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# Rwanda Environmental Threats and Opportunities Assessment (ETOA) 2008 Update



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# Rwanda Environmental Threats and Opportunities Assessment 2008 Update

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**Photos, front cover: Nyungwe National Park (Lance Gatchell, USFS); Gorillas in Volcano National Park (Anecto Kayitare, IGCP), Southern Province (Stephanie Otis, Chemonics International)**

The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.



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# CONTENTS

- Acknowledgements..... i
- Acronyms and Abbreviations ..... iii
- Executive Summary ..... v
- Section 1: Introduction..... 1
  - 1.1 Purpose and Background ..... 1
  - 1.2 Methodology for the ETOA Update ..... 1
  - 1.3 ETOA Update Report Organization..... 2
- Section 2: Context of the Assessment..... 3
  - 2.1 Biophysical Description..... 3
  - 2.2 Socioeconomic Description ..... 5
  - 2.3 Political and Legal Contexts ..... 7
  - 2.4 Overview of Environmental Programs and Initiatives..... 20
  - 2.5 Key Changes since the 2003 Assessment ..... 20
- Section 3: Status of Environmental Resources in Rwanda..... 23
  - 3.1 Forest and Terrestrial Biodiversity ..... 23
  - 3.2 Watersheds and Wetland Ecosystems..... 32
  - 3.3 Agriculture and Farming Systems ..... 33
  - 3.4 Energy Resources..... 34
  - 3.5 Economic Value and Importance..... 38
- Section 4: Threats to Forests, Biodiversity, and the Environment ..... 41
  - 4.1 Population pressure on biodiversity resources and protected areas ..... 41
  - 4.2 Institutional weaknesses and inefficiencies ..... 43
  - 4.3 Energy pressure..... 45
  - 4.4 Degradation of wetlands and lack of clean water ..... 45
  - 4.5 Agricultural inefficiencies and soil erosion ..... 47
  - 4.6 Climate Change..... 48
  - 4.7 Waste disposal issues ..... 48
- Section 5: Initiatives in the Environment Sector ..... 51
  - 5.1 Government Institutions..... 51
  - 5.2 Donors and the Environmental Landscape ..... 52
  - 5.3 USAID-Funded Environmental Activities..... 56
- Section 6 Potential Entry Points and Recommendations ..... 63
  - 6.1 General Entry Points ..... 64
  - 6.2 Opportunity Areas and Recommendations for USAID Involvement ..... 65

Resources Consulted..... 71

Annexes

- A: Scope of Work
- B: U.S. Foreign Assistance Act 118-119
- C: Environmental Analysis – Rwanda
- D: Biographies of the 2008 ETOA Update Team
- E: Persons Consulted/Interviewed
- F: Environmental Legal and Policy Framework in Rwanda
- G: IUCN Threatened Animal and Plant Species
- H: Rwanda Species on CITES Appendices I and II
- I: Additional Maps

## ACRONYMS AND ABBREVIATIONS

ACNR	Association for the Conservation of Nature in Rwanda
AfDB	African Development Bank
ANP	Akagera National Park
ARECO	Rwandan Association of Ecologists
AREDI	Rwandan Association for Integrated Development of the Environment
AWF	African Wildlife Federation
CBD	Convention on Biodiversity
CBOs	Community Based Organization
CDF	Common Development Fund
CURPHAMETRA	University Center for Pharmacy and Traditional Medicine
DFGFI	Diane Fossey Gorilla Fund/International
DFID	Department for International Development
DRC	Democratic Republic of Congo
EAC	East African Community
EDPRS	Economic Development and Poverty Reduction Strategy
EIA	Environmental impact assessment
ETOA	Environmental threats and opportunities assessment
FAA	Foreign Assistance Act
FFI	Fauna and Flora International
GDP	Gross domestic profit
GEF	Global Environment Facility
GIS	Geographic Information Systems
GNU	Transitional Government of National Unity
GOR	Government of Rwanda
GTZ	German Development Cooperation
ICRAF	International Center for Research in Agroforestry
IGCP	International Gorilla Conservation Project
IRST	Institute of Scientific Research and Technology
ISAR	Rwanda Institute of Agronomic Sciences
IUCN	International Union for Conservation and Nature
KIST	Kigali Institute of Science, Technology, and Management
LFRC	National Land and Forest Research Centre
LVBC	Lake Victoria Basin Commission
MEAs	Multilateral Environmental Agreements
MINAGRI	Ministry of Agriculture & Animal Resources
MINALOC	Ministry of Local Government, Good Governance, Community Development and Social Affairs
MINEDUC	Ministry of Education
MINERENA	Ministry of Water, Energy and Natural Resources
MINECOFIN	Ministry of Finance & Economic Planning
MINICOM	Ministry of Commerce, Trade, Industry, Tourism & Cooperatives
MININFRA	Ministry of Infrastructures

MOH	Ministry of Health
MINITERE	Ministry of Lands, Environment, Forestry and Mines
NAFA	National Forestry Authority
NAPA	National Adaptation Program of Action to Climate Change
NBF	National Biosafety Framework
NBI	Nile Basin Initiative
NBSAP	National Biodiversity Strategy and Action Plan
NDIS	National Decentralization Implementation Secretariat
NELSAP	Nile Equatorial Lakes Subsidiary Action Program
NEPAD	New Partnership for Africa's Development
NISR	National Institute of Statistics of Rwanda
NGO	Non Governmental Organization
NNP	Nyungwe National Park
OGMR	Rwanda Geological and Mines Authority
ORTPN	Rwandan Office of Tourism and National Parks
PAs	Protected Areas
PEM	Poverty-Environment Mapping
PNV	Volcano National Park
PRSP	Poverty Reduction Strategic Plan
PSTA	Agricultural Transformation Strategic Plan
RADA	Rwanda Agricultural Development Agency
RARDA	Rwanda Animal Resources Development Agency
RBS	Rwanda Bureau of Standards
REMA	Rwanda Environment Management Authority
RHOoDA	Rwanda Horticultural Development Agency
RIEPA	Rwanda Investment & Export Promotion Agency
RPSF	Rwanda Private Sector Federation
RAFNET	Rwanda Agroforestry Network
SPREAD	Sustaining Partnerships to Enhance Rural Enterprise and Agribusiness Development
TKTIWRDP	Transboundary Integrated Water Resources Development Project
UCB	Belgian Chemical Union
UNCCD	United Nations Convention to Combat Desertification
UNDP	U. N. Development Program
UNEP	U. N. Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
WCS	Wildlife Conservation Society
WWF	World Wildlife Fund

## EXECUTIVE SUMMARY

**Purpose.** This document is an update of the Environmental Threats and Opportunities Assessment (ETOA) that was conducted in 2003. It describes the status and actions necessary to conserve biodiversity and tropical forests in Rwanda. At the request of USAID's Africa Bureau, it both integrates and builds upon substantial pieces of the 2003 ETOA document where the facts and situations have remained constant. The purpose of this approach is to provide the reader with a comprehensive set of information in one document rather than two.

This update provides USAID/Rwanda with facts and assessments about biodiversity and tropical forestry conservation as it enters its next planning period. It provides the information necessary for USAID to comply with Sections 118 and 119 of the U.S. Government Foreign Assistance Act (FAA) of 1961, as amended (see Annex B), to guide and inform USAID/Rwanda as it develops its Annual and Operational Plans and its Country Assistance Strategy. Annex C contains the Environmental Analysis that addresses the FAA's tropical forests and biodiversity directives.

**Report organization.** The assessment report is organized to provide the reader with a broad background about Rwanda's biophysical setting, its general socioeconomic conditions, and summaries of the primary policies and legislation that pertain to the environment sector. It presents an inventory of biological diversity and tropical forests, as well as the general conditions of other important environmental factors such as water, wetlands, energy, and agricultural lands and practices. The main threats to the protection and conservation of these natural assets are presented next, followed by a discussion of what government, donors, NGOs, and the private sector are doing currently to address the perceived threats to the environment. The last section provides the reader with sets of entry points for investment and action that can build on current efforts and also help to address gaps where key threats to biodiversity and tropical forestry conservation and protection are not being adequately addressed. Report annexes provide information to complement the main body of the report.

**Biophysical description.** Rwanda is a small, mountainous, landlocked country with an area of 26,338 km<sup>2</sup> with an average altitude of 1,250m above mean sea level. On the landscape there are five distinct ecosystems: cropland and natural vegetation (47 percent of total land); scrubland, savannah and grasslands (32 percent of total land); forest (12 percent of total land); wetlands and water bodies (8 percent of total land); and sparse/barren vegetation (1 percent of total land). These ecosystems contain a wide variety of different habitats and species due in part to varied topography, which is responsible for diverse regional climatic conditions. Vegetation can best be described as a regional mosaic that includes segments of Guineo-Congolian and Sudanian vegetation. The Lake Victoria biome is subdivided into secondary grass mosaics and east African bush land, which is in turn divided into shrub savannah with trees under four meters high and acacia-wooded savannah with taller trees. Secondary forest mosaics produced by human activity have replaced natural vegetation in several parts of Rwanda.

Rwanda's hydrology is characterized by a dense network of lakes, rivers, and wetlands that feed into two major drainage basins: the Nile to the east and the Congo to the west. Approximately eight percent of the entire country (210,000 ha) is under water: lakes occupy about 128,000 ha, rivers about 7,260 ha, and water in wetlands and valleys accounts for about 77,000 ha.

**Socioeconomic description.** Rwanda's population growth over the last four decades has been unprecedented – from approximately 2.6 million in 1960 to 8.2 million in 2002. In 2007, it was estimated at 9.3 million, and is likely to reach 10.8 million in 2012. Annual population growth rate was 3.1 percent in 2002, one of the highest in Sub-Saharan Africa, but declined to about 2.6 percent in 2007. The population density is about 343 people per km<sup>2</sup>, the highest in Africa, but in some districts it exceeds 500 people per sq km. About 56.9 percent of the population lives below the poverty line and cannot meet their basic human needs. The gender difference nationally is 53 percent female and 47 percent male. The 2002 census data reveals that almost half the Rwandan population (48.6 percent) is under the age of 16. The youthfulness of the population combined with its high population growth rate and density has had a significant impact on the use of natural resources, the environment, and all public services from health care to education.

Agriculture is the mainstay of the Rwandan economy. Approximately 91 percent of the population depends on the sector, which is also estimated to contribute about 40 percent to gross domestic product (GDP) and 30 percent to export earnings. Per capita land holdings are very small, averaging only about 0.6 ha per family, and 2 percent of cultivating households do not own land. Most Rwandans are subsistence farmers, but some earn additional income selling cash/commercial crops such as bananas (primary), coffee, tea, pyrethrum, and cattle. Fish is also another source of income, especially in the Rift Valley lakes in the east.

Health statistics have deteriorated since the genocide of the 1990s; however, there have been significant improvements in health service delivery. Since 2003, new health centers have been constructed to reduce travel distances, and the mutual health insurance coverage has increased. The prevalence of HIV/AIDS is estimated at 3 percent nationally and may be holding firm or falling, a remarkable turn around from the 13 percent prevalence rates in 2000.

Collecting water imposes burdens on the time of women and girls due to the distances involved, and the water itself is often harmful to health. In rural areas, access to safe water is around 40 percent and in urban areas about 60 percent.

Literacy has slightly improved in the past five years from 63 percent to 64.7 percent of women, and from 75 percent to 76.3 percent of men (70 percent of the total population). Only 7.1 percent of the population has post primary education, and only 0.4 percent has tertiary education.

**Legislative framework.** Significant reforms have been made in the legal and regulatory framework for environmental management since the last ETOA in 2003. Almost all sector policies and laws have been repealed and new ones enacted in line with the Constitution of June 2003. Because the environmental sector is a relatively new addition to the political framework of Rwanda, few laws have specifically addressed environmental issues.

Despite the importance of forest and tree resources to the livelihoods and economy of Rwanda, the country did not have a forest policy until 1988, when the first one was enacted but not implemented because of war and genocide. The present policy was formulated in 2004. It has a focus on promoting gender, fostering public-private partnerships, and enhancing international cooperation in forest management. It also creates a national Forest Protection Service, responsible for extension and efforts to combat forest encroachment.

Although wetlands are among the most important resources for Rwanda, both in terms of productivity and ecological functioning, they are not sufficiently protected, and continue to be degraded. A current Global Environment Facility (GEF) project is working to classify wetlands in four areas in the country. Rwanda has comprehensive water or wetlands policy.

Fisheries legislation dates to colonial periods; more recent orders developed by the Ministry of Agriculture for fisheries gives concessions to the private sector. In some areas, fisheries have been leased by local associations. For the lakes within the Akagera protected area, however, the ORTPN (Office of Tourism and National Parks) has jurisdiction, even though it has no fisheries staff. Part of the problem is perhaps the fact that, despite the existing resource endowment and its potential, fisheries remain low in priority within natural resource sectors in terms of public investment. In addition, its contribution to GDP is inadequately recorded.

Since the 2003 ETOA, a number of important policies and pieces of environment-related legislation have been passed, including:

- National Land Policy — key to developing land tenure security
- Organic Law No. 4/2005 — details the protection, conservation, and promotion of the environment
- Organic Law No. 8/2005 — determines the use and management of land
- Law No.16/2006 — established the Rwanda Environmental Management Authority
- National Policy of Decentralization — created districts and allowed hiring of environmental officers to assist in integrating environmental issues into the district planning process and facilitating promotion of environmentally sustainable development at the local level

In addition to being a signatory to a host of international environmental conventions, Rwanda is also a party to several agreements that require close cooperation with its neighbors on environmental matters. At the regional level, Rwanda is part of the ten-member Nile Basin Initiative (NBI) and is host to one of the NBI programs — the Nile Equatorial Lakes Subsidiary Action Program (NELSAP) — and two of its transboundary projects: the Kagera River Basin Transboundary Integrated Water Resources Development Project (TKTIWRDP) that covers Rwanda, Burundi, Tanzania, and Uganda; and the Rusumo Hydropower Project that is implemented jointly by Burundi, Rwanda, and Tanzania.

Rwanda has been a member since 2006 of the East African Community (EAC), and a signatory to its protocols, including the Lake Victoria Basin Commission (LVBC) which is promoting coordinated development and management of transboundary ecosystems around Lake Victoria.

**Significant/key changes since the 2003 ETOA.** The key policy, legislative, and infrastructure changes in the environment domain since the 2003 ETOA are:

- The establishment of Rwanda Environmental Management Authority (REMA) in 2005 (legally in 2006) as the overall authority responsible for environmental management.
- Continued sector and service decentralization following the creation of elected government structures down to the cell level, and increased awareness of environmental issues at the district level with support from REMA.
- Creation of a national land center along with land tribunals from the province down to cell levels. The land reform process is improving the legal framework for land acquisition, transfer, and use.
- A strategic shift in the national planning process from a socially oriented PRSP I (2002-2005) to an economic growth driven EDPRS (2007-2012) has changed the priorities towards more in-depth use of natural resources — water, wetlands, wildlife protected areas, forests, mineral deposits, etc. — which has implications for the environment.
- Nyungwe National Park was established in recognition that its global and national significance merit the protection of national park status (Category II under the IUCN classification) to prevent further encroachment and degradation.
- The role of the private sector has increased in and around Rwanda's protected areas with the explicit intent to capitalize on the inherent value of these resources; the extreme example is the 49-year lease agreement to a private investment firm that now operates and manages Akagera National Park.
- ORTPN policy is that five percent of total tourism revenue be allocated to the districts bordering the three national parks. These funds have been used to build schools, provide health facilities and services, and other community services.

**Biodiversity and natural forest resource inventory.** Almost all of Rwanda's remaining forested lands of any significance are found within the borders of its national parks and two forest reserves. A few small gallery forests and remnant forests also exist. Almost all of the country's significant biodiversity also lies within the protected areas shown in the table below.



**Table: Rwanda's Protected Areas**

Name	IUCN category	Management Responsibility	Date Established	Area (km <sup>2</sup> )	Location	Latest Management Plan	No. of Staff
Akagera National Park	II	Dubai World	1934	1,085	1.45'00 S 30.38'00 E	2006	78
Nyungwe National Park	II	ORTPN	2005	1,013	2.30'00 S 29.14'00 E	2005	108
Volcano National Park	II	ORTPN	1929	140	1.28'41 S 29.30'00 E	2004	103
Gishwati Forest Reserve	IV	For Dept	1933	61	1.47'00 S 29.23'00 E	-	-
Mukura Forest Reserve	IV	For Dept	1933	20	1.59'00 S 29.31'00 E	-	-

These protected areas provide additional services of significance. They are the key components for watershed protection (the headwaters of the Nile and Congo River basins mentioned above); they protect habitats and landscapes that are the basis for a significant component of the economy (tourism); and they are a large carbon sink that captures greenhouse gases, providing a large benefit on a global scale. One estimate puts the economic value of these services just for the Nyungwe watershed is more than \$285 million annually.

There are also economic losses to consider from not having protective regulations and conservation boundaries in place. Areas like Gishwati and Mukura Forest reserves and the larger wetlands in the north that lack management plans and tighter protection legislation have been allowed to degrade with severe consequences to downstream populations. Those who depend on fish stocks, the close proximity of fuel wood and clean water, and tourist revenues have seen their livelihoods lowered significantly because of the loss of forest cover. Siltation in reservoirs that supplied hydropower for electricity has meant the electric utility could not meet domestic demand and had to turn to other more expensive alternative power supplies, resulting in enormous price increases to domestic users of electricity in Rwanda.

**Threats to biodiversity, tropical forestry conservation, and environment.** The update assessment did not find any significant change from the 2003 ETOA list of key threats. They are, in order of seriousness:

1. Population pressure on biodiversity resources and protected areas
2. Institutional weaknesses and inefficiencies
3. Energy pressure
4. Degradation of wetlands and lack of clean water
5. Agricultural inefficiencies and soil erosion
6. Climate change
7. Waste disposal issues

Population growth is straining natural resources as never before and remains the primary threat. Second is the lack of capacity in government institutions charged with establishing standards, guidelines, and enforcing policies governing the use, protection, and conservation of renewable resources. Since 2003, regulatory institutions such as REMA and the Bureau of Standards have been established, but have inadequate staff and capacities.

However, the country is now far better equipped to mitigate threats and is moving as quickly as it can to close institutional gaps. The donor community, and NGOs especially, have helped ORTPN and REMA to make substantial progress with protecting and managing the nations protected areas, particularly the three national parks. Government programs such as the EDPRS and the positive direction of decentralization, along with some rigorous private sector investment, have also aided in mitigating the two primary threats to biodiversity and tropical forestry conservation.

Outside the national parks and reserves, the greatest environmental threat is the lack of a water and wetland policy that will engender a comprehensive strategy to monitor the health of this resource, regulate its management, and ensure there is communication and cooperation with other sectors of the economy that rely on water and wetland services. Water and associated environmental services desperately needs a higher profile in Rwanda.

**Development assistance.** Development assistance to Rwanda's environment sector is small. Recent government documents (Government of Rwanda, 2008b, 2008c) reported that 11 bilateral donors were supporting 165 separate projects/programs in the country and only 10 had links to the environment. Most of the funding for environment-related initiatives is focused on Rwanda's protected areas and is sourced through international NGOs and university-related research efforts. Private sector investment in activities linked directly to Rwanda's biodiversity and protected areas is also growing.

Support for environmental programs by USAID/Rwanda continues to be very limited by budget constraints. The primary environmental activity supported at the time is the Destination Nyungwe Project, funded primarily with biodiversity earmark monies. Activities are intertwined in three components: biodiversity conservation, ecotourism and rural enterprise development, and health. The total budget is \$5.0 million over the 2006 to 2010 life of the project.

USAID/Rwanda also has environment interests in several other small business assistance projects. These include fuel wood supply concerns with an essential oils project, and stream pollution issues associated with wastewater from coffee washing stations in another project. Its food aid program has also been involved with a GOR effort to construct radical terraces. The efficacy and sustainability of constructing bench terraces to control erosion and improve agricultural production is a matter of considerable debate.

NGO coordination, seen as a very weak point in the 2003 ETOA, has improved considerably, especially in NGOs active around the national parks. Much of this is due to the revenue sharing with local communities instituted by the ORTPN. In addition, active social marketing and

themed campaigns have made a significant difference in citizen perceptions on environmental issues, biodiversity, and the role/importance of Rwanda's protected areas.

**Entry points for investment assistance.** The update identifies four environmental opportunity areas where technical assistance could be effective in Rwanda. They are:

- Increased assistance to REMA as well as other GOR institutions engaged in protecting and monitoring the natural environment
- Directed assistance to developing legislation and policies focused on safeguarding the environment and, more importantly, help applying those policies
- Continued development of environmental public-private partnerships with links to local communities
- Continued support for public education and raising awareness about environmental issues, and support for engaging decentralized entities in environmental management

For USAID, the recommended areas for effective investment include:

- Continued support to ORTPN and the activities underway in Nyungwe National Park
- Policy support, especially in the development of a water and wetlands policy, and in providing leadership to address the fuel wood energy crisis
- Working with REMA to find workable, cost-effective solutions that adhere to international standards to resolve the pollution issue at coffee-washing stations, as the GOR follows through on its promise to double the number of these stations before 2010
- Leveraging its own well-known "brand" in Rwanda to bring about greater public awareness and knowledge about environmental issues especially by working with districts, communities, other government institutions, and other donors



# SECTION 1 INTRODUCTION

## 1.1 Purpose and Background

This document is an update of the Environmental Threats and Opportunities Assessment (ETOA) that was conducted in 2003. It describes the status and actions necessary to conserve biodiversity and tropical forests in Rwanda. The specific tasks for this assignment can be found in Annex A, Scope of Work (SOW).

At the request of USAID's Africa Bureau (Resch, 2008), the authors have substantially integrated and built upon the 2003 ETOA document, retaining facts and situations that remain unchanged while noting events and activities in Rwanda's environment sector that have occurred in the last five years. In this way the reader has comprehensive information covering 2003 – 2008 in one document, rather than two. The report examines:

- The current state of biodiversity and forest conservation in Rwanda
- The principal actions necessary in Rwanda to conserve tropical forests and biological diversity
- The extent to which needs can be addressed by USAID/Rwanda given current and past programming initiatives, experience, and funding

This update of the ETOA also provides USAID/Rwanda with facts and assessments about biodiversity and tropical forestry conservation as it enters its next planning period. ETOA documents are intended as tools to be used by USAID in integrating environment concerns into its programming portfolio in the short- and medium-terms. This report also provides the information necessary for USAID to comply with Sections 118 and 119 of the U.S. Government Foreign Assistance Act (FAA) of 1961, as amended (see Annex B), to guide and inform USAID/Rwanda as it develops its Annual and Operational Plans and its Country Assistance Strategy. Annex C contains the environmental analysis that addresses the FAA's tropical forests and biodiversity directives.

## 1.2 Methodology for the ETOA Update

The 2003 ETOA was updated in Rwanda in June 2008 by a team of five specialists (short biographies on the team members can be found in Annex D). USAID/Rwanda's environmental officer provided valuable background information and support, and accompanied team members in field visits on numerous occasions.

Using the tasks outlined in the SOW, the ETOA team developed a preliminary work plan and schedule. This was approved by USAID/Rwanda and modified following the team's initial discussions and briefings. Meetings and interviews with USAID's Africa Bureau staff and international NGOs operating in Rwanda were conducted in Washington, DC prior to the team's

departure. Three team members also held discussions focused on key issues with environment staff at USAID's East Africa Region Office in Nairobi just prior to their arrival in Rwanda.

During its 10-day presence in Rwanda, the ETOA update team reviewed background documents; interviewed key informants in the environmental community in the capital, Kigali; and made field site visits to USAID/Rwanda-supported projects within the SO7 (Economic Growth) portfolio. These included an essential oils project (Ikirezi Natural Products) east of Kigali; a rural enterprise/agribusiness (coffee) project (SPREAD) in Butare; and an ecotourism and biodiversity protection project (Destination Nyungwe) in and around Nyungwe National Park in the southwest part of the country. The team also reviewed issues and important developments with staff of Rwanda's Tourism and National Parks Office in Akagera National Park on the country's eastern frontier. A complete list of the persons consulted/interviewed appears in Annex E of this report.

The interviews and field visits enriched, confirmed, and raised additional questions about the information reviewed in background documents and reports. Information collected through the field visits, background readings and interviews, and a preliminary analysis of potential entry points for future investment were presented at a briefing delivered to USAID/Rwanda at the end of the field phase of the assessment update. A draft report was delivered to and reviewed by USAID/Rwanda; comments and edits from the review process were then incorporated into the final ETOA update.

