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Environment and Climate Change Analysis for Rwanda¹

This Environmental and Climate Change Analysis aims to summarize the key environmental risks and opportunities for Rwanda, related to poverty reduction and economic development and the Swedish governments' thematic priority Environment and Climate which includes four focus areas; (i) climate change adaptation, (ii) energy, (iii) environment and security, and (iv) water.

Summary

Rwanda is highly dependent on natural resources and agricultural growth is critical for pro-poor growth. Given very small land holdings, insufficient investments in soil and water conservation and Rwanda's topography, soil and nutrient erosion is a constraint to agricultural growth and a pressing environmental problem that also affect downstream countries. Climate change is likely to add to existing pressures including erosion through more intense rains. Conversion of wetlands, partly due to large population displacements, is another key environmental problem affecting water regulation, water purification and livelihoods and with negative impacts on downstream hydropower generation. Economic diversification and improved soil and water management are important for sustainable use of the country's natural resources.

Increasingly environment and natural resources management issues are integrated in key planning documents including the recent PRSP. Likewise the institutional capacity is improving and there are signs of successful implementation of programmes for afforestation and soil protection. However institutional capacity, not least on a decentralized level is still weak.

Introduction

Rwanda is the most densely populated country in Africa and 57 % of the population live under the national poverty line. Rwanda is landlocked and is weakly integrated in the global economy. Population pressure coupled with inadequate management of forests and lands constrain economic growth and slow poverty reduction efforts by lowering agricultural yields and raising energy prices. Areas within the Lake Victoria Basin such as Bugesera and Crete of the Nile have the highest levels of food insecurity in Rwanda.² The ability of ecosystems to provide food, clean water, wood fuel and biodiversity is particularly threatened in Kibungu.³ In recent years there is evidence of increased activities to respond to deforestation and soil erosion.⁴

1 At the request of the Swedish Development cooperation office in Kigali and Sida Stockholm, this Environment and Climate Analysis was written, by Olof Drakenberg at Sida's Helpdesk for Environmental Economics, Department of Economics, Gothenburg University, as part of Sida-EEU's institutional collaboration on environmental economics and strategic environmental assessment. Comments are welcome and can be sent to olof.drakenberg@economics.gu.se The analysis builds heavily on the Rwandan supplement to the environmental Policy Brief for the Lake Victoria Basin (Nov 2007) prepared by Olof Drakenberg and Innocent Kabenga at Environmental Economics Unit, Gothenburg University

2 Ministry of Finance and Economic Planning, 2006, Comprehensive Food Security and Vulnerability Analysis

3 Wong et al, 2005, Connecting Poverty and Ecosystem Services – Focus on Rwanda

4 EDPRS, Draft July 2007. The number of villages involved in reforestation has increased from 40% in 2000-2001 to 60% in 2005-2006. According to FAO the forested area has increased by approximately 30% during the same period. Measures against soil erosion have been made in the Northern province (part of LBV) and against deforestation particularly in the Eastern and Southern provinces (part of LVB).

Climate change is expected worsen existing stresses including poverty, land degradation, food insecurity and natural disasters. Vulnerability is a reflection of human capacity to cope with risks or shocks. Wealth, access to technology and societal organisation are important determinants of a county's adaptive capacity. A nation's ranking on the Human Development Index is a proxy for its ability to cope with shocks as it encompasses important aspects like wealth, education and health issues. Rwanda's HDI ranking is 158 indicating low capacity. In a basin context Rwanda is an upstream country and externalities (mainly nutrient rich and polluted water) are "exported" to ecosystems downstream, mainly in the river Kagera and Lake Victoria. Transboundary cooperation to achieve sustainable management of the Lake Victoria Basin requires Rwanda to reduce these externalities. The entry into the East African Community with its vision document for Lake Victoria increases the opportunities and incentives for Rwanda to take more action.

1. Which are the key environmental problems, opportunities and their causes?

Key environmental and natural resources problems

Deforestation, soil erosion, degradation of river banks and lakeshores, overgrazing, wildlife poaching and desertification are the key environmental problems facing Rwanda. The most acute problems are soil erosion and wetland degradation.⁵ Nutrients and eroded soil reach Lake Victoria primarily through River Kagera that account for 1/3 of the river inflow in the lake and is a major contributor of water hyacinth infestation.⁶ Rapidly growing urban areas are also creating problems of waste management, air and water pollution. Another downstream effect is reduced potential for Rwandan hydropower generation due to siltation (reduced water storage) and lower water levels.

