value chains, close material loops, reduce pollution and resource depletion and spur corporate social responsibility.

Sustainable water management: Rwanda is highly vulnerable to climate change and rainfall variability, and water management is recurrent challenge. Water is intrinsically linked to agriculture, forestry, poverty, health and other key factors in Rwanda's social and economic development. In view of climate change in Rwanda, it is thus of increasing importance to pay attention to water management, including issues like distribution, pricing, supply to various sectors, water quality and prevention of disease.

- Assist to improve Rwanda's regulatory and management system for water supply and quality, with plausible focus on industrial waste water, urban water drainage and storm-water management, including pollution control and enhanced public health;
- Improved quality and efficiency of public health service delivery, such as enhanced sewage and wastewater treatment, or solid waste management. Efforts in this area will have positive effects on sanitary conditions, public health (and thus finance and employment!), biodiversity and general environmental quality.

Sustainable Tourism: Tourism is today a relatively large economic sector in Rwanda (12.7 per cent of the country's GDP) and it has increasingly become a driver of changes in the country. Arguably, the sector can grow but it should not be at the expense of Rwanda's natural capital. And if tourism is to thrive, its development must be planned in an integrated manner with other related sectors such as agriculture, mining, transport, forestry, water, petroleum and natural gas. These sectors are increasingly putting pressures on Rwanda's biodiversity and tourism attractions such as national parks. There is thus a need to develop the tourism sector in more sustainable fashion. Eco-tourism creates valuable jobs (especially among low-income earners), conserves nature and promotes biodiversity and be a source of income to communities as well as the treasury.

- Support eco-tourism.
- Support community based natural resource management.

Finally, this policy brief touches upon a range of highly complex issues. Needless to say, there are many aspects that deserve a much more detailed level of analysis. We hope, however, that this Environmental and Climate Change Policy Brief fulfils its aim of being a point of departure for a discussion on how environmental and natural resources aspects can be integrated into Swedish development cooperation with Rwanda.

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Annex 2: Overview of main international actors

This annex provides a brief overview of international actors (multilaterals, bilaterals and NGOs) working in Rwanda related to environmental issues.

The World Bank Group: The World Bank Group has just implemented its FY2014-2018 Country Partnership Strategy for Rwanda. It mainly supports the **energy, agriculture** and **transport sectors**. It also provides smaller support in other areas such as socio-economic inclusion of refugees and host communities in Rwanda, housing finance, and public finance management reform.

Hence, besides the Rwanda Pilot Program for Climate Resilience (closed Feb 2017) the WB Group does not explicitly include a standalone environmental support program. However, indirectly it addresses the environment by containing several components which pertain to the environment such as environmentally sustainable agricultural intensification and food security, sustainable energy reform (e.g. including improving the efficiency and sustainability of charcoal and woodfuel value chains and cross-border hydro power development) and transport (e.g. Rwanda Feeder Roads Development Project)

For more information, see: <https://www.worldbank.org/en/country/rwanda>

European Union/Commission: EU's cooperation with Rwanda is mainly focusing on improving/supporting **pro-poor services, national reconciliation** and **rural economic development**. EU's "National Indicative Programme for Rwanda"* outlines the main focal sectors of the EU cooperation with the country during the period 2014-20 under the 11th European Development Fund. General budget support is also provided to promote basic services, particularly in education, health and water, and rural development (mainly improved food security and agricultural productivity) and infrastructure, financed via EU sector budget support and through individual programmes. EU support is also available to strengthen good governance and the rule of law, improve economic and financial management, boost trade and regional integration and develop the private sector. Hence, EU/EC does not explicitly promote a standalone environmental support program. However, indirectly it addresses the environment by containing several components which pertain to the environment in its other support programs, e.g. within agricultural development and energy. Examples include the following projects: Prepaid Energy. Rent to (off-grid) own solar home systems; EU-FAO partnership to help governments reduce poverty, achieve zero hunger, improve nutrition, and increase resilience in crisis-prone countries; and EU-FAO partnership to develop early warning action against food crisis and promote resilience.