### **1.3 ETOA Update Report Organization**

Background details for the FAA 118/119 Environmental Analysis for Rwanda are provided in Annex C to this report. The main chapters include this introductory section, followed by data pertinent to the country's environmental sector and significant changes in the Government of Rwanda's (GOR) approaches to biodiversity and tropical forestry conservation (Section 2). New programs and policies (and/or changes in old ones) that impact the sector are summarized along with important legislation that has appeared since the 2003 ETOA. Section 3 provides an update of the overall status of natural resources in Rwanda. Key threats to biodiversity and tropical forestry conservation are identified in Section 4, as well as other important threats to Rwanda's natural environment. An analysis of current and planned initiatives in the sector that impact conservation efforts, protection activities, and rural livelihoods that rely on terrestrial and aquatic resources is presented in Section 5. These not only focus on USAID's investments, but also include important government programs, private sector work, and activities that rely on NGO direction, funding and management. A discussion of the 2003 ETOA recommendations in light of ongoing activities is also presented. Section 6 concludes the main text of the assessment by identifying potential entry points and opportunities for additional investment aimed at mitigating the main threats to Rwanda's natural environment. The primary references and citations used by the ETOA team for this update, along with supplemental information (e.g., policy and legal frameworks, maps, contacts, etc.), can be found in the report annexes.

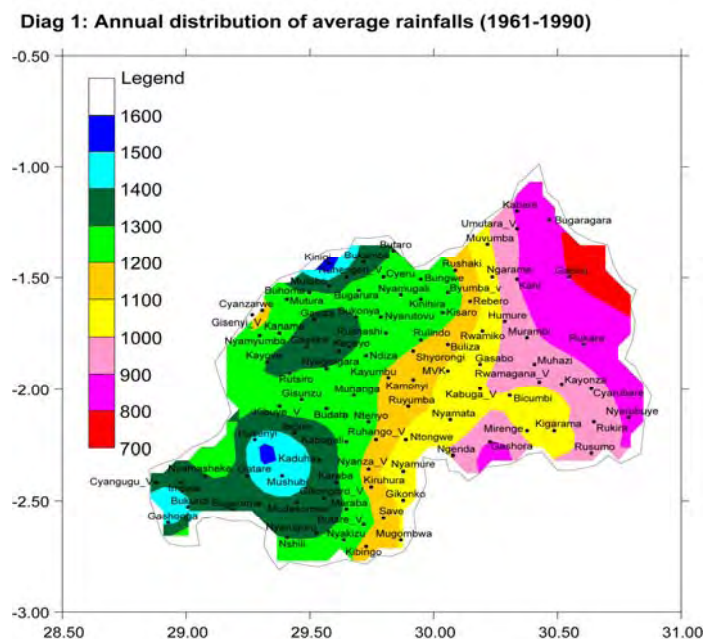
## SECTION 2 CONTEXT OF THE ASSESSMENT

### 2.1 Biophysical Description

Rwanda is a small, mountainous, landlocked country with an area of 26,338 km<sup>2</sup>. It is bordered to the north by Republic of Uganda, on the south by the Republic of Burundi, to the east by the United Republic of Tanzania, and to the west by the Democratic Republic of the Congo (DRC). Its varied territory has an average altitude of 1,250m above mean sea level. Rwanda has been described as the country of a thousand hills (*mille collines*), some with flat peaks and convex slopes, separated by deep valleys measuring between 50 m to 100 m. The six dominant types of topography are the Great Rift Valley and Lake Kivu in the west; Virunga Mountains and the high lava plains of the northwest; the Nyungwe afro-montagne rainforest of the Congo-Nile divide and the central plateau east of the mountains; savannas and swamps of the east and southeast; central plain; and arid area of the southeast. Within these areas, there are five distinct ecosystems: cropland and natural vegetation (47 percent of total land); scrubland, savannah, and grasslands (32 percent); forest (12 percent); wetlands and water bodies (8 percent); and sparse/barren vegetation (1 percent). (World Resources Institute 2003b)

Rwanda has an equatorial mountain climate with an average temperature range of 19-21°C and annual rainfall between 1,200-1,280 mm, distributed over two rainy seasons. The characteristics of the climate are linked with the geomorphology of the country's natural regions.

**Figure 2.1 Rwanda's 30-year Average Annual Rainfall Distribution (in mm), 1962 to 1990**



Source: Government of Rwanda, 2005 and the Rwanda National Meteorological Service.

Rwanda is home to a wide variety of different habitats and species due in part to its varied topography, which is responsible for diverse regional climatic conditions. Vegetation can best be described as a regional mosaic that includes segments of Guineo-Congolian and Sudanian plant life. The Lake Victoria biome is subdivided into secondary grass mosaics and east African bush land, which is in turn divided into shrub savannah with trees under four meters high and acacia-wooded savannah with taller trees. Secondary forest mosaics produced by human activity have replaced natural vegetation in several part of Rwanda.

Savannahs, which occur mainly in the east, comprise five distinct natural zones: Mutara, Buganza, Mubari-Migogo, Gisaka, and Bugesera. These are dominated by xerophyllous vegetation in which *Acacia senegal*, *Albizia petersiana*, and *Lannea humilis* are dominant. The Mutara consists largely of open savannahs in which *Themeda spp.*, *Hyparrhenia spp.* and *Cymbopogon spp.* predominate.

The Buganza subregion is an undulating plateau covered by *Combretum spp.* and *Acacia siberiana*. The Gisaka region is wetter than the other zones; vegetation there consists of a mosaic of mesophyllus forest and woodland savannahs. Vegetation in the Bugesera subregion in southeast Rwanda is dominated by woodland and shrubbery savannah consisting mainly of *Acacia spp* and *Combretum spp.*

According to the World Resources Institute (2003b), the total forest cover (natural and plantation) is 3,070 km<sup>2</sup> (460 km<sup>2</sup> and 2,610 km<sup>2</sup>, respectively). There are two main afro-montagne forest reserves in Rwanda — Gishwati and Mukura — and two afro-montagne national parks, Volcano National Park (*Parc des Volcans*) and Nyungwe National Park. The forests are characterized by high altitudes (2,000 m on average, though varying from 1,600 m to 4,500 m) and the dense understory and clearings typical of afro-montagne forests. The natural forest is estimated to have once covered 36 percent of total land area in Rwanda; that has fallen by a drastic 78 percent since 1990 alone. The GOR's need to permanently resettle the millions of returnees since the 1994 genocide, and to provide people with fuel, agricultural land, and shelter, has led to the almost total destruction of Gishwati and Mukura forest reserves and drastically reduced the forest cover across the country.

Rwanda's hydrology is characterized by a dense network of lakes, rivers, and wetlands. Approximately eight percent of the entire country (210,000 ha) is under water: lakes occupy about 128,000 ha, rivers about 7,260 ha, and water in wetlands and valleys accounts for about 77,000 ha.



Agriculture and tea plantations outside of Nyungwe National Park



Rwanda is located on the eastern rim of the Albertine Rift, where two major drainage basins are located: the Nile to the east and the Congo to the west. The Congo River basin, which covers 33 percent of Rwanda, receives 10 percent of all national waters. The Nile River Basin, which covers 67 percent of Rwanda, receives 90 percent of the national waters. Nyungwe National Park is Rwanda's major watershed for both the Nile and the Congo basins. The waters of the Nile basin flow out through the Akagera river system, which contributes between eight and ten percent to the Nile drainage system.

Wetlands (large permanent swamps) and marshlands (seasonal grass swamps, *marais*) occupy about 10 percent of the country and comprise three large and numerous small *marais* interspersed among the country's many hills. The main swamps are Akanyaru (125.46 km<sup>2</sup>), on the border with Burundi; Kagera, along the Tanzania border to the east (122.27 km<sup>2</sup>); and the Nyabarongo (246.98 km<sup>2</sup>) and Rugezi wetlands (62.94 km<sup>2</sup>) to the north. Rwanda's wetlands are important as buffers in flood or overflow plains. They reduce maximal flow rates during the rainy season and maintain a relatively high flow rate during the dry season. Arable land in Rwanda is approximately 1,385,000 ha (52 percent of total land), 8,250 km<sup>2</sup> of which is cultivated.

## 2.2 Socioeconomic Description

Rwanda's population growth over the last 4 decades has been unprecedented — from approximately 2.6 million in 1960 to 8.2 million in 2002 (National Census Service, 2005). In 2007, it was estimated at 9.3 million and is likely to reach 10.8 million in 2012 (UNFPA 2007). Annual population growth rate was 3.1 percent in 2002, one of the highest in Sub-Saharan Africa, but declined to about 2.6 percent in 2007. The population density is about 343 people per km<sup>2</sup>, the highest in Africa, but in some districts, such as Musanze in the north and Huye in the south, it exceeds 500 people per sq km. About 56.9 percent of the population lives below the poverty line and cannot meet their basic human needs. While the gender difference nationally is 53 percent female and 47 percent male, in Kigali City the split is 52 percent female and 48 percent male. The 2002 census data reveals that almost half the Rwandan population (48.6 percent) is under the age of 16. The youthfulness of the population combined with its high population growth rate and density has had a significant impact on the use of natural resources, the environment, and all public services from health care to education.

Population movement has also seriously affected the quality of life for Rwandans. Almost 3.5 million of them have been displaced or have only recently returned. There is still a huge need for wood for housing construction, and 96 percent of all households in Rwanda rely on wood or charcoal for cooking.

Agriculture is the mainstay of the Rwandan economy. Approximately 91 percent of the population depends on the sector, which is also estimated to contribute about 40 percent to gross domestic product (GDP) and 30 percent to export earnings. Per capita land holdings are very small, averaging only about 0.6 ha per family; 2 percent of cultivating households do not own land at all. Most Rwandans are subsistence farmers, although some earn a portion of their living

with cash/commercial crops (such as bananas [primary], coffee, tea, and pyrethrum) and cattle. Fish is another source of income, especially in the Rift Valley lakes in the east.

There have been significant improvements in health service delivery in recent years. Since 2003, new health centers have been constructed to reduce travel time, and the mutual health insurance coverage has increased. The infant mortality rate declined by 19 percent (from 107 per 1,000 live births to 86 per 1000 live births) and the under-five mortality rate fell by 22.4 percent (from 196 per 1000 to 152 per 1000); yet the rural mortality rates are one and a half times those in urban areas. The fertility rate has slightly increased from 5.8 children per woman in 2000 to 6.1 children in 2005. Also, the percentage of women using modern family planning methods increased from 4 percent to 10 percent. Despite these improvements, the health status is comparable to 1992 pre-genocide levels.

The overall HIV/AIDS prevalence in the country is estimated to be 3 percent (NISR 2005), which implies a considerable decline from 5.1 percent in 2004 and 13 percent in 2000. According to 2005 data from the Rwanda Demographic and Health Survey, there is wide disparity between rural and urban areas. The HIV prevalence in rural areas is 2.2 percent and 7.3 percent in urban areas (UNGASS 2008). Of those infected, 2.3 percent are men and 3.6 are women. Rwanda remains a high risk country for HIV/AIDS, despite commendable efforts of the GOR and other partners.

The greatest cause of morbidity (illness) is malaria, followed by diarrhea and respiratory infections. The causes of ill health are highly complex; among them are low incomes, limited information about prevention methods, low levels of literacy and education, and inadequate access to clean water and health services. The very low use of health services has improved slightly in recent years. The main deterrent is cost, followed by accessibility (though the government has recently made efforts to increase health facilities and offer health insurance coverage as noted above).

Collecting water imposes burdens on the time of women and girls due to the distances involved, and the water itself often affects health because its quality is poor. In rural areas, access to safe water is around 40 percent and in urban areas, Electrogaz provides drinking water to about 60 percent of the population.

As for education, literacy has slightly improved in the past five years from 63 percent to 64.7 percent of women and from 75 percent to 76.3 percent of men (70 percent of the total population). Gender disparities have also improved in primary school, with a higher enrolment rate for girls (87 percent) than for boys (85 percent). In secondary school, girls are still lagging behind boys in completion rates and exam scores. There are still disparities between income and age groups in enrolment in secondary schooling.

As a part of the government's goal to become a knowledge-based and technology-driven society, an Education for All Plan was conceived to provide primary education and the first three years of secondary school free. This is in line with the Dakar Framework of Action on Education for All

(EFA) and the Millennium Development Goals (MDG), and is motivated by the relative success of the fee-free basic education for all introduced by President Paul Kagame. At the university level, science and technology programs are being developed through ICT educational programs for undergraduate and graduate students. Over 4,000 computers were provided to institutions, and the Centre for Innovation and Technology Transfer (CITT) at the Kigali Institute of Science and Technology (KIST) was created.

Only 7.1 percent of the population has post-primary education, and only 0.4 percent has tertiary education. Moreover, there are concerns about the quality of education, particularly given the lack of books and facilities, and the challenges posed by the introduction of English and French throughout primary education without the necessary resources.

In 2003, Rwanda began implementing its first Poverty Reduction Strategy (PRS1 2002-2005). This was the first major medium-term development strategy following the end of the transitional government's tenure (see below). The poverty reduction efforts implemented in PRSP 1 have paid off, albeit modestly: absolute poverty declined from 60.4 percent in 2001 to 56.9 percent in 2006 (according to the Economic Development and Poverty Reduction Strategy 2007) but poverty levels remain unacceptably high (as observed in Table 2.1 below). The southern and northern provinces have the highest incidences (higher than the national average) and this is attributed to soil degradation and overpopulation respectively. But other areas – notably the southeastern plains which are prone to drought — also remain vulnerable to poverty.

### 2.3 Political and Legal Contexts

Since 2003, when the Transitional Government of National Unity (GNU) that was formed under the 1993 Arusha Peace Accords ended, Rwanda has been governed under a democratically elected government established in accordance with the National Constitution of June 2003. The present government is headed by a president whose seven-year term began in since September 2003; a multi-party senate; and lower house of parliament (Chamber of Deputies).

**Table 2.1 Poverty Headcount and Share of Poor**

Province	Poverty headcount (percent)		Share of the poor (percent)		Extreme poverty headcount (percent)	
	EICV1	EICV2	EICV1	EICV2	EICV1	EICV2
City of Kigali	24.4	20.2	4.1	3.4	15.4	11.1
Southern	65.8	67.3	27.1	30.2	45.9	47.2
Northern	66.9	62.7	23.5	20.3	47.2	40.8
Eastern	61.8	50.4	20.4	19.7	41.7	28.7
Western	63.1	62	24.9	26.3	41.8	40.9
<b>National</b>	<b>60.4</b>	<b>56.9</b>	<b>100.0</b>	<b>100.0</b>	<b>41.3</b>	<b>36.9</b>

Source: EDPRS, 2007 (Principal data sources are: EICV1 survey done in 2000 and EICV2 completed in 2005)

The Rwandan constitution ensures the protection and sustainable management of the environment more than any previous constitution. It provides the basis for protection and rational

use of Rwanda's environmental resources and takes into consideration how people relate to natural resources. Article 49 states:

Every citizen has a right to a safe, satisfying, and sustainable environment. Every person has the duty of protecting, maintaining, and promoting the environment. Any act aiming at damaging the environment is punishable by law. The state must protect the environment.

Article 191 prohibits any agreements authorizing the storing on Rwandan territory of toxic waste and other substances that may damage the environment. It states:

It is prohibited to make international agreements permitting the transit or dumping of toxic waste and other hazardous materials capable of endangering public health and the environment.

The 2006 policy on decentralized service delivery developed by MINALOC (Ministry of Local Government, Good Governance, Community Development, and Social Affairs) provided guidance and compelled ministries to decentralize service delivery activities and budgets and retain only policy, monitoring, and capacity building responsibilities. This was backed by reforms that reduced departments in all sector ministries to two: Administration and Finance; and Policy, Planning and Capacity Building.

In 2006, Rwanda was reorganized from 12 provinces to 5: Eastern; Kigali City; Northern, Southern; and Western. Also, the 106 districts were consolidated into 30 (See figure 2.2).

Significant reforms have been made in legal and regulatory frameworks for environmental management since the 2003 ETOA. Almost all sector policies and laws have been repealed and new ones enacted in line with the constitution of June 2003. Because the environmental sector is a relatively new addition to the political framework, few laws have specifically addressed environmental issues.

Nevertheless, Rwanda has long-standing laws that regulate natural resources and several more are being drafted. The main legislation that has significantly shaped environmental governance is listed in Table 2.2, and further information can be found in Annex F.

**Figure 2.2 Rwanda's Provinces and Districts**



Source: Kigali City Official Website, 2007. [www.kigalicity.gov.rw/spip.php?article117](http://www.kigalicity.gov.rw/spip.php?article117)

Despite the importance of forest and tree resources to the livelihoods and economy of Rwanda, the country did not have a forest policy until 1988. It was enacted but not implemented because of the civil war and genocide. The present policy was formulated in 2004, a year after the end of the transitional government. It came into effect after the country had lost two-thirds of the forest estate over four decades, which was attributed to weak forestry governance and over-dependency on forest resources. The policy focuses on promoting gender sensitivity, fostering public-private partnerships, and enhancing international cooperation in forest management. It also creates a national Forest Protection Service, which is responsible for extension and combating forest encroachment.

Although wetlands are among Rwanda's most important resources — both in terms of productivity and ecological functioning — they continue to be degraded; recent efforts have been made toward wetland protection legislation. Currently, the Global Environment Facility (GEF)/World Bank is undertaking an inventory of wetland resources in four critical wetland ecosystems: Kamiranzovu in Nyungwe National Park, Rugezi in the high altitude extreme northern Rwanda, the Rweru-Mugesera complex, and the Akagera wetlands system. The inventory will classify categories of wetlands for different uses, including strict protection. Based on the information from the inventory, five Ministerial Orders will be drafted relating to the use and management of wetlands, as well as an overall wetlands policy.

MINAGRI developed Ministerial Orders for fisheries concessions to the private sector, and in some areas fisheries have been leased by local associations. For the lakes within the Akagera protected area, however, the ORTPN (Office of Tourism and National Parks), which has no fisheries staff, has jurisdiction.

Nonetheless, there are a number of fisheries ordinances dating to colonial times: a 1947 ordinance (No 325/Agri) which prohibits introduction of exotic fish species into Rwandan waters; a 1955 ordinance which prohibits retention, culture, multiplication, sale and transportation of *Eichornia crassipes* — the water hyacinth; a 1955 ordinance (52/55) which prohibits use of narcotics to catch fish in the Rwandan lakes and rivers; a 1955 law that prohibits fishing with a net of mesh less than 4 cm; and a 1959 law that prohibits fishing with seines in the interior lakes, except for research purposes.

Part of the problem is perhaps that, despite the existing resource endowment and its potential, fisheries remain among the lowest priority natural resource in terms of public investment support. Correspondingly, its contribution to GDP is inadequately recorded, and there is limited policy, legislative, and institutional support.

Despite the current developments in environmental policies and legislation, the following challenges in developing and defining environmental management in Rwanda exist:

- **Inter-sectoral and intra-sectoral coordination:** Coordination of institutional activities and integration at all levels — within and among government institutions, donor/government and donor/donor levels — is weak. This undermines any efforts toward integration, joint programming, and monitoring. Improved coordination appears to be evolving at district and other decentralized levels, where the Joint Action Forum brings together all district departments and development partners. At the national level, sectors tend to work individually, which makes it difficult to appreciate and follow-up cross-cutting environmental issues.
- **Engaging young environmental governance institutions:** The establishment of REMA in 2006 strengthened the environmental governance regime, especially since the Department of Environment in the Ministry of Lands, Environment, Forestry and Mines (MINITERE) was under-funded and under-staffed. Environmental monitoring has been stepped up and a number of environmental projects are now coordinated under REMA; yet the institution is still young and needs to strengthen its capacity.
- **Building sustainable capacities in a highly dynamic environment characterized by frequent reforms:** The Environment and Lands Secretariat of State Portfolio established in 2002 was scrapped in the 2007 ministerial reshuffle, and its docket transferred to the minister of state responsible for water and Mines. REMA is still recruiting and there are ongoing discussions that its Directorate of Environmental Impact Assessment and Compliance Monitoring will be transferred to a complex development agency to be placed under the Ministry of Commerce, Trade, Industry, Tourism and Cooperatives (MINICOM). From the

policy perspective, most of the sectoral strategies, plans, and policies elaborated during 2003–2006 are being reviewed to align with the EDPRS elaborated in 2007. These and other developments that are ongoing create a highly dynamic institutional environment in which it is difficult to establish proper systems.

- **Weak information and knowledge management systems:** Availability and access to reliable data remains a big challenge. There is no central location where one can find information on environmental issues, since environmental data are scattered across ministries and agencies. Most agencies – government, donors, NGOs, etc — rely on commissioning specific studies, which means that data are not standardized and are therefore difficult to compare. One positive note: the National Institute of Statistics of Rwanda (NISR) has recently been collaborating with REMA on environmental statistics.

**Table 2.2 Summary of Significant Rwanda Legislation, Policies, and Environmental Instructions Pertaining to the Environment**

LAW/POLICY/INSTRUCTION	DATE	DESCRIPTION OF KEY POINTS
<b>Environment — General</b>		
National Environment Policy	2003	Stipulates the utilization of natural resources and the protection and rational management of ecosystems for sustainable and fair development
National Strategy and Action Plan for the Conservation of Biodiversity	4/2003	Develops national strategies, plans or programs for the conservation and sustainable use of biological diversity; Integrates the conservation and sustainable use of biological diversity into relevant sectoral and cross-sectoral plans, programs and policies
National Land Policy	2/2004	Stipulates the appropriate land administration system as a key of land tenure security by providing the possibility of registering and transferring land and also the possibility of investment in land
Organic Law N° 04/2005 on protection, conservation and promotion of the environment	4/2005	Stipulates the modalities of protecting, safeguarding and promoting the environment
Organic Law N° 08/2005 on the use and management of land	7/2005	Determines the use and management of land in Rwanda and institutes principles on land legal rights. Recognizes private ownership, both customary and legal, of most hillside areas. Previously, all land belonged to the State, making it illegal to buy and sell land and any required expropriation would result in users of land being compensated for assets lost at a fixed rate. As a result, there have been serious shortcomings in the national processes associated with land expropriation, resettlement and associated compensation payments.
Presidential Order N° 54/01 on land commissions	10/2006	Determines the structure, responsibilities, functioning and composition of Land Commissions
Ministerial Order N° 01/2006 on land registers	09/2006	Determines the structure of land registers, responsibilities and functioning of the District Land Bureau
Land Expropriation Law N° 18/2007	04/2007	Determines the procedures relation to expropriation in the public interest
National Biosafety Law	2005 Not yet formal law	Provides the basic understanding upon which to plan and implement appropriate measures to enhance benefits from biotechnology while safeguarding against environmental and human health risks
Guidelines and Procedure for Environmental Impact Assessment (EIA)	2006 Not yet a formal law	Developed to operationalize the provisions of the Organic Law to make EIA mandatory for all development projects

Law No. 16/2006	3/2006	Established REMA and delineated its organization, operation and responsibilities
National Policy of Decentralization	2006	Recreated districts, sectors and cells to include environmental officers within the district organigram to help with planning and coordination of environmental activities in the districts. First time in Rwanda's history to have explicit environmental officers at sub-national levels.
Ministerial Directive of 9/8/2004	2004 Not yet a formal law	Bans the manufacture, importation, use and disposal of plastic bags/containers
National Wildlife Policy	2007 Not yet a formal law	Provides for mechanisms to protect wildlife, including regulatory instruments for hunting and collection of specimens. Wildlife outside protected areas is not explicitly provided for
Law N° 14/2003	5/2003	Stipulates quality control and commercialization of plant seeds
ICT Policy Statement and Action Plan 2006-2010	6/2006	Encourage activities to enhance the civic sense of youth by proposing activities for issues such as the environment, democracy, civic behavior, child labor, etc
<b>Forests and Forestry</b>		
Instruction N° 01/2003	2003 Not yet a formal law	Ban of cutting trees before maturity. Requires the permit of the district mayor
Instruction N° 0001/2004	2004 Not yet a formal law	Ban of fuel wood use in making brick and tiles
Instruction N° 001/2006	2006 Not yet a formal law	Authorizations required for cutting and transporting trees at maturity
National Forestry Policy	2004	Established Provincial Forest Commission to promote and oversee forestry activities that meet, on a sustainable basis, the population's needs for wood and other forest products and services. The main targets are forest cover to comprise at least 30 percent of the national territory and to have at least 85 percent of farmland under agro-forestry by 2020. To replace current Forest Law, No. 47/88 of 1988
<b>Water Resources and Wetlands</b>		
Sector-specific Environmental Impact Assessment (EIA) Guidelines	Expected August 2008	Currently being developed to operationalize the provisions of the Organic Law for water resources and wetlands management; wastewater treatment; hydropower development; housing and roads infrastructure
Wetlands Policy	2004 Not yet a formal law	Shelved pending detailed inventory and categorization of wetlands for production and protection
National Policy on Water and Sanitation	2004	Inventory and integrated management of water resources including watershed protection; expansion of water supply and sanitation infrastructure to increase access to potable water; water for livestock and agricultural production; water resources governance including decentralization, community participation and privatization; capacity building. Policy implementation has, however, been hampered by lack of a strong legal framework and weak institutional and human resource capacities.
Draft Fisheries Law 2008	2008	Three types of fishing governed by law: fishing as a sport or leisure activity; commercial fishing, and scientific fishing, to study and advance the knowledge of fish and aquaculture resources.