Rwanda is regularly affected by droughts and floods, the frequency of flooding seem to have increased⁷. In recent years rains have been less predictable and heavy rains have increased soil erosion. Climate change is expected to increase vulnerability to existing stresses thus putting additional burdens notably on the rural poor. Rwanda, highly dependent on rainfed agriculture, existing problems with land degradation, low economic diversification and high poverty rates is particularly vulnerable to climate change. The NAPA found that the eastern and southern provinces are most vulnerable to drought risks whereas the northern and western provinces are most vulnerable to intensive precipitation, floods and erosion. Expected impacts of climate change include: high degradation of arable land (erosion), desertification trend, lower lake levels and degradation of forests.⁸ There is high certainty about higher temperature and more extreme weather (floods, drought etc) in the future. However projections on rainfall (number of rain days and timing) are uncertain.⁹

Key causes

Land scarcity, population pressure, poverty and lack of alternative livelihood options are main causes for unsustainable use of natural resources. Fallow periods have been drastically reduced and marginal lands, steep hills and wetlands have been encroached in search for

5 Centre for Resource Analysis, 2006 (National Transboundary Diagnostic Analysis for the Lake Victoria Basin)

6 Centre for Resource Analysis, 2006

7 In 1999 close to 900 000 were affected by a drought, since then the number of affected from floods and droughts have been more limited. Major natural disasters happened in the 70's. Source Emergency Events Database, WHO

8 National Adaptation Plan of Action to Climate Change

9 IPCC, 2007

agricultural lands and fuel wood.¹⁰ Internal displacement of 30% of the population following the genocide in 1994 and to some extent elite capture has severely aggravated the situation particularly in the Lake Victoria part of the country and in the Northwest (Gishwati forest).¹¹ Furthermore, Rwanda has inadequate human and institutional capacity to design and enforce policies for land tenure and sustainable management of natural resources (TDA 2006) and suffers from reform fatigue¹². Last but not least capacity to disseminate appropriate technologies to the rural poor is weak.

Opportunities

Improved management of natural resources are seen in EDPRS as a means to increase agricultural yields (soil and water conservation), improve food security and export revenues. Efforts to reduce water and air pollution can also improve employability and reduce health expenditures. Eco tourism is highlighted as an opportunity to increase foreign investments and expansion of the services sector. Increased global focus on climate change mitigation provides opportunities for carbon projects (clean development mechanism or voluntary schemes). Rwanda is planning to expand the capacity to attract such funding. Nevertheless it should be noted that there are few forest sector CDM projects globally and that there are a number of constraints that limit expansion. Rwanda's capacity to absorb funds will in part depend on overall stability and quality of institutions. It is also important that potential projects consider poverty and livelihood impacts.

2. What are the effects of the environmental risks and opportunities?

Economic growth, environment and natural resources

The Rwandan economy, including the Lake Victorian part of the country is based predominantly on agriculture. In 2002, the population engaged in agriculture was 87 % and the sector provided employment to 88 % of the population. Agriculture contributes 47 % to GDP and accounts for 71 % of the country's export revenues and is the main source of income for 87% of the population.¹³ Fisheries account for less than 1% of GDP and forests to about 1%.¹⁴ More than a quarter of the population cultivate less than 0,2 hectares and only 40 % cultivate 0,7 hectares or more, which is an estimate of the minimum area needed to feed a typical Rwandese family. "Small or insufficient plots of land" and "Poor soils" are the two leading causes for poverty according to the National Poverty Assessment. Cultivated land increased by 7% between 2000-2003 and the livestock holdings have increased by 60% between 2000-2005.¹⁵ There is also potential for extended wildlife tourism. Currently tourism account for 5,8 % of GDP.¹⁶

Rwanda lacks significant mineral or oil deposits, export revenues are small and foreign savings finance most of the country's investments. The national target is for agriculture to grow by 5-8 % per year while at the same time reduce the number of people involved in agriculture from 91 to 50 %. Alternative livelihoods and private sector development (manufacturing, ICT, tourism) are to be generated in part through investments in transport network and improved energy supply.

10 94 % of the population use fuel wood for energy needs representing almost 98% of total wood demand. In 2005 the equivalent of 12 % of the forest based was consumed. GoR, 2006, Economic analysis of natural resources management in Rwanda

11 The Arusha Peace Accords have granted land for returning refugees. Large parts of national parks have thus been converted to farmland (Akagera National Park and Gishwati forest) 11 GoR and development partners, 2006, Land use and Environment – joint sector review

12 Sida, 2005, Country Economic Report – Growth and poverty reduction, Evaluating Rwandas first PRS

13 GoR, 2006, Joint Sector Review/EDPRS Self Assessment – SWG: Agriculture and animal resources

14 Data on fisheries and forests are from 1998, source: Gor, 2003, National Strategy and action plan for the conservation of biodiversity in Rwanda

15 GoR, 2006, Joint Sector Review/EDPRS Self Assessment – SWG: Agriculture and animal resources,

16 World Travel and Tourism Council

There are few estimates of the costs of climate change for Rwanda. More extreme weather could be expected to lower agricultural production due to increased erosion, insufficient water availability and livelihoods lost in natural disasters. Ultimately, the costs of climate change to Rwanda will heavily depend on the success of global mitigation and the country's adaptive capacity. According to the Stern review a temperature rise of 5-6 % would result in costs of 5-10% of global GDP and for poor countries costs in excess of 10%. If mitigation efforts can reduce global warming to 2 degrees at 2050 costs would be substantially lower.