* (https://ec.europa.eu/europeaid/sites/devco/files/pin-rwanda-fed11-2014_en.pdf)

For more information, see: https://ec.europa.eu/europeaid/countries/rwanda_en

Canada: Canada pursues cooperation with Rwanda in the field of environment. This is based on a Memorandum of Understanding from 2017 signed between the Ministry of Environment for the Republic of Rwanda and the Department of Environment and Climate Change of Canada concerning environmental cooperation. The Memorandum of Understanding (MOU) seeks to enhance cooperation between Canada and Rwanda on environmental and sustainable development issues. It identifies five areas where the two countries will work together: **climate change, the green economy, environmental compliance and enforcement, sustainable urban wetland management, and other environmental issues of mutual interest**. The MOU emphasizes the role of indigenous peoples and gender equality. It will promote innovation and green growth. Cooperation under this MOU can be in the form of: sharing best practices and lessons learned; capacity building and training initiatives; or participating in meetings and other cooperative activities.

The Netherlands; SNV: In Rwanda, The Netherlands via SNV delivers advisory services to local organisations throughout the country, supporting realisation of Rwanda's national development goals in the **agriculture, energy** and **water**, and **sanitation & hygiene sectors**. SNV's core business is

to strengthen the capacities of local organisations in the private and public sectors. SNV promote market-based solutions to reduce poverty and promote good governance. Currently, SNV in Rwanda supports producer organisations, processors and agro-businesses in the coffee, honey and other bee products and dairy value chains in order to increase income and employment opportunities and as such contribute to food and nutrition security. SNV applies value chain development approaches, promoting market-based solutions to increase overall competitiveness and tap into opportunities while protecting the environment. In the energy sector, SNV promotes innovative solutions and interventions for private sector development with support to MININFRA, MYICT, and REG. SNV also promotes access to water and sanitation as part of Rwanda's Economic Development Poverty Reduction Strategy II.

Hence, The Netherlands does not explicitly promote a standalone environmental support program. However, indirectly it addresses environmental issues by containing several components in its different support programs which pertain to the environment. To exemplify, this is carried out e.g. within 1) the HortInvest project that focus on supporting sustainable horticultural production and horticulture growers; 2) the Isuku Iwacu project that aims to improve household sanitation in Rwanda, in about 140 villages to achieve open-defecation free environments; and 3) promoting sustainable coffee production through the Turnaround Program for Coffee Cooperatives (Phase I and II under the PRICE project funded by IFAD), with support to 50 coffee cooperatives to improve their management, governance and business development capacities.

For more information, see: <http://www.snv.org/country/rwanda>

Germany, GIZ: GIZ is currently working in Rwanda in two priority areas: 1) **Decentralisation and good governance**, and 2) **Economic development and employment promotion**. GIZ is also supporting other sectors alongside these priority areas: 1) Promotion of a Rights-Based Approach programme supporting civil-society organisations in Rwanda, 2) the Civil Peace Service programme which promotes conflict transformation and the establishment of peace, 3) the "Energising Development" project which addresses energy generation, and 4) the Economic and Investment Policy project which seeks to expand the capacities of the Ministry of Finance and the Central Bank. Recently, GIZ also started to support the ICT Ministry in establishing an African Center for Digital Transformation. In the area of Sustainable infrastructure GIZ supports 5) Transboundary water cooperation in the Nile Basin and 6) private sector participation in micro-hydro power supply for rural development.

As far as we can from their current overall aid program to Rwanda GIZ does not explicitly promote a standalone environmental support program. However, as with the donors above, it indirectly addresses and integrates environmental issues by including it in different components in its different support programs listed above.

For more information, see: <https://www.giz.de/en/worldwide/332.html>

African Development Bank Group, AfDB: AfDB is currently working in Rwanda focusing on two pillars: 1 Pillar-1 – **Investing in energy and water infrastructure to enable inclusive and green growth**; and Pillar-2 – **Developing skills to promote high value added economic activities and economic transformation**. The main objective of pillar 1 is to contribute to a reduction in the cost of doing business to further enhance the enabling environment for private investment and economic transformation through improved access to affordable and reliable energy and water supply. Bank support under the two pillars is mutually reinforcing and is provided through its public and private sector windows. Under Pillar 2, the main objective is to support Rwanda in accelerating economic transformation through the development of skills that promote high value added economic activities. Emphasis will be placed on developing skills for industry sub-sectors as well as other sectors which have a strong potential for high value added production, exports and job creation.

For more information, see: <https://www.afdb.org/en/countries/east-africa/rwanda> and [https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Rwanda CSP 2017-21 EN.PDF](https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Rwanda_CSP_2017-21_EN.PDF)