**Regional and international framework.** At the regional level, Rwanda is a member of the ten-member Nile Basin Initiative (NBI) where, together with Burundi and DRC, it is valued as a key upstream member. Indeed, Rwanda is host to one of the NBI programs, the Nile Equatorial Lakes Subsidiary Action Program (NELSAP) and two of its transboundary projects – the Kagera River Basin Transboundary Integrated Water Resources Development Project (TKTIWRDP) that covers Rwanda, Burundi, Tanzania and Uganda; and the Rusumo Hydropower Project that is implemented by the tripartite of Burundi, Rwanda, and Tanzania.

Since 2006, it is also a member of the East African Community (EAC) and signatory to its protocols including the Lake Victoria Basin Commission (LVBC), which is promoting coordinated development and management of transboundary ecosystems in the Lake Victoria Basin.

Rwanda has signed and/or ratified and is signatory to a number of international conventions and protocols and agreements on or related to environment. The status of implementation at the national level is summarized in Table 1.

In June 2005, Rwanda and Ghana became the first two African countries to open up their governance processes for independent and transparent assessment through the APRM (African Peer Review Mechanism) process.<sup>1</sup> The process is being conducted under the New Partnership for Africa's Development (NEPAD), for which there is a fully fledged and facilitated Secretariat in the Office of the President. Rwanda is also actively involved in two pilot environmental sector projects under NEPAD: setting up a national Convention Coordination Centre in Rwanda, along with centers in Uganda, Mozambique, and Tanzania; and the transboundary agro-ecosystem management program for the Akagera River Basin. Environmental governance and sustainability is one of the priority programs of NEPAD.

Since 2003, Rwanda has been selected as a pilot country for various international environmental programs. They include the UNDP-funded Poverty-Environment Mapping in 2003-2004, the UNDP/UNEP-supported Poverty Environment Initiative (2005-present), and the UNEP-funded Multilateral Environmental Agreements (MEAs) Synergies Project. Under the MEAs Synergies Project, Rwanda is piloting the Integrated Reporting System for the Rio Convention on Biodiversity (CBD), United Nations Framework Convention on Climate Change (UNFCCC) and United Nations Convention to Combat Desertification (UNCCD). Rwanda is also a pilot case for implementing the “one UN” concept.

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<sup>1</sup> Rwanda NEPAD. 2005. NEPAD Magazine, Issue No. 004, December 2005

**Table 2.3 Status of International Conventions, Treaties, and Protocols in Rwanda**

Convention	Date signed/ratified	Implementation progress
UN Rio Convention on Biological Diversity (1995)	18 <sup>th</sup> March 1995	2000. September 2007
The Cartagena protocol on Biosafety to the Convention of Biodiversity signed in Nairobi from May 15, to 26, 2000 and in New York from June 5, 2000 to June 4, 2001	Authorized to be ratified by Law N° 38/2003 of 29 December 2003	Prepared a National Biosafety framework and submitted it t GEF/ UNEP in 2006.
United Nations Framework Convention on Climatic Change (1998)	18 <sup>th</sup> August 1998	Submitted initial communication in June 2005; prepared a national plan of action with projects worth about US \$ 8.11 million. The GOR is also preparing second communication report.
The Kyoto Protocol to the Framework Convention on Climate Change adopted at Kyoto on March 6, 1998	Authorized to be ratified by Law N° 36/ 2003 of 29 December 2003	Rwanda has prepared the initial National Communication report to the UNFFCCC Secretariat in Bonn and elaborated a National Plan of Action for Climate Change Adaptation, as part of its obligations under the Convention. However, lack of expertise and appropriate institutional framework as well as funding hinder activities for climate change adaptation.
United Nations Convention on Desertification Control (1998)	22 <sup>nd</sup> October 1998	First reported in 2000, and most recent report submitted in December 2004. The GOR has developed a National Desertification Control Strategy and action plan.
Vienna Convention for the Protection of the Ozone Layer and Montreal Protocol on Substances that Deplete the Ozone Layer (2001)	6 December 2000	Have implemented the implementation plan since 2003. Established a focal point office in REMA.
Stockholm Convention on Persistent Organic Pollutants/POPs (2002)	June 2002	Developed a database on POPs.
The Ramsar International Convention of February 2, 1971 on Wetlands of International importance, especially as waterfowl habitats was authorised to be ratified by Law N° 37/2003 of 29 December 2003	Authorized to be ratified by Law N° 37/2003 of 29 December 2003	Gazetted Rugezi wetland, as a RAMSAR site.
The Bonn Convention On Conservation of Migratory Species of Wild Animals opened for signature on June 23, 1979	29 <sup>th</sup> December 2003 under Law N° 35/2003	
The Montreal International Convention on Substances that Deplete the Ozone Layer, signed in London (1990), Copenhagen (1992), Montreal (1997), Beijing (1999), especially in its Article 2 of London amendments, and Article 3 of Copenhagen ,Montreal and Beijing amendments	Ratified by Rwanda on 29 <sup>th</sup> December 2003	
Convention on the Prior Informed Consent (PIC) Procedure for certain hazardous chemicals and pesticides in international trade (2003)	11 <sup>th</sup> September 1998	
The Rotterdam International Convention on the establishment of international procedures agreed by states on commercial transactions	Approved by Presidential Order N° 28/01 of 24 <sup>th</sup> August	

Convention	Date signed/ratified	Implementation progress
of agricultural pesticides and other poisonous products, signed in Rotterdam on 11 September 1998 and in New York from 12 November 1998 to 10 September 1999	2003 approving the membership of Rwanda	
Recalling the Washington Agreement of March 3, 1973 on International Trade in endangered species of Wild Flora and Fauna	Authorized for ratification by Presidential Order N° 211 of 25 June 1980	
BASEL Convention on the Control of Transboundary Movements of Hazardous wastes and their disposal as adopted at BASEL on 22 March 1989	Approved by Presidential Order N° 29/01 of 24 <sup>th</sup> August 2003	

Source: Various publications from REMA; ETOA 2003

In the implementation of these conventions, agreements, and protocols, Rwanda is progressing, albeit slowly. For example:

- A National Biosafety Framework (NBF) was developed in 2006, with GEF funding support and through UNEP, but the framework not been implemented.
- Some training has been undertaken regarding the Vienna Convention on Ozone Depleting Substances (ODS), an inventory was undertaken in 2007, and a demonstration centre was established in Kigali city. Nonetheless, little has been done to raise awareness and to increase access to information. Capacity building for monitoring of ODS, beyond developing a database at REMA, has not been undertaken.
- Regarding the three Multilateral Environmental Agreements (MEA) viz. CBD, UNCCD, and UNFCCC, there is significant progress, especially in building synergies in the coordination of conventions. Rwanda has a strategy and action plan for each of the three conventions: the National Biodiversity Strategy and Action Plan (NBSAP), the National Desertification Control Plan, and the National Action Plan for Climate Change Adaptation.
- Rwanda is among the pilot countries to develop an integrated reporting system for Multilateral Environmental Agreements recently developed under the Rio Synergies Project. But implementation of these agreements remains weak, due in part to the apparent disconnect with overall national development processes; the poverty reduction strategy (now EDPRS) and sector strategies; weak institutional linkages; and inadequate human resource capacities.

**Institutions and civil society organizations supporting environmental management.** The establishment of the Rwanda Environment Management Authority as a regulatory authority is the landmark event that has taken environmental governance in Rwanda to a much higher level. Its creation raised the profile of environmental management in Rwanda from a small, underfunded, and understaffed department in the Ministry of Lands, Environment, Forestry, Water and Mines to a relatively well facilitated, politically visible, and robust institution. In 2004, the Department of Environment in MINITERE had only three technical personnel, and the public

sector reform of 2005-2006 further reduced staff to only one. REMA now has an established staff of 15 professional personnel, and recruitment is ongoing.

A National Forestry Authority (NAFA) was established in 2007. NAFA is a semi-autonomous institution responsible for policy, planning, and promotion of forest activities. However, the law formally establishing the organization (provisions of the draft forest law) has only recently been elaborated and is yet to be passed by parliament. Recruitment of staff is also yet to start and only a director general is currently in place. Under the present forest sector strategic plan, the National Forest Policy (2004) established Provincial Forest commissions to promote and oversee forestry activities in provinces. It also created the RAFNET (Rwanda Agroforestry Network) as a forum to promote dialogue among national and province-level stakeholders around forestry activities of common interest.

The draft Forest Sector Strategic Plan also created a National Land and Forest Research Centre (LFRC) to undertake forest research alongside the Rwanda Institute of Agronomic Sciences (ISAR). The LFRC will specifically be responsible for inventories and statistics, research on wood technology and utilization, forest economics and forest products marketing, and other tasks. The main concern for both the LFRC and NAFA is the lack of trained human resources — a situation that is further compounded by absence of a forestry training institute in country.

The position of environment in the overall national governance framework in Rwanda has become more prominent with successive institutional reforms. But these frequent changes have affected institutional growth as the portfolio moved from one institution to another. For instance, in the ministerial review of March 28, 1997, the environment portfolio moved from MINETO to MINAGRI (Ministry of Agriculture, Livestock, Environment and Rural Development); another reform two years later, on February 8, 1999, moved it to MINITERE (Ministry of Lands, Resettlement and Environment), where it has remained. The ministry later changed to Ministry of Lands, Environment, Forestry, Water and Mines (MINITERE) and at the end of 2007, it became the Ministry of Water, Energy, and Natural Resources (MINERENA).

**Table 2.4 Key Rwanda Institutions and Departments/Autonomous Agencies with Links to Environment**

Institution Department/autonomous agencies	Roles in/links with environment
<b>MINERENA</b> (Ministry of Water Energy and Natural Resources)	Responsible for environmental policy formulation and monitoring, as well as the sectors of water, mining, forestry and lands. All functional units are coordinated by the Directorate of Policy, Planning and Capacity Building.
<ul style="list-style-type: none"> <li>• National Land Centre (NLC)</li> </ul>	Provide technical and administrative support to the National Land Commission, as well as, archiving information on land conflicts and adjudication. Implements the National Land Policy, the Organic Laws on land and environment, and their subsidiary legislations (e.g. the Presidential Order No. 53/01 on the Registrar of Land Titles). Create land governance structures at decentralized levels – from district, sector and cell levels.
<ul style="list-style-type: none"> <li>• NAFA (National Forestry Authority)</li> </ul>	Implements government forestry policy; promotes agroforestry; advises government on policies, strategies and legislation related to forestry management; advises on implementation of forestry related international conventions; advises on protection of land, water and forest biodiversity; advises on soil erosion and safeguarding forestry; assists districts to prepare their forest management plans.
<ul style="list-style-type: none"> <li>• Rwanda Geological and Mines Authority (OGMR)</li> </ul>	Ensures environmentally sustainable mining by setting policy and standards for mining and provide technical guidance and oversight to prospecting of minerals.
<ul style="list-style-type: none"> <li>• REMA</li> </ul>	REMA as the overall agency responsible for overseeing the implementation of the Organic Law on Environment and related policies and laws. The REMA Director General is designated Coordinator of environmental projects and Focal Point for the Rio Multilateral Environmental Agreements (MEAs).
<b>MINAGRI</b> (Ministry of Agriculture & Animal Resources)	Sets national policies on agriculture, livestock & fisheries. Provides guidelines and standards for land use management including terracing. Promotes marshlands reclamation for cereal growing and ensures safe importation and use of chemical fertilizers.
<ul style="list-style-type: none"> <li>• RADA (Rwanda Agricultural Development Agency)</li> </ul>	Took over responsibilities of the National Seed Certification Service and the agricultural extension services with respect to crop production. It's responsible for land improvement activities and soil conservation through the national terracing programs. Sets standards for terracing, improvement & multiplication of seed, and delivery of extension services.
<ul style="list-style-type: none"> <li>• RARDA( Rwanda Animal Resources Development Agency)</li> </ul>	Responsible for livestock development and management of rangelands, the 'one cow per poor household' program to increase availability of animal manure for organic fertilizer of soil and for biogas production.
<ul style="list-style-type: none"> <li>• RHoDA (Rwanda Horticultural Development Agency)</li> </ul>	Ensures safe use of agricultural chemicals and fertilizers as well as safety of workers in flowers & other horticultural projects.
<b>MININFRA</b> (Ministry of Infrastructures)	Responsible for setting policies related to energy; urbanization and settlements; road and communication infrastructure; meteorology; and urban water supply.
<ul style="list-style-type: none"> <li>• Settlements &amp; Urbanization</li> </ul>	Promotes grouped settlements and improving housing environment. Support to the re-settlement of people displaced from within 50-metres of the Lakes and River banks, and in the construction of protection infrastructures on the banks of target rivers and streams.
<ul style="list-style-type: none"> <li>• Energy</li> </ul>	Promotes alternative energy sources and popularizing energy efficient technologies. Work with REMA on fuel wood saving stoves.
<ul style="list-style-type: none"> <li>• Meteorological Services</li> </ul>	Climatic data collection and dissemination, and monitoring of weather conditions (temperature, humidity, rainfall, etc).

Institution Department/autonomous agencies	Roles in/links with environment
<ul style="list-style-type: none"> <li>Electrogaz</li> </ul>	Public Company which provides access to safe water and sanitation in urban areas and electricity. Pumps and treats water from natural sources while protecting watersheds for sustainable generation of hydro-power and supply of water to urban authorities.
<b>MINICOM</b> (Ministry of Commerce, Trade, Industry, Tourism & Cooperatives)	Sets policy for trade, tourism and cooperatives and industries, including small scale artisans.
<ul style="list-style-type: none"> <li><b>ORTPN</b> (Rwanda Office of Tourism &amp; National Parks)</li> </ul>	Responsible for National Parks management and conservation; promotion of tourism and cultural heritage; development and management of site and monuments; access to wildlife resources and revenue sharing between communities, local authorities and central treasury; monitoring illegal hunting/ poaching and protection of endangered species; and spatial information on planning, monitoring and management of ecosystems.
<ul style="list-style-type: none"> <li>RIEPA, (Rwanda Investment &amp; Export Promotion Agency)</li> </ul>	Facilitates investments and ensures that investors are not constrained by compliance procedures for environmental impact assessment, and ensures standards as part of the investment support package.
<ul style="list-style-type: none"> <li>RBS (Rwanda Bureau of Standards)</li> </ul>	Assist REMA in regulating importation, manufacturing or dumping of environmentally hazardous materials.
<b>MoH</b> (Ministry of Health)	Provides and improves health services through the provision of preventive, curative and rehabilitative care.
<ul style="list-style-type: none"> <li>Environmental Health &amp; Hygiene Department</li> </ul>	Sanitation and hygiene.
<ul style="list-style-type: none"> <li>Epidemiology Surveillance Unit</li> </ul>	Monitor Malaria parasites breeding areas and promote environmental safety of Indoor Residual Spraying
<b>MINALOC</b> (Ministry of Local Government, Good Governance, Community Development & Social Affairs)	Promotes the well-being of the population by good governance, community development and social affairs.
<ul style="list-style-type: none"> <li>NDIS (National Decentralization Implementation Secretariat)</li> </ul>	Supports the decentralization of sectoral functions including environmental management.
<ul style="list-style-type: none"> <li>CDF (Common Development Fund)</li> </ul>	Finance local government development projects as a basket fund derived from national resources and donors. Its funding criteria have to ensure that local development projects funded by the CDF take into consideration environmental concerns.
<ul style="list-style-type: none"> <li>Ubudehe</li> </ul>	Participatory bottom-up planning undertaken by local communities.
<b>MINEDUC</b> (Ministry of Education)	Promotes the reduction of poverty by providing human resources useful for the socio-economic development of Rwanda through the education system.
<ul style="list-style-type: none"> <li>Department of primary and secondary education</li> </ul>	Ensures environmental education in schools (by supporting Environmental Clubs in schools) and initiates the process of mainstreaming environment into school curricula
<ul style="list-style-type: none"> <li>National Curriculum Development Centre</li> </ul>	Includes environmental education in schools.
<b>MINECOFIN</b> (Ministry of Finance & Economic Planning)	Promotes the increase in living standards and human development within a sustainable environment. Promotes mainstreaming of environment into DDPs and budgets. The Directorate of Development Planning has an Environment Focal Point who liaises with the environment and natural resources ministry and REMA on mainstreaming environment into macroeconomic, sectoral and decentralized planning frameworks.
<ul style="list-style-type: none"> <li>National Institute of Statistics of Rwanda (NISR)</li> </ul>	Coordinates the Household Living Conditions Survey (EICV II), Demographic and Health Survey (DHS II), Food Security Survey, and National Census Service (NCS).

Local NGOs have a long record of accomplishment in Rwanda’s environmental sector, and considerable experience in mobilizing human and financial resources and operating directly in the field without heavy administrative structures. The main NGOs concerned with environmental protection in Rwanda are presented later in Table 5.2.

The activities of these NGOs vary from education, training, and promoting public awareness and participation in sustainable natural resource management to environmental programs targeting women, youth, farmers, herders, artisans, and other trades people. Most of these initiatives help reinforce civil society’s role in environmental strategy, policy, and legislation.

The following table lists the key private organizations that have activities directly related to the environment or complementary activities with a focus on environmental management.

**Table 2.5 Key Private and Public Organizations with Links to Environment**

Institution/ Agency	Roles in/links with environment
Rwanda Private Sector Federation (RPSF)	RPSF is an independent body that brings together all private sector practitioners including industrialists; exporters & importers and commission agents. RPSF mobilizes and coordinates the private businesses, enterprises, focusing on improving enterprise efficiency for the interest of the commercial, industrial, agricultural, crafts, and service sectors.
National University of Rwanda	Trains and builds capacity of scientists and researchers in the natural sciences (agriculture, natural and applied sciences, conservation and environmental protection). Established the Environmental Research Coordination Unit to better coordinate environmental research and provide a better framework for multidisciplinary research. The GIS and Remote Sensing Center. established with USAID/PEARL assistance, serves as a clearing house for all Rwanda’s geographical databases, mapping and remote sensing services of rural and urban areas to the private and public sectors in addition to providing training for university students and government departments.
Institute of Agronomic Sciences of Rwanda (ISAR)	Promotes the scientific and technical development of agriculture and livestock; carries out research and experimentation to improve agriculture and livestock; publishes and diffuses research results; manages research stations and centers of experimentation throughout the country.
Institute of Scientific Research and Technology (IRST)	Undertakes scientific and technological research directly related to Rwanda’s socioeconomic development, with particular emphasis on the use of technologies that help preserve the environment. There are two research centers: The Energy Center works on renewable energy technologies such as solar energy and biogas, and on wastewater management. The University Center on Pharmacy and Traditional Medicine (CURPHAMETRA) is charged with exploiting the value of Rwanda’s medicinal plants.
Kigali Institute of Science, Technology, and Management (KIST)	An environmental program in its science and technology department which trains in biogas development, renewable energy, waste management, and increased environmental awareness at all levels by publishing education, information, and communications programs.

## 2.4 Overview of Environmental Programs and Initiatives

Even with improvements and a stronger focus on environmental management in Rwanda, the country still depends largely on internationally funded projects to implement activities and, with their technical expertise, to lead in environmental and biodiversity protection. Despite the formation of REMA and the reorganization of the ministries, Rwandan institutions are too weak and understaffed to provide technical expertise that is needed to effectively manage the environment. There are many positive efforts being made to define environmental management (see Section 5), yet it will take time for the government to act on all of these, given other needs resulting from the genocide.

Very few resources come from the GOR's budget, compared with the efforts led by outside organizations and institutions. The majority of programs and initiatives in forestry and biodiversity protection are concentrated in the remaining tracks of land uninhabited by humans and agricultural development — the National Parks and Forest Reserves. There are substantial efforts being put into protected area management at the national parks (see Section 5), especially for Volcanoes National Park, where species such as mountain gorillas draw in large revenues from tourists visiting from around the world. Also, the newly gazetted Nyungwe National Park is gaining momentum in project activities with international partners like the Wildlife Conservation Society, Family Health International, and the National Cooperative Business Association/CLUSA to involve local communities in protected area management, economic development projects, and improved community health.

Public/private partnerships are being encouraged by the GOR in joint marketing, tourism development, training, access to finance, and enhancing linkages with local communities (see Section 5). Dubai World Rwanda is an example of an international private partnership with the GOR in several developments around the country, from handing over Akagera National Park management to high-end tourism lodges in Nyungwe National Park and Volcanoes National Park.

Environmental protection initiatives beyond the protected areas boundaries have been less of a focus for international donors and organizations, as well as for the GOR. While there are efforts to protect watersheds and wetlands, there are few initiatives to protect one of Rwanda's most precious resources: water.

## 2.5 Key Changes since the 2003 Assessment

The main changes in the domain of environment or with implications to environmental management in Rwanda since 2003 entail:

- **The establishment of REMA** in 2005 (legally in 2006) as the overall authority responsible for environmental management. The subsequent adoption of the Environmental Impact



Assessment as an environmental management tool has helped improve compliance with environmental best practices, especially among private investors.

- **Sectoral and services decentralization** — the first phase of decentralization (2001-2003) created elected government structures down to the cell level, where environmental management was not important. The subsequent phase had deepened decentralized governance by creating stronger and more viable administrative structures (down from 106 to 30 districts) and establishing specific units and staff responsible for environment. Awareness-raising on environmental issues has also been stepped up in districts, with support from REMA. In the context of decentralization, a program dubbed Vision 2020-Umurenge was developed as one of the flagship programs of the EDPRS to localize the Millennium Development Goals. The Vision 2020 – Umurenge program identified the poorest sector in each of the 30 districts, and concentrated development activities and resources to create a head start in poverty reduction and development. The program is coordinated in MINALOC.
- **Land reform process** — has created a national land center and land tribunals from the provincial down to cell levels. The land reform process is creating a land registrar and improving the legal framework for land acquisition, transfer, and use.
- **National planning process** — a strategic shift from a socially-oriented PRSP I (2002-2005) to an economic-growth driven EDPRS (2007-2012) has changed the priorities towards more in-depth use of natural resources — water, wetlands, wildlife protected areas, forests, mineral deposits, etc. — which has implications for the environment. The government’s framework for private-sector led economic growth has attracted large scale investors like Dubai World, which has undertaken the management of Akagera National Park (and its game lodge) and made several investments in Rwanda’s natural resources. Other important areas of the EDPRS that have implications for environmental management are the intensification of high-value crops (washed coffee) and annual crops. The EDPRS has made efforts to mainstream environment compared to the PRSP 1, and consequently all key sectors have at least one environmental key performance indicator.

Under the Agricultural Transformation Strategic Plan (PSTA), MINAGRI is implementing a program dubbed “the green revolution” with emphasis on the development of the value chains of selected agricultural crops (coffee, tea, and annual crops like wheat, cassava, bananas, and potatoes). The main strategy is land consolidation. It has accordingly set targets seen in Table 2.6. While this strategy is an opportunity for environmental improvement, it could also create threats if implications for pollution (e.g. intensive use of fertilizers and expansion of cultivated wetlands) are not properly addressed.

**Table 2.6 A Selection of the PSTA Targets to be Realized by 2010**

Indicator	2006-07	2008	2010
Agricultural land protected ( percent) from erosion	40		100
Radical terraces (ha)			12,000
Hillside irrigation (ha)	130		1,840
Marshlands rehab./developed (ha)	11,000		16,400
Households receiving cows	3,500	11,000	95,000
Households using improved seed ( percent)			17
Fertilizer application (kg/ha)	4		13
Households per extension worker	3,000		2,100
Horticulture exports (tones)	2,000		20,000

Source: GOR, 2007b.

The PSTA emphasizes that crops should be prioritized through a process of consultation at the provincial level, with potatoes, wheat, beans, milk, and meat being highly ranked for attention. The key support that is to be provided by the agricultural research services in the development of each of these value chains is emphasized repeatedly in the document.