Diminishing natural capital

According to a World Bank estimate¹⁷ Rwanda's natural assets are reduced/degraded by close to 3 % of Gross National Income per year, mainly due to deforestation. It is a low estimate as it does not consider land or water degradation. Costs of soil erosion alone have in another study been estimated to 1,9 % of GDP¹⁸.

Over cultivation and soil erosion lead to reduced yields per hectare¹⁹ and threatens food security and livelihoods. Soil erosion is moderate to severe on 50% of the land surface. Land productivity on much eroded farms is 21% lower on farms with little erosion. Deforestation and conversion of wetlands such as Rugezi-Burera-Ruhondo has significantly contributed to lower water flows in rivers and reduced capacity of the Ntaruka and Mukungwa hydropower stations. As a consequence of the power shortage, the electricity bill more than doubled²⁰. Diesel powered generators were brought in to compensate for reduced hydro power generation. By the second quarter of 2006 the cost of paying for the diesel was estimated to approximately US\$ 65,000 per day (EIU 2006)²¹.

Apart from reduced capacity for wetlands to provide ecosystem services like water regulation the poor have suffered from reduced availability of fish, fodder and medicine, reduced flood protection and increased time for transportation.²²

Population, poverty, health and conflict

Rwanda's population is estimated at 9,9 million with an annual growth of 2,8%. About 57 % of the population are living below the national poverty line with large regional disparities. The highest poverty rates are found in the Lake Victoria basin (Butare and Gikongoro in the Southern Province). In Kigali, the poverty rate is about 12,3 % and like other urban areas the city is rapidly growing. Coverage rates for safe water supply have increased between 2002 and 2005 from 41% to 55% in rural areas and from 66% to 69% in urban areas.²³

Unsustainable use of natural resources and pollution tend to affect women more than men. Over 94 % of Rwandans depend on wood fuel for domestic energy. Women often spend longer hours to collect fire wood and water as resources decline and are more exposed to

17 The World Bank has developed a measurement of a country's sustainability performance "Adjusted Net Savings". It depicts a more full picture of savings after accounting for depreciation of produced capital, investments in human capital and depletion of natural capital/pollution. The estimate is said to be low as it does not consider water resources degradation, biodiversity losses or reduced eco system services like water retention or flood regulation. Adjusted Net Savings are positive for Rwanda as Gross Savings plus investments in education outweigh natural resources depletion, see more in Annex 2.

18 Government of Rwanda, 2006

19 Clay and Lewis, 2000

20 GoR (2006)

21 Economic Intelligence Unit (2006). Country Profile, Rwanda

22 Non agricultural goodsGoR, 2006, Economic analysis of natural resources management in Rwanda.

23 GoR and development partners, 2006, Land use and Environment – joint sector review. According to the Little Green Databook, World Bank 2007, 74 % of the population has access to improved water source and 42 % to improved sanitation.

indoor air pollution (respiratory diseases). In Rwanda about 20 000 deaths annually are attributed to poor water quality and hygiene (60%), indoor air pollution (39%) and outdoor air pollution (1%).²⁴ Poor health due to polluted water and air reduce employability and participation in education, especially for the poor.

Natural resources scarcity is perceived to have contributed to the genocide in 1994.²⁵ Land disputes are very frequent, many involving resettlement of refugee-returnees, and could threaten reconciliation and stability.²⁶ Abundant natural resources in neighbouring countries, particularly Democratic Republic of Congo (minerals, forests) has provided a motivation and the means for perpetuating conflict in the Great Lakes. An institutionalized system for controlling natural resources wealth has involved strong interests from DRC, Uganda and Rwanda.²⁷

3. What are key actors doing to manage the Environmental risks and opportunities and to what extent are responses implemented?

National development plans and institutional capacity

Integration of environment and natural resources management is significantly improved in the new EDPRS.²⁸ Environment has been identified both as a sector and as a cross cutting issue and proposed indicators include: areas protected against soil erosion, access to water and electricity, forest cover and implementation of land tenure system. Furthermore the EDPRS mention the need to address findings of the National Adaptation Plan of Action on Climate change, supports use of Environmental Impact Assessments (for development projects, infrastructure etc) and Strategic Environmental Assessments (for policies, plans and programmes).

While it is be too early to judge if measures proposed in the EDPRS will receive necessary funding and capacity for implementation, there are also some encouraging actions that translate government commitment to improved management of natural resources.

-Between 2000 and 2005 the forested area has increased by 8% annually.²⁹

-Improved budget execution for environment between 2003-2005. This is partly due to an improved mandate (establishment of REMA, Rwandan Environmental Management Authority) and better planning.³⁰

REMA has been accused by the private sector and parts of government of hindering investments by being too demanding and/or for having weak bureaucratic capacity.³¹ This could be interpreted both as a sign of strength, that environmental regulations are implemented, but also as a weakness if the capacity is insufficient.

Dissemination and enforcement of the recent land policy (that strengthens women's rights to land), environmental awareness raising and mainstreaming of environment in other sectors are

24 WHO, 2002, Estimated deaths and DALYs attributable to environmental risk factors.

25 Homer-Dixon, 1996, Ohlsson, 2001

26 Institutre for Security Studies, 2005

27 UNECA, 2007, Natural resources and trade flows in the Great lakes region

28 Environmental mainstreaming was weak in the previous PRS. Centre for Resource Analysis, 2006 (National Transboundary Diagnostic Analysis for the Lake Victoria Basin)

29 FAO, 2005, Global Forest Resources Assessment. However there is contradiction about the figures. The World Bank Little Green Databook source FAO and indicate a deforestation rate 2,6 % for the period 1990-2005. It should also be noted that according to the Joint Sector review on Land use and Environment the forested area had decreased by 27 % between 1993 and 2006.

30 Ibid

31 The New Times, 7th of July 2007

considered top priorities.³² However, institutional capacity to design and implement policies and enforce laws is weak.

A decentralization reform in 2006 has given more power to local authorities. District level development plans include environmental protection actions such as planting trees and putting in place anti-erosion measures.³³ Lack of skills and financial capacity on local level however remains a problem. The performance contracts signed by District Mayors with the President of the Republic include environmental protection programmes especially soil protection through building terraces and reforestation.

³² GoR and development partners, 2006, Land use and Environment – joint sector review

³³ Districts Development Plans 2008-2012

Climate change adaptation

Rwanda is party to the UN Convention on Climate Change and the Kyoto Protocol. The National Adaptation Programme of Action (NAPA) was finalized in 2006 and identifies vulnerability, impacts and priority responses including; integrated water resources management, hydro-agro early warning systems and promotion of non agricultural income generating activities.³⁴ Findings of the NAPA appear to be integrated in EDPRS. Given the uncertainty of local climate impacts, particularly rainfall, caution is needed when projections are used to motivate investments that are only justifiable if the projections materialize. There is however, a large overlap on what builds adaptive capacity for climate change and disaster risk reduction and other Rwandan development priorities including economic diversification, education, soil and water conservation and institutional strengthening.

Perception of corruption in Rwanda improved in 2007 but is still lower than in 2005.³⁵ However, the ombudsman's office and the national auditor general have been issuing critical annual reports that, if followed by actions, may result in less corruption happening in the country.

Regional institutions, donors and NGOs

The East African Community (EAC) is the regional intergovernmental organisation of the five Riparian States, Kenya, Uganda, Tanzania, Rwanda and Burundi with its headquarters in Arusha, Tanzania. Within EAC, the Lake Victoria Basin Commission (LVBC) is the most important regional coordination body for environmental management and natural resources in the basin. The tasks of the commission include promoting and coordinating: harmonization of laws and regulations, promotion of stakeholder participation, monitoring, evaluation and compliance with agreed actions. The strength of the LVBC is linked to the status of the national focal points at ministerial level. The Ministry of Lands, Environment, Forestry, Water and Mines is the focal ministry for Rwanda.

A range of bilateral and multilateral donors are active in the environmental sector (NL, SE, UNDP, UNEP, World Bank, African Development Bank etc). Other sectors such as Energy, Agriculture and Water also have a strong influence on the outcomes management of natural resources and the environment. There are also important regional cooperation initiatives related to conflict and trade with great significance for natural resources management. See more information in annex.

4. What are the implications for Sida?

Sustainable management of natural resources is critical for poverty reduction in Rwanda. Measures to improve farm incomes (improved access to markets and credits, secure tenure, soil and water conservation etc) are needed. It is also necessary to diversify the economy, to invest in health and education and to empower the poor to reduce pressure on scarce land and reduce vulnerability for natural disasters.