- **Rwanda's admission into the East African Community**, alongside Burundi in July 2006 (which was effected in November 2006) has generated a series of legal, policy, and institutional reforms, to harmonize with EAC standards. This is an ongoing process, and includes areas such as Environmental Impact Assessments (EIA) and the management of transboundary water resources. A Ministry for East African Affairs was created at the end of 2007.
- **Increased support to environment from multilateral agencies.** Since 2003, there has been a remarkable increase in donor support for environment, mostly through REMA: UNDP, UNEP, AfDB and GEF through UNDP and World Bank (see Table 5.1 in Section 5). However, the resources provided are still too little, over too short timeframes. Moreover, coordination and synergy among projects is weak, even though most of them are under REMA and their coordinators participate in joint weekly management meetings.

## SECTION 3 STATUS OF ENVIRONMENTAL RESOURCES IN RWANDA

This section examines the state of the natural environmental inventory in Rwanda, describes protected areas, and discusses current uses and trends of environmental products and services. The emphasis is on biodiversity and tropical forests, but other sectors of the environment such as watersheds and wetland ecosystems, land use (primarily agricultural uses), and energy figure into the discussion. Most of Sections 3.A and 3.B are taken from the 2003 ETOA to economize information that has not changed substantially between the two periods.

### 3.1 Forest and Terrestrial Biodiversity

Rwanda's 26,338 km<sup>2</sup> is covered predominantly by mixed cropland/natural vegetation (47 percent), followed by savannah (32 percent), forests (12 percent), and water and wetlands (8 percent). Deforestation and conversion of natural habitats to agricultural systems in the last three decades has caused a loss of variability across all of its ecosystems. A little less than nine percent of Rwanda's total land area is protected. Almost all of Rwanda's remaining forested lands of any significance are found within the borders of its national parks and two forest reserves. A few small gallery forests and remnant forests also exist. Figure 3.1 illustrates the extent and location of the forest resource in Rwanda. And, not surprisingly, biodiversity is also greatest within the protected areas. Table 3.1 provides an inventory of the protected area system in Rwanda.

**Table 3.1 Rwanda's Protected Area System**

Name	IUCN category <sup>1</sup>	Management Responsibility	Date Established	Area (km <sup>2</sup> )	Location	Latest Management Plan	No. of Staff
<b>Akagera National Park</b>	II	Dubai World <sup>2</sup>	1934	1,085	1.45'00 S 30.38'00 E	2006	78
<b>Nyungwe National Park</b>	II	ORTPN	2005	1,013	2.30'00 S 29.14'00 E	2005	108
<b>Volcano National Park</b>	II	ORTPN	1929	140	1.28'41 S 29.30'00 E	2004	103
<b>Gishwati Forest Reserve</b>	IV	For Dept	1933	61	1.47'00 S 29.23'00 E	-	-
<b>Mukura Forest Reserve</b>	IV	For Dept	1933	20	1.59'00 S 29.31'00 E	-	-

<sup>1</sup> IUCN defines protected areas based on management objectives. The two categories into which Rwanda's protected areas fall are:

- **Category II: National Park:** protected area managed mainly for ecosystem protection and recreation. **Definition:** Natural area of land and/or sea, designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation inimical to the purposes of designation of the area and (c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible.
- **Category IV: Habitat/Species Management Area:** protected area managed mainly for conservation through management intervention. **Definition:** Area of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species.
- <sup>2</sup> The GOR, through ORPTN, signed a 49-year lease agreement with Dubai World Rwanda in 2008 to conduct the management of ANP as well as the operation of the tourism facilities within the Park boundary.



Rwanda's afro-montane forests used to run the length of the Nile-Congo crest, but population pressure has now limited them to the forest reserves of Gishwati and Mukura, Nyungwe National Park (NNP) and Volcano National Park (*Parc Nationale des Volcans - PNV*). Both national parks are classified by the International Union for Conservation and Nature (IUCN) as a Category II: National Park — a protected area managed mainly for ecosystem protection and recreation. The area estimates of the protected areas listed in Table 3.1 are the best available at the time this assessment was drafted. Definitive boundaries for all protected areas are still being defined and contested. PNV's last survey was 14 years ago. These will become more accurate as conflicts are resolved and the current management plans are rigorously used. Map I-1 in Annex I illustrates each of these protected areas in relation to one another.

**Nyungwe National Park.** Nyungwe National Park (NNP) was newly created in 2005, primarily to protect a natural resource that is widely recognized as being of global as well as national significance. When it was originally designated a forest reserve in 1933, its total area was 1,141 km<sup>2</sup>; encroachment by local farmers between 1958 and 1979 reduced the reserve area to 971 km<sup>2</sup>. Today, partially buffered by forest plantations and tea estates around some of its borders, and with the addition of the remnant forest of Cyamudongo, it covers slightly more than 1,000 km<sup>2</sup>. The forests at Nyungwe are interrupted by two large permanent swamps, Kamiranzovu and Uwasenkoko. Kamiranzovu ("swallows elephants"), which covers approximately 13 km<sup>2</sup>, is one of the largest peat bogs in Africa. With the destruction of Gishwati and Mukura forest reserves (see below), NNP is one of only two remaining afro-montane components of Rwanda's protected area system. Several maps of Nyungwe National Park, including management zones, species richness, and human-induced degradation, are located in Annex I.



Tree ferns in Nyungwe National Park

NNP is important for conservation of several restricted-range species that are found only in the Albertine Rift eco-region in Africa. It is home to 26 Albertine Rift endemic birds, more than any other protected area in the region; only the unprotected Itombwe Mountains contain more endemic species. NNP also contains 13 species of primate, including the owl-faced monkey (*Cercopithecus hamlynii*) and l'Hoest's monkey (*C. lhoesti*) — both restricted-range species. The black and white colobus (*Colobus angolensis*) groups in Nyungwe are unusually large, ranging up to 450 individuals — larger than any other groups recorded for this species. Eastern chimpanzees (*Pan troglodytes schweinfurthii*), an endangered species, live in Nyungwe, and IUCN classifies the owl-faced monkeys as vulnerable.

In 2006, an outlying remnant of the Nyungwe forest at Cyamudongo was added to the park. This relic is only about 4 km<sup>2</sup> but is relatively intact. It is home to an important group of about 25 chimpanzees as well as other small mammals. (Nyungwe National Park, together with Kibira NP in Burundi, which shares a common boundary, has an estimated total chimp population of 200.) In addition to the primate species, Cyamudongo has biodiversity significance as a birding site. Birdlife International's online World Bird Database (2008) notes that:

Cyamudongo forest holds many species typical of the Albertine Rift forests, including *Apalis argentea*. *Musophaga rossae*, which is not found in Nyungwe, is common in Cyamudongo, while the only Rwandan record of *Accipiter erythropus* is from here. In addition, four species of the Guinea-Congo Forests biome (A05) have also been recorded.

USAID, working in collaboration with ORTPN and private investors, is financing a business plan and tented camp designs for a community-owned lodge to be developed at Cyamudongo. This facility would be aimed at small groups of tourists that would be fitting for this more remote site that demands a minimal impact.

Within its altitudinal range of 1,600 to 2,900 meters, NNP is home to 1,068 recorded plant species, of which about 250 are endemic to the Albertine Rift. There are more than 200 different tree species. Among fauna, 85 mammal, 278 bird, 32 amphibian, and 38 reptile species have been recorded there; of these, 62 species are endemic to the rift. A comparison with the Albertine Rift shows that for all taxa, NNP ranks consistently high. It has more endemic species than any other rift forest that has been surveyed (about 60 percent). Thus, Nyungwe is considered a critical area for conservation of restricted-range species not only by the GOR but also by the international conservation community.

NNP's socioeconomic importance is as significant as its biological importance. Nyungwe is the watershed for over 70 percent of Rwanda; its streams feed both the Congo and the Nile basins. It thus protects a major watershed for surrounding communities as well as communities much further downstream. Population densities around Nyungwe are among the highest in Africa (250-500/ km<sup>2</sup>), but the forest's tempering effect results in longer periods of rain each year, supporting a relatively high degree of agricultural production.

The buffer zone around the forest has been planted with a variety of species (*Pinus patula*, *Cupressus lusitanica*, and *Acacia melanoxylon*) and is a source of building poles and firewood for local populations. (At the moment, this is done illegally because there is no management plan for these plantations to enable harvests by local communities.) Local herbalists harvest medicinal plants in the forest and an ORTPN program allows herbalists to harvest wildings from the forest to plant on their own land. Beekeeping associations place hives at the edge of the forest because the honey produced there is of superior quality. Tourism in Nyungwe generates a growing amount of direct revenue (see Section 3.5) for the national park system, but probably has a greater importance to the industry as part of a larger tourism circuit. Private sector investments begun in mid-2008 in a site-friendly tourist lodge at the western entrance to the park will help reinforce NNP as a key component in that circuit.



**Mukura Forest Reserve.** Staying on the western side of the country but moving to the north, the next significant block of afro-montagne forest is the Mukura Forest Reserve. Founded in 1933 with a total area of 2,000 ha, Mukura Forest Reserve was at one time linked to Gishwati along the Nile-Congo crest. Subject to intense human pressure over the years in the form of agriculture encroachment, illegal cutting, grazing (1,000 milk producers are in the forest), and more recently returnee resettlement, Mukura has been reduced to a series of small, disjointed primary forest relics in remote valleys and on steep slopes that are difficult to access. Although the ETOA team did not visit Mukura, interviews suggest that the total area left is very small and that many of Mukura's previously important plant and animal species, particularly birds, have disappeared.

Like other afro-montagne forests of the Nile-Congo crest, Mukura played an important watershed role for Rwanda and was the source of a number of permanent springs and streams. With the disappearance of the forest, many of these springs have apparently become seasonal. Mukura forests also acted as a sponge, absorbing excess water and preventing runoff and erosion, thus stabilizing agriculture in surrounding areas. Local residents report that this benefit has all but disappeared; according to GOR and NGO authorities, the residents have formed an association in an attempt to help reconstitute the forest.

**Gishwati Forest Reserve.** Still further north along the divide is the Gishwati Forest Reserve. Founded in 1933, Gishwati Forest Reserve originally had an area of about 28,000 ha in Ruhengeri/Gisenyi provinces, running for about 25 miles along the Nile-Congo crest at between 2,000 m and 3,000 m altitude. Plant and animal species distribution in Gishwati was similar to that of Nyungwe. Like Mukura, Gishwati has neither a management plan nor permanent staff assigned to its protection and management.

In the 1980s actual forest areas was reduced to about 4,500 ha when a World Bank-funded project cleared the forest and replaced it with pasture to accommodate more than 26,000 cattle. The rationale at the time was that it was better to have a designated pasture area and a smaller protected reserve than to have cattle graze indiscriminately in the forest.

Current estimates of the remaining natural forest area in Gishwati are between 20 and 700 ha, found mostly on inaccessible sites. In a 2006 survey (Munanura et.al.) it was noted that in some instances the remaining 6 km<sup>2</sup> of buffer zone plantations are included in estimates of the forest reserve's total area. The short-term consequences of removal of the forest are readily visible in the erosion on the Gisenyi-Ruhengeri road. Without the forest to slow run-off, areas of the road require almost continuous maintenance in the rainy season to clear mud and silt, and stabilize the roadbed. The resources lost in Gishwati are also addressed in another discussion at the end of this section.

GOR policies over the last decade have also served to transform parts of the Gishwati and Mukura Forest Reserves and a significant portion of Akagera National Park (see below), into resettlement areas. Although this has eroded important components of its natural resource, the policy actions have addressed a major national point of conflict: how to settle returnee families

that had been in exile for decades, and found their ancestral lands occupied on their return in 1994. Under the 1993 Arusha Accords, returnees no longer had the prerogative to lay claim to land upon which they once had traditional tenure rights, yet these families were facing destitution. Use of national parks and forest reserve land was seen as a necessary compromise, despite the negative short- and long-term ecological and economic consequences.

**Volcano National Park.** The final significant portion of the afromontagne forest in Rwanda is that found in Volcano National Park (or *Parc National de Volcan*) along the northern border with the Democratic Republic of the Congo (DRC). This area is also a part of the critical Albertine Rift Ecosystem that is shared by Rwanda, the DRC, and Uganda.

Volcano National Park (PNV) has probably the longest conservation history in Africa. Its major objective was saving the last representatives of a species becoming extinct, the mountain gorilla (*Gorilla gorilla beringei*). In 1902, Captain Oscar von Beringei was the first European to observe the mountain gorilla. He and a fellow explorer spotted a group of black apes while climbing Mount Sabinyo of the Virunga Mountains. They shot two of the animals and sent them to the great German anatomist, Matschu, who said they were a separate subspecies. This started a flurry of international scientific interest that brought the death of 54 more Virunga gorillas between 1902 and 1929.

Carl Ackey, after shooting five mountain gorillas in 1929 for the American Museum of Natural History, was so impressed with the subspecies and its habitat that he urged the Belgian Government, headed by King Albert, to make the Virunga Mountains a national park. That same year, Albert National Park was established as one of the first national parks in Africa, with the Volcano National Park as the Rwandan component.

Currently, mountain gorillas are found in four national parks in two forested blocks. Together they cover about 590 km<sup>2</sup> of afromontagne and medium-altitude forest typified by high species diversity and endemism. One of the forest blocks is the Bwindi Impenetrable National Park in Uganda, which has 310 gorillas. The other is composed of three national parks: Mgahinga Gorilla National Park in Uganda, Virunga National Park in the DRC, and PNV in Rwanda. Together, these parks account for at least 358 gorillas, with half residing in Rwanda. Seven groups, ranging in size from 7 to 33 individuals, are tracked for conservation and ecotourism efforts.

Situated in the Northern and Western provinces, the PNV lies in the Virunga Mountains, a chain of eight dormant volcanoes, five of which are in Rwanda: Karisimbi (4,507 m), Muhabura (4,126 m), Bisoke (3,711 m), Sabyinyo (3,634 m), and Gahinga (3,474 m). The current area of the park is about 15,000 ha, down from 19,000 ha (4,000 ha were given up for pyrethrum culture after Rwanda's independence).

The vegetation, which varies with altitude, is classified into four main ecotypes, with only those at higher elevations remaining fairly intact.



1. **The afromontagne forest zone** at the foot of the volcanoes (2,000-2,900m) in general has been severely degraded into secondary forest as a result of human activity, mainly agriculture and deforestation. Only the higher parts remain more or less intact, most notably the bamboo forest (*Arundinaria albina*) situated between 2,600 and 2,900 m on Sabyinyo.
2. The **Hageni-hypericum zone** (2,900-3,200 m) is characterized by two species, *Hagenia abyssinica* and *Hypericum revolutum*. The lack of spermatophytes is made up for in part by a notable presence of cryptogames (most notably *Usnea spp.*) and bryophytes.
3. **Vegetation of the alpine belt** (3,200-3,500 m) reflects diurnal temperature extremes. It is composed mainly of *Lobelia wollastoni* and *Lobelia stuhlmani*, with grasses (*Alchemilla johnstoni*), bryophytes, and lichens dominating the herbaceous strata.
4. The **desert alpine zone** (above 3,500 m) is composed solely of lichens and mosses.

In addition to the gorillas, the Volcano National Park afromontagne forests contain elephants, buffalo, several primates, and other mammals. CITES considers *Rana anolensis*, *Chameleo rudi*, and *Leptosiphos graueri* endangered.

Overall, the flora and fauna inventory of the park includes:

- 245 plant species, 17 of which are threatened; and of these, 13 species of orchids are internationally protected
- 115 mammal species
- 187 bird species
- 27 species of reptiles and amphibians
- 33 arthropod species

Given the focus on mountain gorillas, many of the other species in the park, both plant and animal, have gone more or less unnoticed. Since the 2003 ETOA, the International Gorilla Conservation Program (IGCP), working with ORTPN, has habituated two groups of golden monkeys (*Cercopitecus mitis kandtii*) that are now visited by tourists. Data collection and monitoring continue. PNV has achieved additional prominence (also as a result of IGCP efforts) as a part of the tripartite transboundary 10-year management plan with the Democratic Republic of the Congo and Uganda, and is working to protect the rich diversity and physical beauty of the *Virunga massif*.

Finally, as in the case of Nyungwe, Volcano National Park is crucial in capturing and retaining rainfall in Rwanda. While the park only covers 0.5 percent of total area, it represents 10 percent of watershed protection. The volcanic soils in and surrounding the park are some of the richest and most productive in Rwanda. Given the high rainfall, Volcano National Park forests act as a sponge, absorbing excess water and preventing runoff and erosion, helping to stabilize nearby agricultural efforts. Numerous maps of PNV that cover park administration, visitation, ranges of gorilla groups, et cetera are in Annex I.

**Gallery forests.** Gallery forests — strips of forest along watercourses or extending from wetlands — have been significantly reduced in Rwanda due to clearing for agriculture, bush fires, and cutting for fire and construction wood. They are now found only in the east along the Akagera river system (including areas within Akagera National Park). Their area is less than 200 ha.

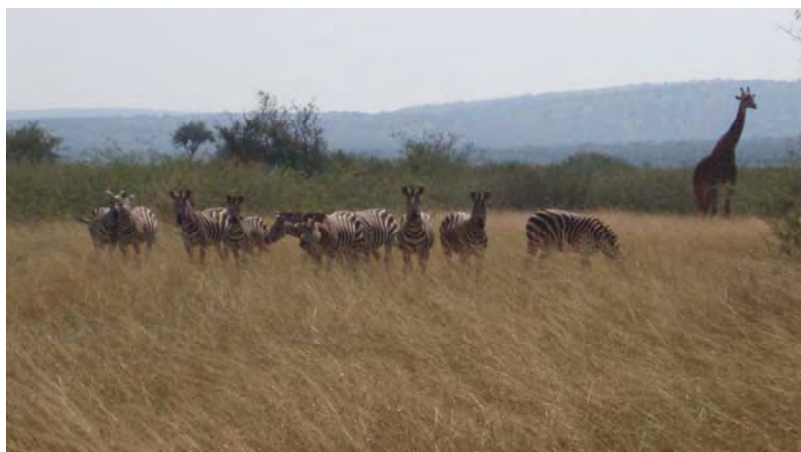
From a biodiversity point of view, the most important gallery forest is Ibanda-Makera in the southeastern part of the country. It contains a number of rare endemic plant species, including *Blighia unijugata*, *Grewia forbesi*, *Rhus vulgaris*, and *Ficus spp.* Many of these species are used in traditional medicine, and there is interest in researching their qualities for biochemical extracts and modern medicine. Commercial exploitation of these species may have negative consequences on Rwanda's remaining gallery forests if no safeguards are put in place.

**Savanna and savanna woodlands.** Savanna vegetation at one time extended through almost half of what is now the Eastern Province as well as the eastern-most parts of the Southern Province. Rwanda has three types of savanna:

- Grass savanna with:
  - *Hyparrhenia collina* (on quartz soils) and *Loudetia arundinacea* on the tops of the hills
  - *Hyparrhenia lecomtei* on the slopes
  - *Themeda trianda* in valleys with sandy clay soil
  - *Themeda trianda* and *Botrio insculpa* on vertisols
- Wooded savanna with mostly spiny shrubs, such as *Acacia hebecladoides* and *Nefasia spp.*, on alluvial soils and around lakes
- Gallery forests with mostly *Carissa edulis*, *Jasminum mauritianus*, *Lanea humilis*, *L. schimperii*, *L. stuhlmanni*, and *L. fulva*, on rocky soils

**Akagera National Park.** Because the savanna region is so rich in flora and fauna, in 1934 the Akagera National Park (ANP) (267,000ha) was established, and the Mutara Hunting Reserve (64,000ha) was added in 1957.

Today, because of human pressure, over-grazing, and the need to resettle returnees, the Mutara Hunting Reserve has been completely converted to agriculture and grazing, as has two-thirds of ANP. The only remnants of the natural savanna outside the ANP are in the state controlled grazing areas of Rilima (430ha) and Karama (300ha) and in the Gako military



Savanna wildlife in Akagera National Park

area. Maps of the Park can be found in Annex I. In the 1960s, Akagera National Park formed part of the Akagera-Lake Mburo ecosystem that included Uganda's Kikagati Game Reserve, Lake Mburo National Park, and the rangeland areas north to the Katonga River. To the east, the system extended across the Akagera River into Tanzania's Ibanda and Rumanyika game reserves. Today, this ecosystem is entirely fragmented and wildlife is found only in small, disturbed enclaves, and the reserves on the Tanzania side of the border exist in name only.

This part of eastern Africa has been greatly affected by civil war and upheavals in Rwanda over the past 40 years, particularly during the early 1990s. Under the 1993 Arusha Accord, it was resolved that returning Rwandan refugees would be settled into open areas of Rwanda; the areas deemed most suitable were the ANP and the Mutara Hunting Reserve. After the genocide of 1994, resettlement became increasingly urgent. In 1997, the Mutara Reserve was degazetted, the ANP area was reduced by two-thirds, and today officially covers 1,085 km<sup>2</sup>.

Vegetation in the ANP previously comprised seven distinct biomes:

1. Gallery forests along the Akagera River in the north
2. Subhumid savanna in the west
3. Floodplains in the central valley
4. Lakeside woodland in the south
5. Subarid regions with dry forests
6. High plateaus
7. Swamp and lake system of the Akagera basin

The fauna is essentially east African, including species of roan antelope (*Hippotragus equines langheld*), baboon, eland, hippopotamus, impala, oribi, sititunga, topi, warthog, waterbuck, and zebra. Black rhinoceros, introduced in 1956, were thought to be extinct, but tracks and spoor have been sighted. Elephants were reintroduced in 1975 and giraffes in 1985. The giraffes have thrived, but the elephants are all but gone. Large carnivores include leopards and, until recently, a small lion population. In 1990, the fauna comprised 5 primate, 18 carnivore, and 17 ungulate species. The lake and wetland system of ANP is home to about 525 different bird species, including the rare shoebill stork (*Balaeniceps rex*).

German Technical Cooperation (GTZ) estimates that the reduction in ANP area and the loss of the Mutara Reserve have resulted in a severe loss of biodiversity through the exclusion of three principal biomes: the subhumid savanna in the west; the floodplains of the central valley; and the *Acacia kirkii* gallery forest in the north. It is estimated that the total loss resulting from exclusion of these ecosystems will be 15 percent of the former tree and shrub species and 20 percent of the herbaceous species. The loss of these habitats will lead to a decline in all wild fauna species in the area. The species most severely affected are:

- The topi, which breeds in the floodplains
- All ungulates in general, because the floodplains are one of their main feeding grounds during seasonal movements

- The silver monkey, whose major habitat is the *A. kirkii* forest
- All small fauna with species-specific relationships with plant species in the abandoned ecosystems

As recently as 2006 it was also quite common to see cows grazing in the park from the neighboring resettlement areas. Today, under a practical management plan (ORTPN, 2006), increases in patrolling staff, re-establishing boundary markers, and greater awareness on the part of neighboring communities that stiff fines are issued for grazing violations inside the park have all but eliminated the problem.

Dubai World Rwanda, a South African company, signed a 49-year lease in June 2008 with the GOR through ORTPN, assuming the daily management and operation of the entire park (GOR, 2008a; Hofmeyr, 2008). The hotel and other tourism infrastructure inside the park boundary are also included in the lease agreement.

### 3.2 Watersheds and Wetland Ecosystems

Rwanda's hydrology is characterized by a dense network of lakes, rivers, and wetlands. Water is, without a doubt, Rwanda's most valuable natural resource. Approximately 210,000 ha, eight percent of the entire country, are under water; lakes occupy about 128,000 ha, rivers about 7,260 ha, and water in wetlands and valleys about 77,000 ha. The country is divided into two major drainage basins, the Nile to the east and the Congo to the west. The Congo basin covers 33 percent of Rwanda and handles 10 percent of all national waters. The Nile basin covers 67 percent and delivers 90 percent of the national waters. The forested area of Nyungwe National Park is Rwanda's major watershed for both the Nile and the Congo basins. The waters of the Nile basin flow out through the Akagera river system, which contributes 8 to 10 percent to the Nile drainage system. Figure 3.2 illustrates the river and lake systems of the country.