Due to capacity constraints there is an imminent risk that policies are elaborated without assessing environmental impacts and climate risks. Capacity to work across sectors and to

34 GoR, 2006c. The NAPA also identify 7 priority projects eligible for funding under the convention. Top priorities are: land conservation and protection against erosion and floods; early warning system; development of irrigated areas; improve district capacity for planning and implementing measures (soil and water conservation, better crop varieties etc).

35 The score on Transparency International Perceived corruption index was 3.1 in 2005 , 2,5 in 2006 and 2,8 in 2007.

enforce legislation is also weak which could lead to inefficient use of money and degradation of the ecosystems that often are the most important assets for poor women and men.

Rwanda defines Environment both as a sector and a cross cutting issue. The question for Sida is: What does it mean to integrate the environment and sustainable use of natural resources in the sectors of Swedish priority? Or put differently. What can be done within these sector programmes to maximize positive impacts on ecosystem services and natural resource assets and to minimize the negative impacts and climate risks? On request we have made two proposals to fuel further discussion. The proposals complement the existing discussions between the Swedish EPA and the Rwandan Environmental Management Authority (REMA).³⁶ (To be expanded when sectors are chosen)

1. Improve decision making processes

In line with the EDPRS and the Paris declaration on aid effectiveness there is a need to strengthen the use of strategic environmental assessments (SEA). SEAs can be used to assess climate risks and environmental impacts of policies, plans and programs in an integrated manner.³⁷ Sweden should support the government of Rwanda to carry out SEAs for key sector policies and investigate needs for SEAs in sectors of Swedish support.

2. Link bilateral and regional support

The following examples are taken from the policy brief made for Lake Victoria, they are regional in character but have been included to provide a regional outlook.

Seek synergies with the EAC Strategic Action Plan for Lake Victoria

The bilateral ties between Sweden and the five Basin countries provide an opportunity to support improved regional management of the Lake. It appears that Sweden is particularly well positioned to incorporate the Strategic Action Plan for Lake Victoria Basin in its dialogue with Kenya and Rwanda where there is on-going support to natural resources and environment sector/authorities. There is also a strong link between implementation of the EAC Strategic Action Plan and Human rights and democratic governance, a focus sector for Swedish bilateral cooperation in all five countries. Improved property rights for both men and women are important for sustainable management of natural resources and ecosystems. Opportunities to contribute to strengthened property rights should be explored within on-going programs and/or in dialogue with the government.

Build regional capacity on climate change and disaster risk reduction

The region will be affected by climate change both directly and indirectly. Directly expected changes in the climate includes increased frequency of natural disasters (floodings, droughts), impact on agricultural yields, food security, spread of malaria etc. Indirectly the region is likely to generate substantially increased interest from OECD countries looking for ways to offset CO2 emissions and/or invest in bio fuel production. Capacity building is necessary to deal with both the threats and opportunities. Economies of scale could be realized by regional collaboration. EAC is already working jointly on natural disaster management. EAC could expand the work to encompass the challenges and opportunities related to carbon offsetting (research, climate scenarios, guidelines, oversee design and marketing of carbon credits,

³⁶ A delegation from REMA met with Swedish EPA in January 2008 and REMA is currently working on a proposal for future cooperation.

³⁷ The purpose of SEAs is to make more informed decisions on policies, plans and programmes by integrating environmental/natural resources issues and climate risks and evaluate their inter linkages with economic and social considerations. An SEA is typically carried out simultaneously when new policies etc are created for instance by having environmental expertise available in discussions. SEAs brings environmental considerations into key policy processes and is promoted in the Paris Declaration on aid effectiveness (§41).

awareness raising etc).³⁸ The Lake Victoria Initiative should investigate the opportunities for regional collaboration around climate change. There is a risk that the rapidly growing attention to climate change and disaster risk reduction result in the formation of new institutions and separate tracks thus raising transaction costs. It is of key importance that existing frameworks and institutions should be used as much as possible

³⁸ The Draft Operational Strategy for the Lake Victoria Basin Commission (draft June 2007) elaborates on the demand for increased capacity in this area.