The network includes numerous lakes (the major ones are Kivu, Bulera, Ruhondo, Muhazi, Cyohoha, Rweru, Sake, Gaharwa, Kilimbi, Mirayi, Rumira, Kidogo, Mugesera, Nasho, Mpanga, Ihema, Mihindi, Rwampanga, and Bisoke) and rivers (the major ones are the Akagera, Nyabarongo, Akanyaru, Ruhwa, Rusizi, Mukunga, Kagitumba, and Muvumba). This network and its associated wetlands



Lake Ihema in Akagera National Park

contain a wide variety of plant, animal, and aquatic species. A map of Rwanda's wetlands is presented in Figure 3.3.

In Rwanda the term "wetlands" has been restricted to the large permanent swamps; the seasonal grass swamps have been generally classified as marshlands, which is equivalent to the French term *marais*. These are discussed separately below.

Rwanda's wetlands are extremely important. They act as a buffer in flood or overflow plains, reducing maximal flow rates during the rainy season and maintaining relatively high flow rates during the dry season. The wetlands and marshlands, which occupy about 10 percent of the country, are comprised of three large swamps and small wetlands scattered among the country's many hills. The main swamps are Akanyaru (12,546 ha) on the border with Burundi, Kagera along the Tanzania border to the east (12,227 ha), and the Nyabarongo (24,698 ha) and Rugezi wetlands (6294 ha) to the north (Odada, 2004).

The marshland systems are the most physically and chemically heterogeneous of all the aquatic ecosystems in Rwanda. They act as sinks for silt particles and soluble inorganic nutrients and are sources of dissolved and particulate organic matter. They are seasonal wetlands, with the water table near or above the lowest ground surface during the wet season. They do not have large flood plains (generally less than 200m wide) or great length.

From a hydrological point of view, marshlands are complex, with runoff and river valleys downstream replacing seepage in the upland areas. Because they are environmentally fragile, it is critical that their ecological integrity be safeguarded — a difficult task when Rwanda's growing population wants to convert them to agriculture. The total area of marshlands in Rwanda is estimated to be 168,000 ha, 94,000 ha of which have already been developed officially, mostly for agriculture and pasturage. This estimate is probably much higher, given that most of the areas are not under public management and therefore are not captured in official statistics.

The main user of water in Rwanda is the agricultural sector (94 percent) followed by the domestic users (just under 5 percent), and industry consuming the balance. The total estimated withdrawal rate is 0.8 cu. km/year (equivalent to 141 m<sup>3</sup>/person/year), which is approximately 22 percent of the total allowable withdrawal (IISD, 2005). This suggests that there is presently little pressure on the water systems to meet demands.

### **3.3 Agriculture and Farming Systems**

As reported in the 2003 ETOA and above in Section 2.B, agriculture is the mainstay of Rwanda's economy. The main food crops are bananas, beans, sorghum, sweet potatoes, Irish potatoes, cassava, maize, and rice. Vegetable crops are mainly tomatoes, cabbages, and peas. Crop yields are generally low, but the agro-diversity present in Rwanda is greater than in many other parts of Africa.

Animal husbandry, especially cattle raising, is an important component of the farming systems in the country. The main areas are the eastern province (especially old provinces of Umutara and Kibungo), rural Kigali, and southern province, ex-Gitarama. The use of animal manure from cattle and other livestock figures prominently into the farming systems and are important for fallow (when there is that opportunity) and for returning nutrients to soils that become exhausted due to the cultivation intensity.

For the most part, agriculture lands do have a fairly continuous cover, and crop rotation is widely practiced. Without it, the soils would produce even less, and the steep slopes would erode more quickly and more severely than they do today. The use of chemical fertilizers is relatively rare in Rwanda, with its rich history of agroforestry as a mainstay of most of its farming systems (and an important source of fuel wood). Over-cultivation, rather than erosion, appears to be a main factor in declining soil fertility (IISD, 2005) and agricultural productivity. Rwanda has recently embarked on a nationwide program to improve and retain its agricultural soils through an active terracing campaign. Section 4.2 provides some discussion about the techniques used.

Commercial crops such as coffee, tea, pyrethrum, and cut flowers also provide important cover and protection functions. The hazards of growing these crops on a commercial scale are discussed in a Section 4, along with other threats to Rwanda's environmental resources.

### 3.4 Energy Resources

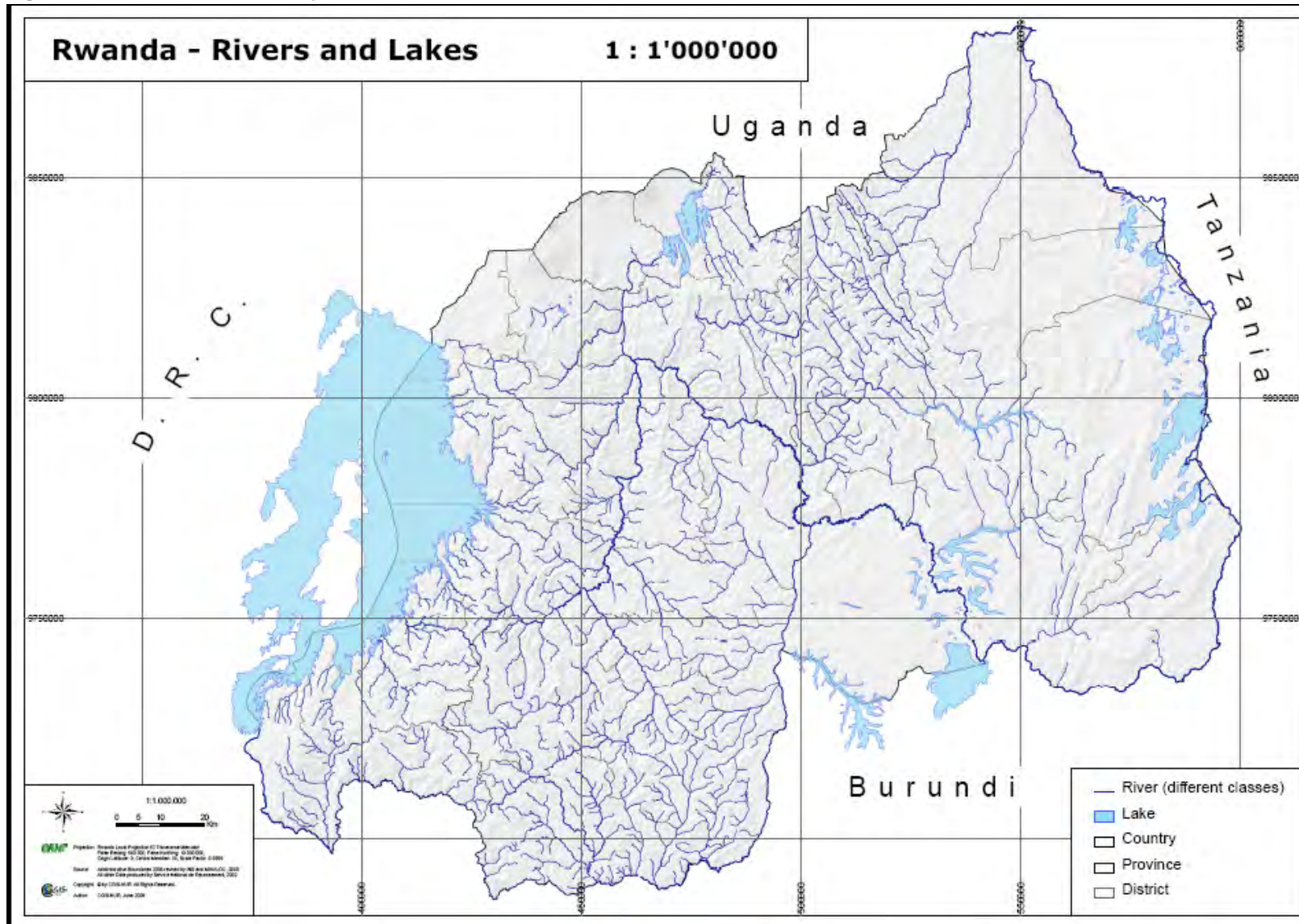
Rwanda's energy resources consist primarily of wood fuels, geothermal sources, and methane. Research on geothermal options began in Rwanda in 1969 and there is strong evidence that there are geothermal fields that could be developed as power sources. Especially promising is the Albertine Rift region, where nine thermal sources have been identified, with a total estimated energy potential of 50–170 mw (Tuttle et. al. 1990).



Fuel wood collection along Akagera National Park



Figure 3.2 River and Lake Systems in Rwanda







**Wood fuels.** Rwandans depend heavily on wood fuel, which currently meets 90 percent of their energy needs. Rwandans used 3,510 million kg of wood fuel in 1992 (the last year for which figures are available). Most of this wood is consumed by homes, though large quantities are also consumed by a variety of commercial users, such as tea factories. Usage is not confined to the dispersed rural population: wood fuel also makes up the bulk of energy used in urban centers like Kigali. Biomass fuels are supplied by a commercial network. Though wood is not generally considered a commercial energy source, the supply of wood throughout Rwanda is monetized.

Supply sources are fragmented. Large consumers like prisons, brick burners, or tea factories contract directly with one supplier or send their own employees out to gather wood. Very large consumers, such as the SORWATHE tea factory, actively plant trees (mainly eucalyptus) and harvest trees for fuel from their own renewable harvesting areas. Smaller users like residences, bakeries, and workshops generally purchase wood on the street, at a higher cost.

A World Bank study concluded that the major use of wood fuel was wholesale to the residential sector. Nationwide the use of biomass as a fuel in commercial establishments like bakeries, brick-making, or in government buildings tends to be minimal.

Earlier in the decade, the state owned an estimated 44,000 ha of forest plantations, and districts owned another 23,000 ha. The primary species are *Eucalyptus spp.*, sold for wood fuel and construction. Most of the plantations were planted with *umuganda* labor, although some were planted with Food for Work and other forms of payment. Proceeds from sale of products from state plantations go into the National Forestry Fund, to be used for additional plantings and to cover administrative costs. Proceeds from district plantations go into district forestry funds, where, more often than not they are used to cover general district administrative costs (salaries), with little left over for additional plantings.

**Methane.** Lake Kivu in western Rwanda is home to substantial natural gas reserves. It holds about 250 billion m<sup>3</sup> of carbon dioxide, 55 billion m<sup>3</sup> of methane, and 5 billion m<sup>3</sup> of nitrogen, as well as numerous other trace gases. Of these gases, methane is the most important because of its commercial potential. Box 3.2 provides some details about what is being done today. As reported in the 2003 ETOA, methane is generated in the depths of the lake by two bacteriological processes. The bathymetric study of Lake Kivu carried out by Lahmeyer International in 1998 concluded that the maximum annual extraction per module would be 50 million m<sup>3</sup> (STP), given extraction hydraulics limitations. The study also concluded that up to 20 modules could be operated, with total annual production of 1 billion m<sup>3</sup> (STP).

This estimate is based on maximum production. If the Lake Kivu gas reserves are to be extracted in a sustainable manner, a study by Klaus Tietze (2000) indicates that the yearly maximum extraction would be 150 million m<sup>3</sup> (STP), because that is the amount the lake creates every year; extraction at or below the replenishment rate is sustainable. Tietze also concluded that no more than 25 million m<sup>3</sup> (STP) of gas should be extracted from each location; higher production would require the GOR to set up a system to monitor lake dynamics. Such a system would also help to

determine the precise amount of gas that could be safely extracted from any particular region of the lake.

Lake Kivu gas production was first investigated by the Belgian Chemical Union (UCB), which built a pilot plant at Keshero west of Goma in the Congo in 1954. UCB later built a pilot plant at Cap Rubona near the Rwanda town of Gisenyi in 1963. This plant, originally built to operate for only 10 years, is still in operation today with all gas produced being sold to the Bralirwa brewery, which uses the gas to fire its boilers. It has a production capacity of between 1.0 and 1.5 million m<sup>3</sup>/year, though the plant is often offline due to maintenance problems.

### 3.5 Economic Value and Importance

There is no question today that Rwanda's natural heritage — its forests, savannas, water and biodiversity — have significant value. The global community, the region, and Rwandans themselves are increasingly aware of their importance and value. Rwanda's Economic Development and Poverty Reduction Strategy (EDPRS) highlights the environment and land priorities as major cross-cutting issues. It states:

Environmental and land priorities involve ecosystems, the rehabilitation of degraded areas and strengthening newly established central and decentralised institutions. Special attention will be paid to sustainable land tenure security through the planning and management of land registration and rational land use, soil and water conservation, reforestation, preservation of biological diversity and adaptation and mitigation against impacts of climate change.

The EDPRS recognizes that tourism and ecotourism constitute significant components of the national economy. The tourism industry is growing (see Table 3.2 below) and it is heavily dependent on the country's rich biodiversity. The sustainability of tourism, and its growth, depends on maintaining biodiversity and conservation of the environment. The EDPRS targets

#### Box 3.1 Tapping the Methane in Lake Kivu

With Lake Kivu's rolling green swells and serene coastline, it's hard to imagine why this is called one of Africa's "killer lakes." Fishermen have known for more than a century about the mysterious gas that occasionally bubbles up, killing fish and sometimes swimmers.

The source, scientists say, is a massive pool of methane and carbon dioxide that lies at the bottom of the deep-water lake on the border between Rwanda and the Democratic Republic of Congo. Gas levels have been steadily rising, and experts say the gases might one day explode or burst to the surface, releasing a deadly cloud similar to one that killed more than 1,700 people at Cameroon's methane-rich Lake Nyos in 1986.

Hoping to avert a catastrophe on the shores of a lake where 2 million people live and to solve its energy woes at the same time, the Rwandan government is embarking on a risky project to extract the methane and use it to generate electricity.

Methane-power generation plants exist elsewhere, but the effort here is the first attempt to extract the gas from underwater and burn it to fuel an electricity plant.

The government launched a \$15-million pilot project in May 2008 that will try to power a four-megawatt generator with methane from the lake. A floating platform, installed this year, dropped a pipe more than three football fields deep to reach the methane-rich water.

An American energy investment firm, New York-based Contour Global, is close to signing a deal to build the permanent electricity plant on Lake Kivu's shore, which would eventually produce 100 megawatts of sorely needed power for Rwanda, nearly twice the country's daily production, government officials said.

Source: <http://www.latimes.com/news/nationworld/world/la-fg-lake23-2008may23,0,5609738.story>

for tourism infrastructure and investments are closely linked to the continued growth of the tourism sector.

**Table 3.2 Number of Visitors in the Rwanda's National Parks, 2004-2007**

Visitor Category	2004	2005	2006	2007
<b>Volcanoes NP</b>				
Rwanda Resident	561	577	776	735
Foreign resident	562	693	512	510
Foreign visitors	7,417	9,225	12,720	16,764
<b>Sub-total</b>	<b>8,540</b>	<b>10,495</b>	<b>14,008</b>	<b>18,760</b>
<b>Akagera NP</b>				
Rwanda Resident	11,866	7,196	8,018	9,400
Foreign resident	2,185	1,258	1,737	2,066
Foreign visitors	2,425	2,785	3,965	4,978
<b>Sub-total</b>	<b>16,476</b>	<b>11,239</b>	<b>13,720</b>	<b>16,323</b>
<b>Nyungwe NP</b>				
Rwanda Resident	172	250	392	252
Foreign resident	469	419	492	453
Foreign visitors	1,339	1,717	2,204	3,276
<b>Sub-total</b>	<b>1,980</b>	<b>2,386</b>	<b>3,088</b>	<b>3,981</b>
<b>TOTAL</b>	<b>26,996</b>	<b>24,120</b>	<b>30,808</b>	<b>39,064</b>

Source: ORPTN statistics.

At least one foreign investment firm, Dubai World Rwanda, is making substantial moves in Rwanda to capitalize on the inherent value and potential for profit that is present in Rwanda's natural environment. It already has two ecotourism properties linked directly to Volcano National Park, and it is investing in two others in the southwest part of the country, next to Nyungwe National Park. And it has just concluded an agreement to manage and operate Akagera National Park within a 49-year lease agreement that includes an eco-lodge within the borders of the park.

Outside of ecotourism, there is also substantial value and importance in the country's tropical forest and biological inheritance. One example involves the afro-montagne forests and the value of watershed protection inside the borders of Nyungwe National Park, with a focus on ecosystem services. Often such services are primarily beneficial to the global community at large, such as in protecting biodiversity, or carbon sequestration and storage. In his examination of Nyungwe's economic value, Masozera points out the value of other services that also benefit Rwandans more directly. Table 3.3 gives a quick summary of his thesis.

**Table 3.3 Total Economic Value of Nyungwe Watershed**

<b>Ecosystem services</b>	<b>Economic Value (\$US/year)</b>	<b>Beneficiaries</b>
Watershed protection	117,757,583	Local communities, OCIR THE, Electrogaz, Regideso/Burundi
Biodiversity protection	2,000,000	Global community
Carbon sequestration and storage	162,080,000	Global community
Recreation and tourism	3,372,313	Global community, ORTPN and tour operators
<b>Total</b>	<b>285,209,896</b>	

Source: Masozera, 2008.

Since the last ETOA in 2003, Rwanda has ratcheted up its environmental quotient and its campaign to make its citizens greater participants in the conservation and protection of the nation's natural resources. Their value is being increasingly recognized within the country and from outside of its borders.

Some of this awareness stems from costs of not taking proper conservation and protective measures of forested lands and wetlands. One study (Musahara et.al., 2007) found that degradation of the Gishwati Forest and the Rugezi wetlands resulted in a 167 percent rise in the per capita cost of electricity to the two percent of Rwandans who have access to electricity. The cost is directly traceable to the siltation of the wetlands and the loss of capacity to generate electricity from hydropower. To meet demand, Rwanda's electric utility had to purchase diesel generators, a much more expensive (and polluting) alternative.

Loss of vegetative cover in Gishwati even claimed human lives (Smith, 2007). Fifteen people were killed in 2007 from landslides in areas previously covered by natural forests. Opportunity costs, such as decreased livelihoods from reduced fish stocks, longer travel distances/time to obtain clean water and fuel wood, decreases in tourism revenues, increased incidences of flooding on agricultural lands, and so on are all the result of negligence and improper stewardship of forests, land, and wetlands. The potential economic loss of these resources over the long term is extremely important. In combating climate change, the same argument prevails. Tropical forests are an important carbon sink that help reduce greenhouse gases, an important mitigation factor in climate changes that can affect fragile ecosystems.

This section has examined the state of the natural forests, biodiversity, and major components of Rwanda's natural environment. Section 4 discusses the critical threats to forests, biodiversity and the environment and attempts to put them into a context that government, donors, NGOs, and the private sector can begin to address.

## **SECTION 4**

### **THREATS TO FORESTS, BIODIVERSITY, AND THE ENVIRONMENT**

This section discusses threats to the natural environment inventory that was discussed in Section 3. In most instances it also analyzes what threats are attributed to, and provides the reader with options that can be considered to alleviate them. Comparisons are also drawn between the 2003 assessment and the 2008 update.

There is no doubt that tropical forests, biodiversity, and Rwanda's overall environment are in peril, and the principal threats that were named in 2003 remain the same today, although the finer details have changed. The three overarching, primary threats are:

1. Human population pressure on the landscape
2. Insufficient or weak legal and institutional frameworks for the environment sector are not in place and/or operational
3. Natural causes (usually exacerbated by humans)

Other threats to Rwanda's natural environment are probably not as direct or immediate as those mentioned and discussed above. They include other aspects of point and non-point pollution of air and water resources. Many of these are urban related, such as improper management and disposal of solid waste from domestic, industrial, and medical sources. International standards and safeguards exist for most of these materials, but it is not known to what degree best practices are followed, monitored, or if they are even established.

Rwanda is home to almost nine million people and is the most densely populated country in all of Africa. Headway is being made in reducing poverty and the country's development focus on the economy rather than social action does seem to be quite positive in the past three years. As reported in Section 2, at least 60 percent of Rwandans fall below the poverty line. Close to 90 percent of the population relies on agriculture, with a growing need for land and access to natural resources, especially water. The particular social, political, and economic situations in Rwanda have led to serious environmental problems posing significant challenges for achieving sustainable development, including dramatic soil erosion and loss of fertility, reduction in surface and ground water, a national energy crisis, and significant and rapid degradation of ecosystems and key habitats.

#### **4.1 Population pressure on biodiversity resources and protected areas**

Rwanda's population growth has put pressure on the limited natural resources, such as forests, that do not match with to the high demand of the population needs. This has led to misuse and over-exploitation of natural resources which in turn leads to environmental degradation. This has far-reaching consequences in terms of resources spent on reforestation and all efforts aimed at restoring the lost value of the environment.

In the 40 years prior to 2003, protected areas in Rwanda decreased by more than 50 percent of their initial area (Rwandan Office of Tourism and National Parks, 2004a). Overall, 80 percent of Rwanda's forests were lost in those four decades.

The threats to biodiversity in protected areas are caused by neighboring human populations with high population densities (more than 350 people per km<sup>2</sup>) who compete for scarce land and natural resources. The lack of livelihood alternatives and poverty pushes people to poaching, grazing, and wood collection for household use.

Human pressure on biodiversity resources is also exacerbated by population displacement: returnees after the 1994 genocide, refugees coming from neighboring countries in civil war, and internally displaced people due to natural disasters such as floods or earthquakes. Population displacement can cause environmental threats such as deforestation, land degradation, overgrazing, unsustainable groundwater extraction, water pollution, solid waste management, and encroachment of protected areas/national reserves (such as Gishwati and Mukura forest reserves).

**Improvements in/around protected areas.** In this decade, the losses of natural forest cover have slowed, especially in and around the protected areas. Local communities have become involved with their protection and conservation while government, NGOs, and CBOs have worked to make their livelihoods less dependent on them. Poaching remains a threat, but less so in 2008 than in 2003. Large national campaigns such as Kwita Izina have been growing in popularity each year, and Rwandans countrywide have a much better understanding of the importance of the gorilla population and the national parks.

Another significant event since the 2003 ETOA has been the government's policy to invest a portion of all receipts collected from entry fees to national parks back into the local communities adjacent to the parks. ORTPN initiated a revenue sharing program in 2004. According to its policy, five percent of the total tourism revenue is allocated to the districts bordering the three national parks in the following ratios: 40 percent to Parc National des Volcans, 30 percent to Akagera National Park, and 30 percent to Nyungwe National Park. These funds have been used to build schools, provide health facilities and services, and the like. Most importantly these are additional incentives for local communities to help protect the biodiversity and the other attributes that attract tourists to these protected areas.



Ditch dug along southern border of Akagera National Park to reduce human-wildlife-cattle conflict

International and local NGOs, donors such as USAID and the Dutch government, and the private sector have each helped to raise awareness about the resources in and around Rwanda's protected areas. Strategies and action plans that work directly with local communities and district officials have also brought about increased participation, interest, and investment of human capital in protecting and conserving these areas. Results of these programs are becoming evident. Nyungwe National Park, for example, reports decreases in fires caused by beekeepers operating in the park. In Akagera National Park (ANP), grazing cattle inside the park boundary has decreased significantly (since the 2003 ETOA) with enforcement and public awareness.

Human/animal conflict is a problem in protected areas, particularly some sections of ANP, and those types of threats exist on both sides of the boundary. One solution that is being tried is a 13-km-long trench at the boundary. Another posited solution is an electric fence. Park staff members are continuing to work with the local communities to identify and test alternatives.

Time will reveal the results of ORTPN's latest experiment: leasing operational and management authority of Akagera National Park to a private investment group: Dubai World Rwanda. The company has experience managing protected areas in several African countries; it operates several properties in Rwanda and is investing in several more. The company caters to high-end tourists, with the intent of encouraging them to work to protect and enhance their investment. Whether this will provide direct benefits to Rwandan citizens remains to be seen; however, the results should be positive for protected areas.

#### **4.2 Institutional weaknesses and inefficiencies**

**Forest and biodiversity.** Gishwati and Mukura forest reserves, the only significant forested areas remaining outside national parks, are extremely threatened. The fact that there are no management plans or personnel permanently on site for their operation or monitoring does not bode well for their futures. The few gallery forests that remain are also highly threatened and will probably disappear. Also, the demarcation boundaries and land area of the protected areas and gallery forests are unclear, as are the management of buffer zones and road policies inside the parks. The Forest Service, under the Ministry of Agriculture, is charged with planning and monitoring these resources; the just-created National Forest Authority (NAFA) will execute programs; and a third entity, the National Protection Service, is responsible for the protection function. Coordination without plans, labor, or a functioning forest policy likely will be difficult.