Table 1 Selected indicators for the five Basin countries

	Burundi	Kenya	Rwanda	Tanzania	Uganda
Population	7,5	30	8,3	28,8	38,3
Annual population growth	2,1	2,1	2,9	3,4	2,0
Human Development Index, (Ranking)	0,384 (169)	0,491 (152)	0,450 (158)	0,430 (162)	0,502 (145)
Mortality due to environmental risk factors/1000 inhabitants	2,3	1,1	2,4	n.a.	1,9
GDP per capita (PPP) current, USD	729	1316	1278	751	1519
Environment and natural resources share of GDP (incl. tourism)	55	36,4	42,8	57,4	51,8
Forest area (% of area)	5,9	6,2	19,5	39,9	18,4
Annual change in forest area (2000-2005)	-5,2	-0,3	6,9**	-1,1	-2,2
Agricultural land (% of area)	91	47	78	54	63
Adjusted net savings See Annex	-2,9	10,5	9,1	2,0	-2,9
Access to improved water	79	61	74	62	60
Access to improved sanitation	36	43	42	47	43
Corruption index 2006	2,4	2,2	2,5	2,9	2,7
Country Policy and Institutional Assessment 2	2,5	3	3	3,5	4
Legal framework for environmental impact assessments (EIA) and strategic environmental assessments (SEA) 3	EIA (2000)	EIA (1999) SEA (2002)	EIA (proposed in EPRS 2007) SEA (proposed in EPRS 2007)	EIA (2004) SEA (2004)	EIA (1995) SEA (work to develop guidelines was initiated in 2003 but has not been finalized)

World Bank, 2007, Little Green Data book 2007, Human Development Index, 2004, EAC, 2006, RTDA, Global Forest Resources Assessment, Transparency International Corruption Perception Index. For

2 World Bank Country Policy and Institutional Assessment. The **environment criterion** assesses the extent to which environmental policies foster the protection and sustainable use of natural resources and the management of pollution. Assessment of environmental sustainability requires multi-dimension criteria (i.e. for air, water, waste, conservation management, coastal zones management^{natural resources} management). To ensure balanced assessments, World Bank staff assesses country policies and institutions by filling

References:

- Centre for Resource Analysis, 2006, National Transboundary Diagnostic Analysis for the Lake Victoria Basin
- Clay and Lewis, 2000, Land use, soil loss and sustainable agriculture in Rwanda MSU/MINAGRI papers
- Development Gateway, May 2007, Interview with Patricia Hjabakiga, Minister of State for Lands and Environment – www.developmentgateway.org
- District Development Plans 2008-2012
- East African Community, 2006, Transboundary Diagnostic Analysis of the Lake Victoria Basin Economic Intelligence Unit (2006). Country Profile Rwanda
- EM-DAT: The OFDA/CRED International Disaster Database - www.em-dat.net - Université Catholique de Louvain - Brussels - Belgium
- Institute for Security Studies, 2005, From the Ground Up: Land Rights, Conflicts and Peace in Sub-Saharan Africa
- Ministry of Finance and Economic Planning, 2006, Comprehensive Food Security and Vulnerability Analysis
- GoR, 2006, Joint Sector Review/EDPRS Self Assessment – SWG: Agriculture and animal resources
- GoR, 2006b, Economic analysis of natural resources management in Rwanda.
- GoR, 2006c, Ministry of Lands, Environment, Forestry, Water and Mines, National Adaptation Plan of Action to Climate Change
- GoR and development partners, 2006, Land use and Environment – joint sector review
- GoR, July 2007, Economic Development and Poverty Reduction Strategy (Draft)
- Sida, 2005, Country Economic Report – Growth and poverty reduction, Evaluating Rwanda's first PRS
- The New Times, 7th July 2007, Rema –the investors lock horns
- Swedish Environmental Protection Agency, 2007, Scoping study on the possibility of developing a bilateral environmental co-operation between Swedish EPA and the Rwandan Environmental Management Authority (REMA)
- Swedish Ministry of Foreign Affairs, 2004, Regional Strategy for the Great Lakes
- Transparency International, “*Transparency International's Corruption Index 2006*”
http://www.transparency.org/policy_research/surveys_indices/cpi/2006
- UNECA, 2007, Natural resources and trade flows in the Great lakes region
- WHO: “Quantifying environmental health impacts”
http://www.who.int/quantifying_ehimpacts/countryprofilesebd.xls
- Wong et al, 2005, Connecting Poverty and Ecosystem Services – Focus on Rwanda
- World Bank, 2007, Little Green Databook
- World Travel and Tourism Council:
www.wttc.travel/eng/Research/Tourism_Satellite_Accounting/TSA_Country_Reports/Rwanda/index.php

Annex 1: Donor activities ³⁹

The following initiatives are the main ones in the environment sector that are supported by the development partners in Rwanda:

- **Decentralization and Environment Management Project (DEMP) 2004-2007**
Mainly funded by the Netherlands and UNDP with some support from Sida. Aims to build capacity for environmental and natural resource management at the district (and lower) level by integrating environment into district planning. Implemented in the Western province (one of five provinces). 42 projects in the fields of; building terraces; environmental competitions; energy saving stoves; rehabilitation of Lake Kivu; riverbank protection; and forest rehabilitation. REMA personnel received training in GIS and GPS through the project. There might be a continuation of the project but the contents might be modified. The Netherlands wants to continue with practical on-the-ground type of interventions such as promoting the energy saving stoves.
- **Poverty and Environment Initiative (PEI) 2005-2009**
The process started already in 2002 with a Poverty and Environment Mapping project funded by UNDP that established qualitative and quantitative indicators for poverty and environment linkages. PEI is a joint initiative by UNDP and UNEP and is executed by the Government of Rwanda through MINITERE and implemented by REMA. It has a two-phased approach with Phase 1 (2005-07) ensuring the integration of environment into the EDPRS, which has been quite successful. Phase 2 (2007-09) will focus on the implementation of the EDPRS and capacity building for sound environmental management at the local, district and national level (e.g. enhance capacity of liaison officers within key ministries in order to increase the acknowledgement of environmental issues in their planning and policy process; promote implementation of environment into district development plans; awareness raising towards environmental committees, environmental and planning officers at district level). The funding for Phase 2 has been secured from Ireland.
- **Projet d'appui Institutionnel a la Gestion de l'environnement au Rwanda (Paiger) 2004-2007**
Funded by the African Development Bank, this project aims at strengthening the capacities of environmental institutions in Rwanda. Institutional support to REMA has been in the form of supplying equipment to the IT department. Training of REMA staff will be provided in the form of sending two officers to Uganda to be taught in drafting laws and regulations, while five or six officers will be sent to Maastricht University (Netherlands) for a certificate course in environmental management. The training will be conducted between September and December 2007. 4800 people in all districts (local authorities and environmental officers) have been sensitised (1 week brief overview) in the new environmental policy, law, and function of REMA etcetera.
- **Urban infrastructure and city management infrastructure project (UICMP)/ Projet d'Infrastructures et de Gestion Urbaine (PIGU) 2006-2009**
Mainly focuses on building infrastructure, slum upgrading, and capacity building. The capacity building focuses on (among others things) environmental management at district level and urban planning. Involved in 5 of 30 district (Kigali City and four secondary cities; Huye, Musanze, Nyanza, and Karongi). REMA has been asked to look into possible upgrading into the remaining districts, and to discuss the environmental training.
- **Protected Areas Biodiversity (PAB) (or "Strengthening Biodiversity Conservation Capacity in the Forest Protected Area System of Rwanda") 2005-2010**

³⁹ This section builds entirely on the Scoping study on the possibility of developing a bilateral environmental co-operation between Swedish EPA and the Rwandan Environmental Management Authority (REMA), 2007-10-22

Funded by GEF. The project will strengthen *in situ* management of mountain forest protected areas (PA), increase local participation with and benefits from PA management, and strengthen the central government's institutional capacity to finance, monitor, and manage all PAs. Project activities include support for capacity-building at all levels, increased collaboration between central-central and central-local government bodies, and a complementary set of income and employment generating activities in targeted PA-neighbouring communities. The executing agency for the PAB project is MINITERE while the lead implementing agency is REMA. Direct responsibility for the management of Rwanda's PAs is vested in the Rwandan Office of Tourism and National Parks (ORTPN) housed within the Ministry of Commerce (MINICOM). Not yet fully operationalised.

- **Integrated Management of Critical Ecosystems Project (IMCE) 2005-2009**
IMCE is a World Bank project which aims to help farmers to adopt sustainable agricultural intensification technologies that increase agricultural productivity and improve livelihood while protecting the natural resource base. The project consists of three main components: Development of a policy and regulatory framework for integrated ecosystem management; Capacity building and institution strengthening for integrated ecosystem management and; Development and implementation of community-based integrated ecosystem management plans for critical ecosystems. It deals more specifically with the wetland and watershed degradation, as well as biodiversity conservation issues associated with the rehabilitation of wetlands for agricultural production.
- **Montreal Protocol: Refrigerant Recovery and Recycling Centre 2005-2008**
A UNDP executed project, part of the Refrigerant Management Plan for Rwanda, contributes to the country's compliance objectives under the Montreal Protocol. The initiative is focused on the establishment of a CFC Recovery and recycling centre in Kigali, which was established in April 2007.
- **GEF-Sustainable Land Management** (will be funded but has not yet started)
With the support from GEF, this project will aim to strengthen policy, regulatory, and economic incentive frameworks to facilitate wider adoption of sustainable land management practices across sectors. Integration of environment concerns in rural development activities is an expected output.