A Forest Law has been drafted that is somewhat in line with a 2004 forest policy, but it has not been enacted. The 2004 policy itself is weak in many places. It fails, for instance, to address the institutional coordination gaps in the management of the Forest Reserves or in the buffer zone plantations, such as those that are so important to protect areas like Nyungwe NP. There is also lack of clarity on the management of natural forests, particularly the need to balance the needs for biodiversity and ecosystem services with production use functions (for structural lumber or fuel wood). Other stakeholders like ORTPN are not even considered in the strategies. And, even though fuel wood is a monetized resource, there is no cohesive plan for maintaining or improving stocks from public and/or private suppliers in this nation that relies on wood as its



primary energy source for fuel. The lack of adequate coordinated strategies and action plans intensifies the threats to the forest resources, both from conservation and utilization perspectives.

In addition to the inherent institutional structures for protecting and managing forests there is, as in many Rwandan institutions, still a paucity of trained manpower in the forestry sector for furthering action agendas and getting necessary operations in place.

Despite these institutional weaknesses, the EDPRS plans to increase the proportion of protected areas for biodiversity preservation from 8 percent to 10 percent in 2012. Forest and agroforest coverage is scheduled to increase from 20 percent to 23 percent of the total surface land area, and annual wood consumption is due to be reduced by 30 percent from the 2002 figure.

**Watersheds and wetlands.** Similar to the forest sector, a draft wetlands policy was developed in 2004 as part of Rwanda's Vision 2020 strategy, but it is still on the shelf waiting for a detailed inventory and categorization of wetlands for production and protection.

Conflict among institutions, and lack of coordination, also poses a threat to overall health and protection of Rwanda's wetlands. There is a Focal Point for the RAMSAR Convention in REMA who is charged with wetlands issues, but this person is not involved in day-to-day management of wetlands. The MINAGRI seems to have a strong grip on wetlands management in the absence of a clear legal or institutional framework for wetlands management by either the Ministry of Natural Resources or REMA. Nonetheless, REMA has used provisions of the 2005 Organic Law on environmental protection and Ministerial instructions to ban activities in wetlands except those identified by MINAGRI for cultivation of rice and other cereals.

Lakes, rivers, and streams also support a fisheries resource. This too remains threatened by a lack of protection and a clear policy governing the aquatic resources in the country. Too few fisheries experts and a lack of experienced fisheries personnel also mean that a new Fisheries Bill passed in mid-2008 won't, in the short term, have enforcement teeth nor the institutional capacity to monitor concessions, and the fact that some of the fishing communities have been excluded by privatization.<sup>2</sup> MINAGRI developed and is using ministerial orders for private sector fisheries concessions, and in some areas, fisheries have been leased by local associations. For the lakes within the Akagera protected area, however, the jurisdiction is under the ORTPN (Office of Tourism and National Parks), which has no fisheries staff.

A main problem is the fact that, despite the existing resource endowment and its potential, fisheries remain among the lowest priority natural resource sectors in terms of public investment support. Correspondingly, its contribution to GDP is inadequately recorded, and there is limited policy, legislative and institutional support.

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<sup>2</sup> REMA/UNEP/ UNDP – Bugesera Integrated Ecosystem Assessment. 2007. Prepared under the Poverty-Environment Initiative.



### 4.3 Energy pressure

The Rwanda energy picture is dominated by traditional fuel use (firewood, charcoal, and agricultural residues) making up 95 percent of the total national energy requirement, 1 percent by electricity and the remaining 4 percent by petroleum and other products. Most of the energy used is by households, followed by industry, commerce and agriculture. Approximately 90 percent of households are dependent on wood for cooking and kerosene for lighting. Access to electricity is low, with about 4 percent of urban households and 1 percent of rural households being connected (Poverty Environment Initiative, 2006). Even where available, electricity is considered expensive and costly for household cooking use.

The rate of households using fuel wood will continue to grow before the exploitation of methane gas from Lake Kivu is developed. There are no other feasible alternatives for cooking needs, and a large percentage of people will not be able to afford modern energy services in the medium term without large investments. The GOR has focused more efforts on reforestation yet the demand still out weighs the supply. This deficit in supply will exacerbate the already critical state of deforestation unless a sustainable supply of fuel wood is ensured.

### 4.4 Degradation of wetlands and lack of clean water

Rwanda's territory is a significant source of water for both the Nile and Congo River watersheds; its water resources are important not only for Rwandans, but also for the Great Lakes Region and many others downstream on the continent. How Rwandans manage and treat their water is important: Threats to the quality and availability of clean water increase as the population grows, demand goes up, and the GOR's economic policy agenda creates gaps in coordination and communication among users of environmental services.

**Causes and consequences of wetland degradation.** Wetlands degradation in Rwanda is closely linked to development in urban centers countrywide (see Box 4.1). The most outstanding threats of wetland stability are industrial pollution, agriculture, drainage activities and over harvesting of wetland resources (Rwanda Development Gateway, 2008). Many construction activities being carried out require inputs from wetlands, which degrades these resources. High demand for brick making coupled with sand mining has led to the misuse of wetlands throughout the country. This results in the creation of pits which accumulate stagnant water for habitats of diseases carrying vectors like mosquitoes and snails encouraging health problems to occur.

The location of industries within wetlands, such as the Gikondo industrial area, garages operating near wetlands and poor garbage disposal also degrade wetlands and affect the normal functioning of wetlands as filtration systems for clean water. The discharge of toxic chemicals, hazardous oils and unwanted metals pose a serious threat to the biodiversity that are vital to the health of a wetland ecosystem. The impact of wetland resource use has led to the reduction of permanent streams and the disappearance of permanent springs leading to low ground water levels.

The lack of coordination between the Ministry of Environment and urban planning authorities has led to the degradation of various wetlands in and around Kigali. To this effect, concerned authorities have established clear linkages to enable smooth running of policies regarding wetland conservation in the country.

**Availability of clean water.** At present, even though less than a quarter of the withdrawal capacity of the resource is used annually, the systems that collect, store, and release water are quite threatened. In low-lying and wetland areas, pressure for agricultural space and inappropriate marsh cultivation has caused stream flow changes, increased water evaporation, and reduced water tables and groundwater recharge (Odada et al., 2004). As of 2005, at least 93,754 ha of the total 164,947 ha of wetland surface area have been cultivated (Kanyarukiga and Ngarambe, 1998). In Bugesera District (Lakes Cyohoha, Bugesera and Rweru) and Kirehe District (Lake Mugesera regions), reclamation, siltation, flood damage, and water weed infestation from invasives such as water hyacinth have severely decreased and degraded wetlands. In Bugesera District, Gashora marsh was drained for food emergency assistance in 2000 (FAO, 2001).

The extreme cases of deforestation, especially in the higher elevations along the Congo-Nile Crest, have also decreased the ability of watersheds to hold and restore water. In addition the large quantities of precipitation in the rainy season cause water run-off problems when high-volume water flows, inundate exposed soil, cause sedimentation, and point and non-point sources of pollution.

**Point and non-point pollution.** Because the watersheds and wetlands are a complex web of microsystems on the Rwandan landscape, their capacity to provide fresh, clean water can be very vulnerable as was noted above. Pollution, either from sedimentation due to erosion or from man-caused events and sources, is an increasing problem, as land use intensifies and unregulated runoff from urban areas continues. Tea plantations located high up in the watersheds use significant amounts of herbicides and pesticides and jeopardize the water resources if proper precautions and steadfast monitoring are not maintained.

**Box 4.1 Possible Adverse Effects of Infrastructure Development in and beside Wetlands**

- Filling in certain marshlands would destroy their ecological integrity and role.
- Water, soil, and sediment would be polluted by increased use of chemicals.
- Soil fertility would be reduced by poor management of hillsides and marshlands and the intensive use of the soil without replenishing nutrients.
- Silting of canals could lead to flooding.
- Health issues could arise if the marshlands are modified in a way that is conducive to the breeding of malaria-transmitting mosquitoes (*Anopheles gambiae*).
- Flooding is likely downstream due to reduced retention of water in the canals; it would be necessary to increase the size of canals and construct buffer zones at intervals to hold excess water.
- There is the threat of loss of biodiversity through reduction of habitat, particularly for birds, reptiles, and amphibians.
- Soil biodiversity would also be reduced by habitat modification and loss through use of pesticides and agrochemicals, which affect soil microorganisms. This will in turn affect soil fertility, which is dependent on these microorganisms.
- Reduction in atmospheric moisture would raise ambient temperatures.
- A loss of traditional materials for thatching and craft manufacture.

Source: 2003 ETOA.

Similarly, under the EDPRS, even the admirable goal of economic development can have deleterious consequences if planning and coordination across sectors are not properly considered. As an example, the government's policy to make specialty coffees a global brand and (hopefully) an economic mainstay for the country is likely to put at risk the nation's watercourses and the people that rely upon them.

#### **4.5 Agricultural inefficiencies and soil erosion**

The main environmental threat to Rwanda's farming systems is erosion, stemming from the fact that most agriculture is done on slopes so steep that they occasionally approach 100 percent. MINAGRI sources indicate that around 37 percent of the land in Rwanda needs to be managed before being cultivated, and overall, an estimated 39.1 percent of the land has a high erosion risk. Steep hillsides are likely to erode whenever protective vegetative covering is removed or the surface is disturbed; the hillsides typically suffer the least erosion in their natural state as forests or grassland. Regularly disturbing the soil and leaving large portions of it without protective covering — as happens with agricultural row crops — promotes erosion. Estimates of soil loss from cropped hillsides vary, but may be as much as 80 to 100 m<sup>3</sup> per ha per year. MINAGRI sources indicate that erosion is responsible for soil nutrient losses estimated at 945,200 tons of organic materials, 42,210 tons of nitrogen, 280 tons of phosphorus, and 3,055 tons of potash annually. Fields may become infertile after only three or four years, resulting in environmental impacts downstream, including silting of streams and rivers.

The GOR does recognize soil erosion as a major problem. The EDPRS plans to increase the area to be protected against soil erosion from 40 percent of the agricultural land area in 2006 to 100 percent in 2012. The soil erosion issue was reported in the 2003 ETOA, and mitigation actions were discussed as part of the ongoing national development strategy of the period, the 2002 Poverty Reduction Strategy Plan. Then as now, terracing, reforestation, and wetlands management were seen as actions that could be taken. Arguments continue today about whether radical terracing, involving the physical movement of soil into contoured benches, is best. Some argue that a more passive and slower option, vegetative contour bunds, is more effective (and sustainable). USAID, through its Food Aid program, has participated in the GOR's progressive terracing program. Given the controversial nature of the radical terracing technique, the findings of several studies and discussions with the ETOA Team and USAID/Rwanda at the time of this report was moving toward removing this specific type of assistance from its Food Aid program.

Land tenure issues, if not properly resolved, are also a significant threat to agriculture and agricultural production. Since the 2003 ETOA there has been improvement in this area, but more remains to be done. Legislation (see Section 2.3 and Annex F) has been promulgated and is beginning to become operational in some areas of the country. The strong move to decentralization in 2006 has also had a significant positive benefit, placing the decision-making and conflict resolution responsibilities in the hands of local/district officials.

## 4.6 Climate change

In Rwanda, degradation of environment and ecosystems is not only human-made but caused by climate disturbances. According to the National Adaptation Programs of Action to Climate Change (GOR, 2006b), serious floods linked to “El Niño” in 1997-1998 destroyed a large number of agricultural plantations and swamps of Nyabarongo and Akanyaru river basins. From 1999 to 2000, a prolonged drought seriously affected Bugesera, Umutara, and Mayaga regions.

Like the famous Ruzagayura famine during 1943 to 1945, such disasters are provoked by climate change, as well as, the landslides in the north (Gakenke, Cyeru, Rulindo, Butaro, and Kinihira) and the west (Nyamesheke, Karongi, and Ngororero) of the country in 2001-2002. Due to the steep relief, western and northern regions are prone to landslides and flooding and consequently sensitive to erosion. In 2007, floods killed 15 people and left about 1,000 people homeless. In September 2008, a similar incident occurred and destroyed 1,982 houses and 106 schools.

Heavy rains, floods, and frequent landslides affect the ecosystem negatively through water pollution, invasion of exotic aquatic species, loss of soil fertility by leaching, increase of sediments on arable land and wetlands, and soil erosion. Negative effects of climate change in Rwanda are also driven by increases in temperature, prolonged droughts, and high evapotranspiration. Rwanda has experienced low river flows and low water levels at Lake Kivu and the hydroelectrical stations at Ntaruka and Mukungwa. Drinking water levels in Kigali have also been affected due to the reduced intake flow of the Yanze River.

Faced with the challenges of climate change, Rwanda has started to adopt national strategies of integrated watershed management. There have been several efforts to make the discussion more prominent so that all Rwandans can participate in helping reduce the country’s vulnerability to this global threat (Uwizeye and Hammill, 2007). Other fora are being planned and organized by local NGOs like ACNR with assistance from the MacArthur Foundation (which has been funding similar discussions throughout Africa). The GOR is also reported to be organizing climate change discussions.

## 4.7 Waste disposal issues

There are two areas of concern for waste disposal in Rwanda: medical and industrial waste.

**Medical waste.** In exploring different possibilities for disposal of the Indoor Residual Spraying waste in relation to the Presidential Malaria Initiative, USAID found that medical incinerators in Kigali do not meet safety and environmental requirements.

The incinerator at Kibagaba Hospital was visited by the ETOA team and USAID and it was agreed that the incinerator should not be considered as a potential solution to dispose of wastes. It is located too close to the patient ward and needs to be repaired/upgraded by installing a new filter to reduce the air pollution. There is also a need to equip the incinerator operators with

Personal Protection Equipment (PPEs) and provide them with training on safe operation of the incinerator.

USAID health projects being implemented in Rwanda adhere substantially to international standards and best practices regarding the disposal of waste materials. Activities are not permitted to move forward unless best practices are in place. For example, USAID denied approval to empty pesticide plastic sachets, hand gloves, nose masks, and carton packaging that had been in contact with pyrethroid insecticide during the Presidential Malaria Initiative/Indoor Residual Spraying (IRS) project that started in 2007. The IRS waste is currently waiting for a safe and environmentally safe disposal.

**Industrial waste (particularly in the coffee sector).** Specialty coffees have washing/depulping stations that often operate without adhering to recognized standards and best practices for effluent discharge. The typical washing station in Rwanda discharges 100 tons of pulp in a season. Coffee washing wastewater, high in carbohydrates and organic matter, is typically discharged untreated directly into streams. Usually this takes place in a season when stream flow is decreasing. The waste stream can quickly reduce available oxygen in the receiving water (stream or wetland), affecting downstream fishponds, drinking water sources, and fragile wetlands/swamps that are key to water management (see Box 4.2). In 2008, the GOR set a goal

#### **Box 4.2 Wastewater Pollution at Coffee Washing Stations**

Coffee processing produces large quantities of organic residue-pulp and skins. (1T of parchment coffee produces nearly 5T of pulp; e.g., more than 80 percent of the coffee cherry weight is waste organic matter or water contained therein.) Wet processing also demands large amounts of water beyond that contained in the cherry itself in the absence of water recycling, approximately 15-17 liters/kilo of cherry.

Processing wastewater containing pulp and skins is characterized by very high BOD (biological oxygen demand) and COD (chemical oxygen demand). If discharged directly to surface waters, this effluent has severe impacts on downstream water quality and aquatic life. Unlike sewage or discharge from animal feeding or slaughtering operations, coffee processing wastewater is not a source of fecal-oral route pathogens; however, wastewater may provide a growth medium for existing pathogens. In addition, the anaerobic environment facilitates the growth of some harmful micro-organisms.

Natural or assisted biological activity in mucilage-containing wastewater results in a thick crust of digested mucilage floating over acidic (pH 4 or less) water. This crust exacerbates the highly anaerobic conditions brought on by the decomposition, increasing odor problems and inhibiting further biological decomposition.

Coffee wastewater, even when of high clarity, will also tend to take on a dark-green/brown/black color. This color is derived from the chemical constituents of the red color of the coffee cherries, but is not itself toxic or a significant contributor to BOD/COD. However, off-colors can understandably be a source of concern for downstream communities utilizing the water. When separated out of wastewater, coffee pulp and skins can be composted and used as a soil amendment (If dried, but not fully composted, pulp and skins can also be used as mulch.) If unmanaged pulp piles can create significant odor and fly problems, and provide rodent habitat. Run-off from compost piles is also a potential source of surface water contamination.

Finally, wet coffee processing employs large numbers of people and also attracts sellers to the processing site. This creates a significant biological waste stream composed of foodstuffs and bodily wastes. Poor management of bodily wastes, in particular, can result in surface water contamination and the potential for oral-fecal disease transmission.

Sources: Gibson et. al., 2002.

Natural Resources Defense Council at: <http://www.nrdc.org/health/farming/ccc/chap4.asp>

to double its number of coffee-washing stations to more than 250. This could potentially have serious negative effects on streams and wetlands throughout the country if pollution standards for these sites are not set, monitored, and enforced. (See also Section 5.C and Section 6.)

Several of the USAID-financed washing stations have not incorporated environmentally sound design elements in their construction plans to mitigate the impacts of coffee processing on the surrounding environment and untreated wash water is entering water sources directly. Other stations have incorporated environmentally sound design elements but are poorly managing liquid and solid effluent disposal. In addition to the negative environmental consequences of poor waste management, non-compliance with best environmental practices can compromise the ability of stations to gain revenue-enhancing certifications (i.e. fair trade, preferred supplier, or organic). (Chemonics, 2006)

On other USAID-financed economic growth activities, such as small business development in essential oils and in coffee production, environmental safeguards are currently points of serious discussion. Mitigation of any environmental hazards are planned and acted upon, but implementation challenges still exist.

This section has discussed a number of the major threats to tropical forest conservation, biodiversity, and Rwanda's natural environment. Human population pressures on the environment and weak institutional structures and laws are seen as the two greatest threats at the time of this assessment. Section 5 examines ongoing and planned environment sector initiatives in Rwanda that have a strong link to biodiversity and tropical forests.

## **SECTION 5**

### **INITIATIVES IN THE ENVIRONMENT SECTOR**

This section discusses recent and ongoing initiatives that have impacts in the environment sector. First is a brief look at progress and important strategies and actions undertaken by GOR institutions, followed by a snapshot of donor-funded activities with environmental components. A more specific analysis of USAID-funded activities, including a look back at what the 2003 ETOA recommended, completes this chapter.

#### **5.1 Government Institutions**

Sections 2.C and 2.D summarized the government institutions and the political/legal context related to Rwanda's environment. Section 4 also pointed out how weaknesses in these institutions and policies actually jeopardize the well being of important components of the environment sector in Rwanda. It is also necessary to highlight the fact that substantial progress has been achieved since the 2003 assessment in actions related to mitigating environmental issues and addressing concerns.

The establishment of REMA as the environmental watchdog is most significant among these. REMA is still a young organization and is finding its way in the maze of issues, conflicts about jurisdiction among ministries and their departments, and the important task of building capacity within its own ranks. REMA leadership at the time of this assessment is strong, and its staff is dedicated. It has a broad mandate, however, and inadequate skilled staff to cover the range of topics and issues for which it is responsible. The agency is doing its best, but outside operational assistance and practical, targeted training that targets would be most helpful. Having an in-house GIS and mapping capability would also be valuable in helping REMA with almost all of its tasks.

The GOR decentralization efforts since the last ETOA are also having a significant impact on activities related to the environment at the local level, where Rwandans are most benefited. Staff members at Nyungwe National Park reported that they work closely with district officials and that decision-making that involves local community activities tied to the protected area is operational. The recent recruitment of environmental officers at the district level will provide another important service, and in some instances, this cannot happen soon enough. The Environment Office would be better located in the Directorate of Planning rather than Infrastructure (where its currently located), in order to reflect the crosscutting nature of environmental mandate.

Significant gaps in important areas of policy guidelines continue to exist. There are still no operational policies for forested land outside of protected areas, nor for wetlands. The national wildlife policy drafted in 2007 remains on the shelf, and does not address issues of wildlife outside of protected areas (e.g., the three national parks). Coordination and communication among the various ministries and agencies involved with environmental issues/activities are still serious problems at the central level, albeit less so at the district level.



The primary development strategy, the EDPRS, touts the environment as an important crosscutting issue. But because it is labeled as a crosscutting rather than a single issue, it is often neglected in favor of something with a budget line item. The strategy is an improvement over previous government programs, but lack of personnel, experienced professionals, and the necessity to often move in unfamiliar directions make progress slow. Operational assistance, training, and practical guidance for specific actions remain areas where outside assistance could be most effective.

## 5.2 Donors and the Environmental Landscape

Development assistance to Rwanda's environment sector is small. Recent government documents (Government of Rwanda, 2008b, 2008c) reported that 11 bilateral donors were supporting 165 separate projects/programs in the country, and only 10 had links to the environment. Similarly, six multilateral sources of funds were engaged in more than 60 different programs and only 12 had environmental connections. Most of the funding for environment-related initiatives is focused on Rwanda's protected areas and is sourced through international NGOs and university-related research efforts. Private sector investment in activities linked directly to Rwanda's biodiversity and protected areas is growing. Dubai World Rwanda, a South Africa-based company, has reported planned investments of more than USD 250 million in Rwanda, most in properties that cater to high-end tourism and ecotourism in and around the country's national parks, as well as recreation infrastructure in Kigali City.

A specific inventory of ongoing environment-related projects and programs coordinated and linked to GOR partners is found in Table 5.1.

Table 5.2 illustrates activities undertaken by international and national NGOs in Rwanda. The majority are most active in the protected areas, especially Volcano National Park, and focus on gorilla conservation. National environmental NGOs are small (in terms of their professional and budget capacities) but they play important roles, especially in local communities.

NGOs, with government support, have been instrumental during the last several years, particularly since the 2003 ETOA, in raising awareness about environmental issues in Rwanda. The 2003 assessment recommended pointedly that the international NGO community be more proactive in coordinating its activities and in communicating its goals and objectives to Rwandans and among one another. Most of them listened; these groups' actions are much more effective today.

Active social marketing and themed campaigns have made a significant difference in citizens' perceptions of environmental issues, biodiversity, and the role/importance of Rwanda's protected areas. A good example is the annual *Kwita Izina* campaign, which promotes gorilla conservation and is organized by ORPTN with support from NGOs and other sources. It has grown to festival proportions and its week-long agenda is highlighted on radio, on television, and in the printed press. In 2008, it provided the backdrop for the first-ever Conservation Conference that provided



a forum for NGOs, government, researchers, and donors to tout the importance of Rwanda's biodiversity, its national parks, and investments in conservation.

**Table 5.1 Ongoing Environmental Projects in Rwanda with Links to GOR Partners**

Project	Funding source & Amount (US\$)	Implementation Period and Partner	Thematic scope
Destination Nyungwe Project	USAID US \$ 5.0 million	2006-2009 ORPTN	Capacity building of NNP staff, ecotourism infrastructure and marketing; community health
Integrated Management of Critical Ecosystems (IMCE)	GEF/World Bank US \$4.3 million	2005-2009 REMA	Strengthening the national and decentralized capacity for protection, conservation and sustainable use of critical watershed areas, focusing on wetland rehabilitation, conservation and sustainable management.
Rural Sector Support Project Phase 2	World Bank US \$37 million	2008-2012	One component focuses on marshlands and hillside rehabilitation and development aimed at expanding irrigated areas in cultivated marshlands (3,500 ha) and increasing use of sustainable land management practices on associated hillsides (9,900 ha) to accelerate the pace of intensified agriculture.
Projet d'Appui a l'Institutionelle Gestion Environnement au Rwanda (PAIGER)	AfDB UA 1million (US \$ 1.6m)	2004 – 2008 REMA	Institutional support to REMA/ environmental management, including development of public-private partnerships in environmental management;
Poverty and Environment Initiative (PEI)	UNEP/UNDP (Ireland) US \$ 2.3 million	2007 – 2009 REMA	Focuses n improving understanding of the poverty-environment links; and supports decentralization. Builds on PEI phase
Rio MEAs Synergies	UNEP (Belgium Fund) US \$ 358,000	2006-2008 REMA	Institutional capacity building for the implementation of MEAs, and provision of micro-grants for grassroots activities
Decentralization and Environmental Management Project (DEMP) <sup>1</sup>	UNDP/Netherlands US \$3,536,100	2004-2007 REMA	Institutional strengthening of national and decentralized entities in environmental policy formulation and implementation
KIEM <sup>2</sup>	UNHABITAT/UNDP/ UNEP US\$ 150,000	2005-2006 REMA	Urban wetlands conservation/ rehabilitation by relocating industrial & commercial activities from the wetlands.(Prep studies only to date)
Protected Areas Biodiversity Conservation (PAB)	GEF/UNDP US \$ 5,45m	2006-2011 REMA	Institutional capacity building for protection & conservation of biodiversity in/around protected areas of Nyungwe National Park and Volcano National Park
African Environment Information network (AEIN)	UNEP US\$ 25,000	2008-2010 REMA	Start-up process for a project to improve the state of environment reporting – and harmonizing national

Project	Funding source & Amount (US\$)	Implementation Period and Partner	Thematic scope
			reporting systems with other regional states in the context of African Environment Outlook formats.
Montreal Protocol Implementation Programme	Multilateral MEAs Fund US \$ 662,925	Since 2003 REMA	Support the implementation of the Montreal Protocol on ODSs (Substances that Deplete the Ozone Layer).
Strengthening the Forest Sector Project	Belgium Technical Cooperation Euros 3 million (US \$ 4.5 million)	April 2008- December 2012 Forest Unit/ MINIRENA	Institutional capacity building of the forest sector, including support to afforestation activities in 6 districts of Ngoma, Kirehe, Bugesera (Eastern Province) and Gakenke, Gicumbi and Rulindo (Northern Province). Inventory of forest resources and tree nursery establishment.
Rwanda Forest Management Support Project (PAFOR)	African Development Bank UA 8.9 million (US\$ 14.24)	June 2002- December 2007 Forestry Unit/ MINIRENA	Forest rehabilitation; establishes district tree nurseries; trains personnel and provides institutional support to the Forestry Dept. and district forest offices.
Capacity Development and Mainstreaming Sustainable Land Management in Rwanda	GEF/UNDP US\$ 900,000	2007 – 2012 RADA	Addresses land degradation due to poor cultivation hilly agro-ecological zone. Invests in terracing; strengthens agricultural extension services and provides institutional support.
Institutional Support to the Directorate of Water and Sanitation	African Development Bank US\$ Unknown	MINITERE/ Rural Water Supply	Expansion of water supply systems in rural areas; improving hygiene and sanitation.

<sup>1</sup>A second phase of the project has been approved for 5 years with approximately US \$ 6 million. <sup>2</sup>Kigali Industrial-Environmental Management Project was implemented with funding from UNHABITAT.

**Table 5.2 NGOs Involved in Conservation and Environment Activities in Rwanda**

NAME	MAIN INTERVENTION FOCUS
<b>International NGOs</b>	
Diane Fossey Gorilla Foundation International ( <b>DFGFI</b> )	Gorilla conservation focusing mainly on research with the support to the Karisoke research center
Gorilla Organization ( <b>GO</b> ) ( former Diane Fossey Gorilla Foundation Europe )	Gorilla conservation focusing mainly on community conservation activities
Mountain Gorilla Veterinary Project ( <b>MGVP</b> )	Gorilla conservation focusing mainly on gorilla health
International Gorilla Conservation Programme ( <b>IGCP</b> ), a coalition of AWF, WWF & FFI	Gorilla conservation focusing on institutional enterprises development with community and transboundary collaboration
Wildlife Conservation Society ( <b>WCS</b> )	Nyungwe NP conservation support: research and monitoring, community conservation and ecotourism
<b>CARE</b> International	Environment conservation in the region: CARE in partnership with IGCP are implementing a transboundary project“ Equity, Enterprise and Environment in the Great Lakes Region” in the Virunga-Bwindi Region funded by Buffet Foundation
World Vision	Increasing agriculture production through terracing and marshland reclamation (drainage and irrigation)
Help Age Rwanda	Agroforestry program
<b>ACDI/VOCA</b>	Agroforestry program in partnership with ICRAF
<b>Local NGOs</b>	
Association pour la Conservation de la Nature au Rwanda ( <b>ACNR</b> )	Nature Conservation (biodiversity in general) and environmental education
Association Rwandaise des Ecologistes ( <b>ARECO-RWANDA NZIZA</b> )	Environmental protection
Rwanda Environmental Conservation Organization ( <b>RECOR</b> ) former Rwanda Wildlife Clubs-RWC	Conservation, agroforestry, eco-tourism and environmental education
Association Rwandaise des Journalistes Environnementaux ( <b>ARJE</b> )	Promotion of environmental reporting in different media in Rwanda
<b>SERUKA ASBL</b>	Gender and environmental protection
<b>ISUKU ASBL</b>	Hygiene and environmental protection
Association Rwandaise pour le Développement Intégré ( <b>ARDI</b> )	Development and environmental protection
Rwanda Rain Water Harvesting Association	Rain water harvesting
Rwanda Development Organization ( <b>RDO</b> )	Rural development and reforestation
Association Rwandaise pour l'Environnement et le Développement Intégré ( <b>AREDI</b> )	Environmental protection integrated development
Rwandese Health Environment Project Initiative ( <b>RWEPI</b> )	Environmental health and protection
Duharanire Amajyambere y'Icyaro or Action pour le Développement Rural Intégré ( <b>DUHAMIC-ADRI</b> )	Marshland reclamation to increase agriculture production by irrigation and drainage and in the reforestation program

Another area where NGOs have provided cutting-edge assistance and gained valuable lessons in the process is the transboundary cooperation, engendered mainly through the International Gorilla Conservation Programme (IGCP). IGCP is a coalition of three organizations: World Wildlife Fund (WWF), African Wildlife Foundation (AWF) and Fauna and Flora International (FFI). Pooling resources and even working through periods of conflict, environmental leaders from Rwanda, Uganda, and the Democratic Republic of the Congo envisioned, developed, and put into operation a 10-year transboundary management plan (IGCP, 2006) for a region of the Albertine Rift, one of the richest areas of biodiversity in the world. Others have already started to capitalize on this experience. Nyungwe National Park staff reported that it was using the lessons learned from IGCP's work to liaise and work with staff in Kibira National Park in Burundi that shares a boundary with NNP. Others are also looking for ways to cooperate with Tanzania to improve Akagera National Park's eastern boundary issues with that country.

Finally, one other important improvement established since the last ETOA has been the design and implementation of active and useful management plans for each of the three national parks. These are important steps in the overall conservation and protection of critical habitats and resources. Discussions with staff of two of the three parks indicated that the management plans were in active use and not just sitting on park office shelves. The lessons learned from using the plans in the implementation of activities are valuable for future efforts and in engaging the local communities whose livelihoods rely significantly on the parks' healthy existence.

### **5.3 USAID-funded environmental activities**

The primary environmental activity supported by USAID/Rwanda at the time of this assessment is the "Profitable Ecotourism through Improved Biodiversity Conservation in Rwanda Project," better known as the "Destination Nyungwe Project." It is funded primarily with biodiversity-earmarked monies and supplemented with funds from USAID's health program. Destination Nyungwe falls within the USAID Rwanda's Economic Growth Strategic Objective, SO7. The project is being implemented by IRG, Ltd. supported by a significant partnership with the Wildlife Conservation Society, and with Family Health International and CLUSA as additional subcontractors. The depth of IRG's international experience in environment and protected area projects and WCS's history with Nyungwe provides a solid team to implement the goals of the project.

The Destination Nyungwe Project, which will be implemented through 2009, has activities in the three components listed in Table 5.3.

**Table 5.3 Major Components and Tasks of the Destination Nyungwe Project**

<b>COMPONENT</b>		
<b>Biodiversity Conservation</b>	<b>Ecotourism and Rural Enterprise Development</b>	<b>Health</b>
<p><b>Nyungwe National Park</b></p> <ul style="list-style-type: none"> <li>• Strengthen ORTPN's park management capacity</li> <li>• Develop sustainable financing mechanisms</li> <li>• Monitor key species, illegal activities, ecotourism impacts</li> </ul>	<p><b>Product Development &amp; Marketing</b></p> <ul style="list-style-type: none"> <li>• Nyungwe and community ecotourism product development</li> <li>• Ecotourism infrastructure and services development</li> <li>• Marketing ecotourism (dropped in second year of implementation)</li> </ul>	<ul style="list-style-type: none"> <li>• Complete mapping and health needs assessment</li> <li>• Strengthen clinical and community capacity in providing a continuum of care for maternal and child health</li> <li>• Strengthen clinical and community capacity in providing and promoting family planning</li> </ul>
<p><b>Communities &amp; Conservation</b></p> <ul style="list-style-type: none"> <li>• Implement community outreach program</li> <li>• Mainstream environmental and sustainable use issues into district development plans</li> <li>• Design pilot implementation plan for buffer zone management in Banda and Kitabi (dropped in second year of implementation)</li> </ul>	<p><b>Rural Enterprise Development</b></p> <ul style="list-style-type: none"> <li>• Identify and support small scale rural enterprises through the Small Grants Program</li> <li>• Identify markets, develop business and marketing plans for natural products, arts and handicrafts</li> </ul>	

Source: International Resources Group, Ltd., 2007.

The goals and activities of the project meld well with the GOR's emphasis on economic growth and the strengthening of the NNP's management capacity and infrastructure. Destination Nyungwe will also complement the private sector investments being made by Dubai World outside the park's boundary. (One is the construction of a 30-plus-bed eco-lodge at the edge of one of the tea estates that buffer the park.) The health component bolsters community participation through investments in that sector; other community efforts and planning also engage the local population in its investment to make certain that NNP remains an integral part of the region's economy. The overall goal of these investments is to bring more tourism and awareness to NNP as a viable destination in Rwanda. Box 5.1 details the anticipated results of the project.

Other SO7 projects supported by USAID/Rwanda also have environmental considerations, but these are neither as primary nor direct as in the Destination Nyungwe Project. Two are focused on small enterprise development. The SPREAD (Sustaining Partnerships to Enhance Rural Enterprise and Agribusiness Development) Project is concerned with promoting and improving specialty coffee in Rwanda.

**Box 5.1 Anticipated Results from USAID's Destination Nyungwe Project**

- Threats to biodiversity will be demonstrably mitigated over the life of the project.
- Benefits to local communities will include income generation, shared park revenues, employment, diversification of income sources and/or increased access to community services including health and other relevant services.
- Number of visitors to and revenues generated from Nyungwe Forest National Park increase.
- Increased number of women participating in rural enterprises development activities and in key positions in their communities.

Source: International Resources Group, Ltd., 2006

Environmental concerns stem directly from the coffee-washing station and the de-pulping activities. The wastewater effluent at these stations can seriously hamper the oxygen capacities of the receptive water bodies and can potentially impact downstream users. The assessment team examined one example near Butare and observed a prototype settling-pond intended to remove the solids before discharge. The prototype had design flaws: it was not large enough and was poorly sited; heavy rainfall would cause surface soil sediments to flow directly into it. The SPREAD project is aware of the pollution issue (see Section 4.2) and is experimenting with corrective measures.

In discussions with project staff, the assessment team recommended that international standards for pollution control and monitoring of coffee stations be explored and that best practices be adopted. (The East Africa Fine Coffee Association should also be in a position to provide guidance, as should other USAID-supported coffee projects, e.g. See USAID, 2005b.) It is important that USAID and SPREAD “get it right” in terms of environmental standards and monitoring. An excellent reason to develop a good model is the GOR’s policy to double the number of coffee-washing stations in the next year.

The Essential Oils Project (Ikirezi Natural Products) is also a small enterprise receiving USAID/Rwanda support. Widows and orphans are employed to grow natural products that are used to extract specialty oils for an export market. Environmental issues come into play on the fields that used a progressive terrace scheme (as opposed to the GOR’s controversial radical terracing). This approach not only provides a better growing medium for the product plants (according to the owner), but is highly beneficial to the site and the soil. Erosion is mitigated and soil fertility is improved.

There are additional issues involved with cutting and burning wood to distill the product (as well as the proper/safe disposal of the residual distillate by-product). The USAID environmental officer calculates that once the specialty oils initiative is fully operational, it will consume up to



Settling pond at Cyarumbo coffee washing station (Southern Province)





Radical terracing in eastern Rwanda

5 hectares of eucalyptus fuel wood plantations per year. If wood is to remain the main energy source for this operation, USAID needs to work with Ikirezi to ensure that a deliberate and well-planned strategy is developed soon for local wood sources. This issue is discussed further in the next section.

There is also a Food Aid program supported by USAID in conjunction with Catholic Relief Services (assisted by World Relief, CARE, and Caritas), World Vision (assisted by ADRA), and ACDI/VOCA (assisted by Africare) — all international NGOs. These programs help construct schools, provide grants that promote food security, and make direct grants to HIV-affected households for home gardening, etc. Some of the food is monetized to help with agroforestry plantings, such as shade coffee on individual farms; and for constructing terraces to combat soil erosion and improve soil fertility.

Some of the terracing techniques being promoted by the GOR, as mentioned in Section 4.B, are controversial. Even though its Food Aid program is scheduled to end in September 2009 (the ACDI-VOCA contract extends to January 2010), USAID should use its participation to raise awareness about best practices, help to resolve the debate, and work to develop the employment of effective and sustainable terracing strategies.



The staff of USAID/Rwanda’s SO7 group also interacts with the democracy and governance team (SO5), and with the health team (SO7). The health SO constitutes a little more than 90 percent of USAID/Rwanda’s entire budget. The SO7 team has had some oversight of activities that are undertaken by the health team. One notable example has involved the disposal of plastic sacks that contain the chemical lambda-cyhalothrin (trade name ICON), a biodegradable pesticide used by the Indoor Residual Spraying Program for malaria control. Until the time the assessment team visited the country, an acceptable method for disposing the sacks was not available.

One alternative discussed was to incinerate them at the Kigali Central Hospital’s incinerator. However, a site visit to the incinerator raised more questions than it answered. The equipment was properly rated, but the facility’s proximity to a nearby school and hospital patients raised concerns in light of the lack of burn control, poor attention to monitoring, and overall lack of security at the facility.

The 2003 ETOA noted several activities that USAID/Rwanda might undertake to help meet significant forestry and biodiversity conservation needs in the country. It provided USAID with a list of specific recommendations to pursue in the short term and medium term. Table 5.4 lists these, shows the action taken since 2003, and provides a brief discussion on the original recommendation and the follow-through. This analysis is based on the information made available to the 2008 assessment update team in the form of reports and discussions with staff, and does not claim to be fully complete.

**Table 5.4 Examination of 2003 ETOA Recommendations to USAID/Rwanda**

Recommendation	Action taken	Comments
Move beyond environmental compliance to maintain and restore “natural resources upon which economic growth depends”	Provided active support	The Economic Growth team has integrated several actions that go beyond environmental compliance as a part of its activities: Support Biodiversity Conservation and Ecotourism Promotion in Nyungwe National Park (\$ 5,000,000); Support conservation and economic development goals through ecotourism in area adjacent to the afro-montagne Forests of Volcanoes National Park (Kinigi) (\$180,000); Together with the Democracy and Governance team, assist in establishing the new Organic Land law and other associated laws of land valuation and expropriation.
Push for REMA legislation and help REMA to get up and running	Provided active support	REMA is established, understands its mission and is operational, active and visible in the environment sector
In agribusiness projects help partners maintain a key focus on ensuring that producers/processors are aware of supply chain requirements for environmental and social values	Provided active support	Support was given during the LOPs of the contracts in place at the time of the 2003 ETOA. SO7 today continues to be engaged with USAID-funded projects to ensure that issues of environmental compliance are properly addressed.

<b>SO6, Health and HIV/AIDS:</b> Strengthen family planning programs in environmentally sensitive areas; develop program for medical waste disposal; and conduct follow-up survey of users of treated mosquito nets.	Provided active support	Family planning and HIV/AIDS programs have been integrated into the USAID biodiversity conservation and ecotourism development project in and round Nyungwe National Park, one of the environmentally sensitive areas of the country. Small medical waste incinerators were built in the health centers supported around Nyungwe Forest. But in general, medical waste management remains a concern. An amended pesticide evaluation report and safer use action plan was done in 2004 in relation to the insecticide treated nets.
<b>SO7, Economic Growth:</b> Increase off-forest timber production and enhance the market potential of non-timber forest products; promote forest-plantation-based small-scale industries; support additional studies on biodiversity and better integration of terracing on farms; and modify development assistance projects (DAPs) to better reflect current socioeconomic and environmental reality.	Provided active support	Bee keeping and handicrafts businesses have been supported by USAID funded projects in 2006 such as ADAR and IESC. The small grant programs under the Destination Nyungwe Project aim at supporting non timber forest income generating activities for the communities around the Park. DAPs are no longer involved in radical terracing based on the ETOA 2003 recommendations.
Provided more input in major biodiversity issues (ETOA gave Akagera National Park rehabilitation as an example)	Unknown	The mission has put its efforts on Nyungwe given its endemic, rich and endangered biodiversity. ORTPN is crafting and implementing a park management plan, has moved ANP significantly along the path to rehabilitation. The Park is now managed and operated by a private company under a 49-year lease agreement with the GOR/ORTPN.
Work with East Africa Regional Office to help create resettlement environmental strategy	None taken	Most resettlement has already occurred. Environmental strategies are needed in numerous sectors and should be applied country-wide. According to UNHCR report, refugees and returnees' camps are still threats to environment in Rwanda.
Build local capacity to conduct IEEs and EIAs	Some support	IEE trainings were held and there is some capacity, but none with the EIAs. More training is needed
Continue to promote a balanced and accountable system of governance across SOs	Some support	SO6 Health and SO7 Economic growth do work with programs under the democracy and governance SO5; The GOR decentralization initiatives have helped this. Examples of collaboration include: land reform initiative supported conjointly by the three SOs decentralized health services at district level, putting together SO6 and SO5, and PEPFAR Wraparound activities in the Democracy and Governance SO 5.
Conduct economic and a socio-economic analyses of terracing techniques	None taken	The debate over radical terracing continues to boil; although there have been improvements to the practice there is still an important place for USAID to help resolve the issues and identify best practices that ensure techniques that are effective and sustainable
Provide additional support to NUR GIS/GPS	Some support	The GIS unit at NUR is now pushing for more decentralized capacity in GIS for the institutions that use it/need it the most, i.e., REMA, Forestry Department, other planning agencies using spatial data to make decisions
Limit involvement in Lake Kivu methane extraction to the development of environmental guidelines	Unknown	A US-based firm is now prepared to invest in an electrical generating plant that will use methane from the lake; environmental guidelines need to be in place

Support for environmental programs by USAID/Rwanda continues to be very limited by budget constraints. Some activities have been funded by successfully leveraging monies from other SOs. There are still many areas where technical assistance can help the country address issues that have important impacts on the environment. Several of these are highlighted as entry points and opportunities in Section 6. A generic list also appears in Annex C.

## SECTION 6

### POTENTIAL ENTRY POINTS AND RECOMMENDATIONS

This section discusses opportunities for investment and assistance to Rwanda's environmental sector that donors may wish to consider based on the findings and analyses presented in this assessment. These recommendations are meant as entry points: ideas that warrant additional discussion or maybe even case study investigations by donors and/or local counterparts in government, NGOs and the private sector. The section also provides specific recommendations for USAID presented in light of the agency's past and current activities in Rwanda, its experience in the region, and the comparative advantage it brings in specific instances based on its development assistance around the world.

In general terms, the opportunities discussed here are aimed at addressing the main threats identified in Section 4. These included:

- Population pressure
- Institutional weaknesses and inefficiencies
- Energy pressure
- Degradation of wetlands and lack of clean water
- Agricultural inefficiencies and soil erosion
- Climate change
- Waste disposal issues

The assessment and analyses in this assessment pointed out that Rwanda's rapidly growing population is resulting in unsustainable use of renewable natural resources in the country: that is the number one threat.

Lack of capacity in government institutions charged with establishing standards, guidelines, and the enforcement of policies governing the use, protection, and conservation of renewable resources is the number two threat. These two threats have changed slightly since the 2003 ETOA. For example, regulatory institutions such as REMA and the Bureau of Standards have been established but have yet to develop sufficient staffing and institutional capacities.

However, the country is now far better equipped to mitigate these threats and is moving as quickly as it can to close the gaps. The donor community, and NGOs especially, have helped ORTPN and the Rwanda Environmental Management Authority to make substantial progress with protecting and managing the nations protected areas, particularly the three national parks. Government programs such as the EDPRS and the positive course of decentralization, along with some rigorous private sector investment, have also aided in mitigating the two primary threats to biodiversity and tropical forestry conservation.

## 6.1 General Entry Points

The two primary threats cited above are part of a much longer list; much work remains to be done. The assessment team for this 2008 ETOA update has noted that there are four entry points in particular where investments in technical assistance can be most effective in assisting the environment sector in Rwanda. These are:

1. Additional and continued assistance to REMA, ORTPN, and other institutions engaged in environmental protection and conservation
2. Directed assistance to developing legislation and policies focused on safeguarding the environment and more importantly, help with applying the policies
3. Continued strengthening of the development of environmental public-private partnerships and their links to local communities
4. Continued support for public education and raising awareness about environmental issues and for engaging decentralized entities in environmental management

### **REMA, ORTPN, and others.**

REMA is a young institution with a well-led and enthusiastic staff; however, it lacks professional depth and experience. Assistance with specific technical training, developing guidelines (applying and enforcing regulations, for example), developing effective websites, and even conducting periodic in-house reviews on topics such as management-by-objectives approaches would be helpful.

Installing a GIS lab within REMA and providing technical training for staff and management training for production flow are necessities. An environmental management authority needs this capability in house in order to perform effectively.



ORTPN staff trained in interpretation at Uwinka, Nyungwe National Park

Other GOR institutions that work directly in the environment sector, (Forest Service, ORTPN, etc.) can also benefit from similar assistance, including having their own GIS capabilities.

**Practical approaches to policy implementation.** Too many environment policies formulated under the Vision 2020 rubric (Forest Law, the Wildlife Policy, the Wetlands Policy) are languishing unfinished or have not been passed. Additional policies and legislation still must be

developed. Leadership is needed at several levels to correct the situation and create movement, because often it is simply a lack of directive experience that prevents action. In many instances, practical approaches can be provided that will help make legislation and policies operational. These approaches include “how-to” manuals, guidelines for developing norms and standards, and guidelines for applying those standards and monitoring the process or results. The experience of other institutions and countries have in environment sector policy application needs to be leveraged. Lessons learned in other situations can be examined for their utility in Rwanda. Hands-on training or participation in short-term assignments that allow for environmental issue discussions and debate is always valuable for staff in growing institutions. The objective with this set of opportunities is to aim at the practical and to gain the experience that comes with trying to apply laws and policies.

Applying the policies will remain difficult as long as institutional coordination remains a key challenge for government offices responsible for the environment. Communication among and within environmental agencies is poor, especially at the central government level. As management systems are reformed, assistance should also be targeted to make coordination smoother and more efficient.

**Strengthening community and private/public partnerships.** The recent successes with private-public partnerships should continue to be encouraged, and current experiences used to strengthen these efforts. The NGO cooperation and communication associated with the Volcano National Park is exemplary. Using this model elsewhere in Rwanda can be a significant complement to the institutions that designed them and, more significantly, to the communities that have taken the risks to participate in them. Nyungwe National Park and the communities surrounding it are becoming engaged in partnerships that appear to be moving forward. There will always be conflicts, but with a forum to discuss them and to work together, most of the issues can be solved. The infrastructure planned with community and ORTPN assistance, and the private sector investments taking place outside NNP, should provide lessons that can be applied elsewhere. The experience gained by ORTPN in working with Dubai World Rwanda ought to be used in attracting similar outside investors to diversify the results. (Although there are already rumblings about the capacity to do so in such a small country.)

There are still significant opportunities in and around Rwanda’s protected areas for technical assistance by donors and/or the private sector to communities and government institutions to create partnerships that are mutually beneficial. Table 6.1 provides a list of what some of these more specific entry points might be for additional donor assistance in Rwanda’s environment sector. The list is by no means exhaustive and is provided here merely to stimulate discussion.

## **6.2 Opportunity Areas and Recommendations for USAID Involvement**

**Protected areas.** Budget constraints have limited USAID/Rwanda’s role in the country’s environment sector, but the main focus on biodiversity and ecotourism infrastructure and marketing in Nyungwe National Park is a good and successful one. Future actions and strategies

should continue to build on the present experience and work to make NNP a destination that is equal to Volcano National Park in terms of overall tourist numbers.

USAID needs to continue its work to strengthen the professionalism and capacity of ORTPN staff in NNP. Equally important is to maintain the ties to the surrounding communities through the health activities and to build on the goodwill to work with district-level staff to help resolve conflicts.

USAID can also investigate with other private sector investors, including Dubai World Rwanda, to ensure cooperation on ecotourism activities, complementarities of investments, and assurance that all Rwandans can have visiting access to their protected areas. (Akagera National Park is now under Dubai World Rwanda management. ANP has not had the benefit of working with outside technical assistance to the degree that the other two parks have. Lessons learned in PNV and NNP, especially those that involved working with local communities, might be extended to Dubai World as it undertakes its management responsibilities and begins to become acquainted with its neighbors.)