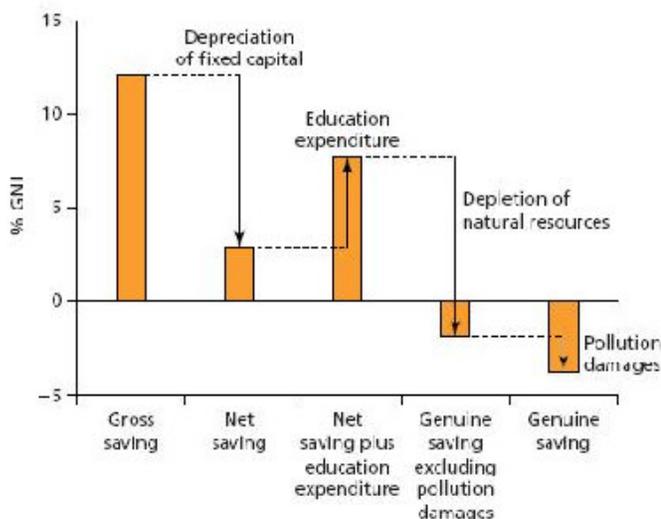
The following three bullet points are additional to those covered in the "Scoping study on the possibility of developing a bilateral environmental co-operation between Swedish EPA and the Rwandan Environmental Management Authority"

- Swedish Lake Victoria initiative
- World Bank LVEMP II (Lake Victoria Environmental Management Programme II)
- Nile Equatorial Lakes Subsidiary Activity Project

Annex 2 Adjusted Net Savings⁴⁰

Adjusted net saving, (also known as genuine saving), is a sustainability indicator building on the concepts of green national accounts. Adjusted net savings measure the true rate of savings in an economy after taking into account investments in human capital, depletion of natural resources and damage caused by pollution.

How to calculate Adjusted net saving



Adjusted net savings are derived from standard national accounting measures of gross national savings by making four types of adjustments. First, estimates of capital consumption of produced assets are deducted to obtain net national savings. Then current expenditures on education are added to net domestic savings as an appropriate value of investments in human capital (in standard national accounting these expenditures are treated as consumption). Next, estimates of the depletion of a variety of natural resources are deducted to reflect the decline in asset values associated with their extraction and harvest. Estimates of resource depletion are based on the calculation of resource rents. An economic rent represents the excess return to a given factor of production. Rents are derived by taking the difference between world prices and the average unit extraction or harvest costs (including a 'normal' return on capital). Finally, pollution damages are deducted. Many pollution damages are local in their effects, and therefore difficult to estimate without location-specific data. Here we estimate health damages due to urban air pollution. As for global pollution damages, the estimates include damages from carbon dioxide emissions.

A note on negative adjusted net saving rates

Negative adjusted net saving rates imply that total wealth is in decline; policies leading to persistently negative adjusted net savings are policies for unsustainability. In addition to serving as an indicator of sustainability, adjusted net savings has several other advantages as a policy indicator. It presents resource and environmental issues within a framework that finance and development planning ministries can understand. It reinforces the need to boost domestic savings, and hence the need for sound macroeconomic policies. It highlights the

⁴⁰ The text is copied from the World Bank webpage for Adjusted Net Savings:

<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTDATA/0,,contentMDK:20502368~pagePK:210058~piPK:210062~theSitePK:2875751,00.html>

fiscal aspects of environment and resource management, since collecting resource royalties and charging pollution taxes are basic ways to both raise development finance and ensure efficient use of the environment. And it makes the growth-environment trade-off quite explicit, since those countries planning to grow today and protect the environment tomorrow will be notable by their depressed rates of adjusted net saving.

In table 4 World Bank Adjusted Net Savings have been complemented with figures on land degradation for Kenya, Rwanda and Uganda.

	Burundi	Kenya	Rwanda	Tanzania	Uganda
Gross savings (%of GNI)	8,7	12,2	19,5	9,3	10,1
Consumption of fixed capital (%of GNI)	6,7	8,8	7,7	8	8,1
Education expenditure (%of GNI)	3,9	6,6	3,5	2,4	4
Energy depletion (%of GNI)	0	0	0	0	0
Mineral depletion (%of GNI)	0,1	0	0	0,4	0
Net forest depletion (%of GNI)	11,3	1,1	2,6	0	4,6
CO2 damage (%of GNI)	0,2	0,4	0,2	0,2	0,2
Particulate emission damage (%of GNI)	0,1	0,1	0,1	0,2	0
Land degradation		3,8	1,9		7,3
Adjusted net savings (%of GNI)	-5,8	4,6	10,5	2,9	-6,1

Source: World Bank, 2007, Little Green Data book. Data on land degradation are taken from Republic of Rwanda, Economic Analysis of natural resources management in Rwanda, 2006, Kenya- Cohen et al, 2006, Estimating the environmental cost of soil erosion at multiple scales in Kenya using energy synthesis, Uganda, Yaron et al, 2004, The role of environment in increasing growth and reducing poverty in Uganda.