**Policy assistance.** USAID's environmental policy experience around the world and in the region certainly qualifies it to sit closer to that table in Rwanda. Practical advice on implementing environmental policy, developing guidelines and providing expertise on monitoring and standards are areas that USAID can render assistance.

*Wetlands* are without a guiding policy or legislation in place. Water is Rwanda's greatest natural resource and it is increasingly at risk from improper use, outright destruction of the resource, and lack of any concrete policy to regulate and monitor its health. One case in point shows up in the GOR's development strategy, the EDPRS, where planning aims to stimulate growth and secure infrastructure by increasing irrigated agriculture and also creating more electrical capacity by constructing numerous small, micro-hydro power centers. Both actions will result in a significant increase in the consumption of water resources and the use of wetlands and other riparian resources. But nowhere in the strategy is there concern about impacts on these water-related resources or plans to monitor the effects of such actions.

An up-to-date, unbiased assessment of watersheds is needed and can also provide an entry point (The last assessment was done with regard to agricultural development.) A water quality monitoring system also needs to be established and implemented. REMA and other Ministry of Environment staff would also be involved in such efforts. Targeted restoration projects of some wetlands identified as critical sites might also be an additional component. There is a significant opportunity for USAID to work with the GOR and other donors in order to draw attention to these threatening gaps, help raise awareness about the importance and fragility of water in Rwanda, and help implement local strategies that are more environmentally friendly.



*Fuel wood.* USAID's experience and knowledge gained in its essential oils project, especially as it pertains to the energy requirements for obtaining the distillates, can be an important entry point to help address Rwanda's fuel wood crisis. The anticipated demand of this small business when it becomes fully operational is estimated to the equivalent of 5 hectares of 15-year old eucalyptus grown in a plantation, per year. Demands such as this one are reported to be small relative to the residential population demand that requires



Field site of Ikirezi Natural Products, USAID Essential Oils Project

more than 90 percent of its energy needs to come from fuel wood. The GOR has issued stopgap environmental "directives" in an attempt to address threats from over cutting, but a comprehensive and enforceable policy is desperately needed. USAID's global and regional experience, combined with the lessons being learned in Rwanda, should be called upon to help the country resolve this issue that directly impacts the lives of almost every single citizen.

USAID/Rwanda's current and planned budgets are very small. The funded activities do contribute to mitigating some of the threats to the environment, biodiversity, and tropical forestry conservation in the country. But given the opportunities for addressing an even wider range of threats, and USAID's global leadership in the environment sector and its leveraging possibilities with CARPE and other African experiences, more funding for environment-related activities in Rwanda would have an important and visible impact. And with its experience in natural resources governance and public-private partnerships, there is also an opportunity to step into a leadership role and to leverage action among donors and private sector participants in Rwanda's environmental sector.

**Pollution abatement.** REMA can also benefit from USAID assistance in the form of targeted, practical advice and training. Under the SPREAD project, for example, the efforts to assist small-scale, specialty coffee entrepreneurs yield social, technical, and political know-how in the operation of their coffee-washing stations as well as more knowledge about public/private partnerships in the sector. These stations discharge significant amounts of effluent into streams, usually untreated. In addition to helping mitigate the effluent issues by researching and constructing cost-effective settling ponds, USAID can also help inform Rwanda and coffee entrepreneurs about the dangers and risks associated with point source pollutants and also about acceptable world standards associated with coffee-washing. As the GOR policy to double the number of these coffee washing stations is implemented the adoption of these techniques and

standards can only help to make Rwanda’s specialty coffees more acceptable in the world market. It is recommended that USAID work with REMA to find workable, cost-effective solutions that adhere to international standards to resolve the pollution issue at coffee-washing stations. REMA gains practical experience in regulating polluters, the GOR maintains the high road while it pursues the Rwandan Specialty Coffee Brand, and USAID promotes a model for small enterprises that can be replicated elsewhere and gains an ally with REMA.

**Public awareness and education.** As in the coffee-washing example just mentioned, public education is a significant, direct opportunity for USAID and other donors. USAID is an established “brand” in the country, primarily associated with assistance in the health sector. This brand can be used to work with districts, communities, other government institutions, and other donors to support continued educational efforts and public relations efforts aimed at environmental issues.

**Table 6.1 Recommended Entry Points for Donor Assistance Aimed at Mitigating Threats to Rwanda’s Environment**

Threat	Recommended Entry Points	Analysis
<p><b>Population Pressure on biodiversity resources and protected areas</b></p>	<ul style="list-style-type: none"> <li>• Support community-based projects that link Population, Health and Environment (PHE) around protected areas;</li> <li>• Support income generating projects to provide alternative livelihoods;</li> <li>• Develop market infrastructure to encourage further income generation and alternative livelihoods;</li> <li>• Support projects that remove people’s reliance on forest by engaging them in commercially viable projects (i.e. sericulture, apiculture, cultivation of medicinal plants);</li> <li>• Promote community forest plantations with native species;</li> <li>• Promote agricultural intensification away from forest blocks;</li> <li>• Promote agro-ecological techniques in agricultural production to help reduce forest loss;</li> <li>• Promote environmental education;</li> <li>• Encourage behavioral changes from traditional practices to holistic approaches;</li> <li>• Support food security projects, particularly related to agriculture intensification, diversification, and commercialization to decrease pressures on resources; and</li> <li>• Encourage family planning and education endeavors to complement such efforts, as well as social programs to mitigate migration effects.</li> </ul>	<ul style="list-style-type: none"> <li>• USAID has experience</li> <li>• This is a cross-sector issue and communication and collaboration are key</li> <li>• Utilize and build on GORs decentralization strategy and also the resources at the district and community levels</li> <li>• Continue to utilize and build on NGO expertise in Rwanda</li> </ul>
<p><b>Institutional weaknesses and inefficiencies</b></p>	<ul style="list-style-type: none"> <li>• Continue to support ORTPN capacity building for its protected area staff in management and technical areas;</li> <li>• Support District Environmental Officers in community liaison, conflict resolution and planning;</li> <li>• Work with ORTPN, REMA and the Forest Department to resolve conflict and inaction that pertains to the use and management of buffer zone plantations around Nyungwe National Park;</li> <li>• Support practical training and continued education in ecological monitoring, watershed monitoring, policy reform, and sustainable financing;</li> <li>• Assist central regulatory agencies with crafting (and then implementing) hands-on (how-to) instructions for implementing</li> </ul>	<ul style="list-style-type: none"> <li>• USAID has experience that it can leverage</li> <li>• USAID strength</li> <li>• Other donors are present who can participate and provide expertise</li> </ul>

Threat	Recommended Entry Points	Analysis
	<p>rules and regulations, monitoring processes, chain of custody, etc. to make them less dependent and vulnerable to outside assistance;</p> <ul style="list-style-type: none"> <li>• Work with the government institutions responsible for protecting forest resources and conserving biodiversity in providing clear and easily understood language related to policies and laws;</li> <li>• Assist institutions charged with conserving and protecting the environment to develop strategies and action agendas that can resolve the problems that the GOR has (usually) inadequately addressed by issuing “environmental instructions”;</li> <li>• Provide assistance in acquisition and training of GIS hardware and software to regulatory agencies to make them self-sufficient in using these tools and generating their own maps, overlays and analyses; and</li> <li>• Assist with practical management training aimed at conflict resolution, communication and coordination</li> </ul>	
<b>Energy pressure</b>	<ul style="list-style-type: none"> <li>• Support intensive reforestation programs through environmental education and awareness-raising activities;</li> <li>• Support policy and legislative action that promotes fuel wood plantations on private land;</li> <li>• Assist in the development of a strategic action plan for forestry and forest management in areas outside of protected areas;</li> <li>• Promote the sustainable use of forest products for the benefit of local communities;</li> <li>• Improve forest sector governance, especially at the district level;</li> <li>• Help the forestry industry become more competitive and sustainable;</li> <li>• Assist in the development and enforcement of legal texts connected to forest exploitation and that comply with environmental impact assessment provisions;</li> <li>• Support local pilot forestry projects;</li> <li>• Support carbon sequestration schemes;</li> <li>• Support public and private efforts to safely tap the methane resources under Lake Kivu;</li> <li>• Support strategies that examine other alternative energy sources or technologies that will reduce dependence on fuel wood for cooking; and</li> <li>• Alternative fuel sources and tree plantations should be promoted to alleviate energy consumption pressures.</li> </ul>	<ul style="list-style-type: none"> <li>• United States has expertise in this area</li> <li>• USAID has experience</li> <li>• Private sector has experience</li> <li>• Lessons , ideas and policies from other African nations need to be in the picture</li> </ul>
<b>Degradation of wetlands and lack of clean water</b>	<ul style="list-style-type: none"> <li>• Assist government efforts to develop and implement a comprehensive watershed and wetlands strategy and monitoring system;</li> <li>• Promote best practices for the treatment of wastewater from coffee washing stations and work with the GOR to establish standards and monitoring procedures for wastewater flushed into watercourses from these stations;</li> <li>• Help establish community-based management schemes for wetlands;</li> <li>• Disseminate better agricultural practices and soil conservation techniques, especially those associated with terracing techniques;</li> <li>• Work with the public and private sector to undertake actions that will stop channelization in wetlands, rivers, and streams; and</li> <li>• Help public and NGO efforts to raise awareness of the importance of wetland conservation and watershed protection.</li> </ul>	<ul style="list-style-type: none"> <li>• USAID strength</li> <li>• USAID has experience in country and around the world</li> <li>• GEF project is currently working to classify four wetland areas</li> <li>• Other donors are present with experience</li> <li>• Private sector involvement is key in some instances</li> </ul>

<p><b>Agricultural inefficiencies and soil erosion</b></p>	<ul style="list-style-type: none"> <li>• Work with community organizations and district level environmental and agricultural officers to discourage the use of pesticides, chemical fertilizers and herbicides;</li> <li>• Promote crop diversification, integrated pest management and rational soil conservation techniques;</li> <li>• Disseminate better agricultural practices and soil conservation techniques;</li> <li>• Help to mitigate risks associated with radical terracing techniques and encourage the GOR to promote alternatives that are more sustainable and less labor intensive;</li> <li>• Engage district-level and national interests to actively communicate and participate in cooperative food security planning;</li> <li>• Support soil conservation practices, especially on upland areas; and</li> <li>• Support tree nurseries, reforestation projects, and tree plantations to counter deforestation.</li> </ul>	<ul style="list-style-type: none"> <li>• USAID has extensive experience</li> <li>• Other donors are present with experience</li> <li>• Draw on knowledge and lessons from other countries in the region</li> </ul>
<p><b>Climate change</b></p>	<ul style="list-style-type: none"> <li>• Explore Rwanda's participation in carbon sequestration trading projects;</li> <li>• Adaptation measures need to be explored and discussed for Rwanda's most vulnerable areas to prepare for climate change;</li> <li>• Support measures to plant trees; and</li> <li>• Continue to provide assistance in emergencies and disasters provoked by climate disturbances (population displacement due to floods or drought).</li> </ul>	<ul style="list-style-type: none"> <li>• United States has expertise in this area</li> <li>• Rwanda has begun to address the issue, most notably in relation to its energy sector</li> <li>• Other donors have experience and there are grant funds available as seed money for developing strategies</li> <li>• Need to use experience and lessons learned from other African nations that have started to address the issue</li> </ul>
<p><b>Waste disposal issues</b></p>	<p>Waste disposal at coffee washing stations</p> <ul style="list-style-type: none"> <li>• Work with REMA to find cost-effective solutions that adhere to international standards to resolve pollution issues;</li> <li>• Promote new pulping machines that minimize water consumption without comprising the quality of coffee processing;</li> <li>• Promote sustainable waste water management of coffee washing stations by scaling up the Cyarumbo coffee washing station (see Section 5); and</li> <li>• Institute compost management training to coffee washing station owners to ensure efficient use of coffee pulps and enhance soil characteristics.</li> </ul> <p>Medical waste management</p> <ul style="list-style-type: none"> <li>• Ensure incinerators at all USAID assisted clinics meet the safety and environmental requirements (site selection, construction, emissions, burned residues maintenance, and protection of operational staff);</li> <li>• Provide USAID assisted health centers and clinics with incinerator maintenance manuals and training to operational staff manipulating medical waste on a daily basis; and</li> <li>• Find a sustainable and safe way to dispose of Presidential Malaria Initiative Indoor Residual Spraying waste in concert with PMI Washington.</li> </ul>	

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[http://www.panda.org/about\\_wwf/where\\_we\\_work/africa/where/rwanda/index.cfm](http://www.panda.org/about_wwf/where_we_work/africa/where/rwanda/index.cfm)



# ANNEX A

## SCOPE OF WORK FOR USAID/RWANDA ENVIRONMENTAL THREATS AND OPPORTUNITIES ASSESSMENT WITH AN EMPHASIS ON TROPICAL FORESTRY AND BIODIVERSITY CONSERVATION

### 1. PURPOSE

The purpose of this work is to deliver to USAID/Rwanda a countrywide Environmental Threats and Opportunities Assessment (ETOA) with a special focus on Tropical Forestry and Biodiversity Conservation needs and related issues analysis that will inform the Environmental Compliance Annex of the USAID/Rwanda Operational Plans (OP) in the coming years, under ADS 201.3.4.11 and ADS 204.5. Based on the results of this two-fold assessment, this work will provide recommendations to USAID/Rwanda on how to efficiently contribute to the conservation needs identified.

The last ETOA of USAID Rwanda was conducted in February 2003 when the Mission was writing its five-year Integrated Strategic Plan (ISP 2004-2008). This Environmental Assessment included the Mission's last FAA Section 118 Tropical Forests and 119 biodiversity conservation analyses. The document investigated the causes and severity of environmental problems in Rwanda and how these relate to the condition of tropical forests and to the conservation of biodiversity (TF&BD). The 2003 ETOA recommended how activities under the intermediate results (IRs) of the Mission's SOs could promote the conservation of TF&BD. In November 2005, the Regional Environmental Officer together with the mission updated the FAA 118 Tropical Forest and FAA 119 Biodiversity Analyses for the environmental compliance purpose while the mission was writing its 2006 Strategy Statement and recommended to revise by 2008 the ETOA along with the FAA118/119.

### 2. BACKGROUND AND JUSTIFICATION

Updating ETOA and revisiting FAA 118/119 analyses are justified by three reasons:

The first reason is related to the **strategic and operational planning process** requirements. The ETOA is a useful programming tool which will help the USAID Rwanda to update its data and assumptions on Rwanda environment as a whole and better integrate environment concerns into its overall program during the annual operational planning (OP) processes. Since January 2007, the USAID Rwanda's ISP (2004-2008), as modified by the OP and its associated guidance and elements budgets, was extended indefinitely until further notice.<sup>1</sup> The ETOA occurs while the country has just adopted its Economic Development and Poverty Reduction Strategy (EDPRS) for the period of 2008 through 2012 which integrates environment across the programs as one of the key cross-cutting actions<sup>2</sup>. The ETOA will help the Mission in aligning its Operational Plans and the upcoming Country Assistance Strategy with the GOR's EDPRS mainly in the area of environment mainstreaming. This alignment of the USAID's Rwanda programs with the EDPRS will signal support for the GOR and enhance synergy with its programs.

The second reason is linked to the **environment requirements**. The core environmental requirements of USAID operating unit strategic plans are spelled out in 201.3.4.11.b Technical Analysis for Strategic

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<sup>1</sup> Interim Guidance on the Status of USAID Strategic Plans Under the New Foreign Assistance Framework ( January 11, 2007 USAID Notice)

<sup>2</sup> MINECOFIN, EDPRS 2008 -2012, p.39

Plans, Environmental Analysis, and are derived from provisions of the Foreign Assistance Act (FAA) of 1961:

- FAA 117 on “*Environment and Natural Resources*,” dictates that operating units will implement their programs with an aim toward maintaining (and restoring) natural resources upon which economic growth depends, and to consider the impact of their activities on the environment. USAID/Rwanda recognizes that protection of the environment and wise management of the natural resources base are absolute requirements of any successful development program. The legal requirements of the FAA are reflected in USAID’s *ADS Chapter 204 “Environmental Procedures*,” which provides essential procedures and policy on the application of *22 CFR Part 216*. This regulation codifies the Agency's procedures "to ensure that environmental factors and values are integrated into the USAID decision making process." Further, *22 CFR 216.5* requires USAID operating units to conduct their assistance programs in ways that are sensitive to the protection of endangered or threatened species and their critical habitats.
- Sections 118 “*Tropical Forests*” and 119 “*Endangered Species*” of the FAA codify the more specific U.S. interests in forests and biological diversity. These two provisions require that all USAID Missions conduct a periodic country analysis of the conservation and sustainable use of tropical forests and biological diversity. Specifically, FAA Sections 118 and 119 require that all country plans include: (a) an analysis of the actions necessary in that country to achieve conservation and sustainable management of tropical forests (118) and conserve biological diversity (119); and (b) the extent to which current or proposed USAID actions meet those needs. By mandating these analyses, Congress is recognizing the fundamental role that tropical forests and the conservation of biodiversity play in sustainable development<sup>3</sup>.

The third reason concerns the new developments in Rwanda’s environmental context which need to be taken into consideration at programmatic level. Since the last 2003 ETOA, there have been significant developments in the legal and policy framework governing environmental management and inspiring implementation initiatives in Rwanda:

At policy level, the National Environment Policy has been put in place by the Government of Rwanda since 2003. Key areas on target by this policy are natural resources protection: water resources, forest and protected areas, lands, soil and underground soil, wetlands and other numerous elements of the biodiversity. The National Environment policy has political and strategic options regarding population and regional planning, management of the use of natural resources and other socio-economic sectors with necessary provisions to the implementation of the policy. It constitutes a framework of conciliation of the three pillars of sustainable development which are the environment, the social and the economic set up. This way, it falls under the policy of poverty reduction while ensuring the quality of life and environment

Other policies or strategies have also been adopted by the Government of Rwanda: National strategy and Action plan for biodiversity conservation ( April 2003), Land Policy (2004), National Policy on Forestry (2004), National Policy on Water and Sanitation (2004), the national biosafety framework for Rwanda in final draft (2005), ICT policy statement and Action Plan ( 2006-2010) in environment related issues.

With regards to the legal framework, many laws or presidential/ministerial orders have been enacted in relation to the environment:

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<sup>3</sup> [http://www.usaid.gov/our\\_work/environment/biodiversity/118\\_119\\_analyses.html](http://www.usaid.gov/our_work/environment/biodiversity/118_119_analyses.html)

- The organic law N° 04/2005 of 08/04/2005 determining the modalities of protecting, safeguarding, and promoting the environment in Rwanda:
- The law N° 16/2006 of the 03/04/2006 on organization, operation and attributions of the Rwandan Environment Management Authority (REMA) and the agency is operating since June 2006. REMA is now a functional agency beginning to forge roles at both the national and District levels, and it oversees the compilation of State of the Environment Reports and the development and implementation of Environmental Action Plans.
- The Law n° 14/2003 of 23/5/2003 related to production, quality control and commercialization of plant seeds,
- The Rotterdam International Convention on the establishment of international procedures agreed by states on commercial transactions of agricultural pesticides and other poisonous products, signed in Rotterdam on 11 September 1998 and in New York from 12 November 1998 to 10 September 1999 was approved by Presidential Order n° 28/01 of 24 August 2003 approving the membership of Rwanda;
- The Basel Convention on the Control of Transboundary Movements of Hazardous wastes and their disposal as adopted at Basel on 22 March 1989 was approved by Presidential Order n° 29/01 of 24 August 2003 approving the membership of Rwanda;
- The Montreal International Convention on Substances that Deplete the Ozone Layer, signed in London (1990), Copenhagen (1992), Montreal (1997), Beijing (1999), especially in its Article 2 of London amendments, and Article 3 of Copenhagen ,Montreal and Beijing amendments was approved by Presidential Order n° 30/01 of 24 August 2003 related to the membership of Rwanda,
- The Cartagena protocol on Biosafety to the Convention of Biodiversity signed in Nairobi from May 15, to 26, 2000 and in New York from June 5, 2000 to June 4, 2001 was authorised to be ratified by Law n° 38/2003 of 29 December 2003;
- The Kyoto Protocol to the Framework Convention on Climate Change adopted at Kyoto on March 6, 1998 was authorised to be ratified by Law n° 36/ 2003 of 29 December 2003;
- The Ramsar International Convention of February 2, 1971 on Wetlands of International importance, especially as waterfowl habitats was authorised to be ratified by Law n° 37/2003 of 29 December 2003;
- The Bonn Convention opened for signature on June 23, 1979 on conservation of migratory species of wild animals as authorised to be ratified by Law n° 35/2003 of 29 December 2003 ;

At ministerial levels, various environmental instructions have been promulgated:

- Ban of cutting threes before maturity ( Instruction N° 01/2003 dated on July 14, 2003)
- Ban of fuel wood use in making brick and tiles ( Instruction N° 0001/2004 dated on July 16, 2004)
- Authorizations required for cutting and transporting threes at maturity (Instruction n° 001/2006 dated on February 3, 2006.
- Site selection and construction requirements for coffee washing stations ( Instruction n° 001/06 dated on February 24,2006)
- Ministerial directive of the 9/8/2004 taken by the Minister of Lands, Environment, Forestry, Water and Mines relating to the use and the manufacture of plastic bags,

To implement the environmental conventions that Rwanda has ratified, different projects and initiatives have been undertaken and financed jointly by the Ministry in charge of Land, Environment, Forests,

Water and Mines (MINITERE) and United Nations Agencies as well as the Global Environmental Fund (GEF): Persistent Organic Pollutant (PoPs); National Initial Communication on Climate Change; National Action Programs for Adaptation to Climate Change (PANA), Poverty and Environment Initiative (PEI), Institutional Support Project to Environmental Management in Rwanda (PAIGER), Decentralization and Environmental Management Project covering the Western Province (DEMP) and Protected Areas Biodiversity (PAB). All these projects through various studies carried out have drawn lessons that could be useful to any development agencies engaged in the environment fields.

### **3. USAID PROGRAMS IN RWANDA**

USAID programs in Rwanda fall into 3 program areas

- Governing justly and democratically
- Investing in people
- Economic growth

The Economic Growth program encompasses agriculture, private sector competitiveness and environment. In the country where ninety percent of Rwandan population depends on agriculture for their livelihood, USAID seeks to support the Government of Rwanda (GOR) priorities to transform agriculture from subsistence into a viable commercial activity to promote economic growth and reduce poverty. Efforts are tailored to strengthen the capacity of private sector institutions, with the goal of making these institutions sustainable and independent of donor assistance within a five year period.

As to private sector competitiveness component, USAID works with entrepreneurs in agro-processing and tourism and encourage continued reform of regulations on customs clearing operations. Concerning environment where in the past 40 years, Rwanda has lost 95% of its natural forests and 43% of its national parks, significant source of tourism income and ecosystem services, efforts are aimed at spurring Rwanda's economic growth while protecting its environment and biodiversity. Focus is put on the improved management of the biodiversity within the Nyungwe National Park. This mountain rainforest is a biological hotspot, with more than 75 mammal, 278 bird, 120 butterfly, 100 orchid, and 200 tree species. Protection of such rich biodiversity, and the source of 70% of the nation's water, is critical. Local populations, both women and men, surrounding the park will also be targeted for income generation and conservation activities.

In Investing in People program area, USAID Rwanda intervenes in health, education and socio-economic services and protection for vulnerable populations. In health sector, initiatives are taken to establish an effective and equitable health system that provides sustainable access to basic health interventions at scale through PEPFAR, PMI complementing Child Survival and Health Funds. It is anticipated that declining fertility will relieve pressures on land and natural resources, and reductions in maternal and infant mortality will result in a healthier and more productive workforce that will propel Rwanda from a developing to a transforming country. In Education, USAID will implement a youth employability program that will develop employable skills in youth that are desired by employers and link them with employment opportunities. With regards to Social and economic services and protection for vulnerable populations, USAID uses Title II program to address chronic and transitory food insecurity among targeted vulnerable populations including PLWHA, elderly people, the handicapped and OVCs. The five year goal is to strengthen public and private institutions to provide social assistance with less donor support so that Rwanda can move from the development to transformational country category.

Through “governing justly and democratically”, USAID seeks to:

- protect human rights, and to ensure that the country makes progress towards the transforming category by building the country’s legal aid framework which will lead after 5 years to a robust legal aid system able to assist the vulnerable populations throughout the country
- help Rwanda develop sound decentralization policies and strengthen capacity of local governments to deliver high quality health care and other services in accountable manner.
- strengthen the ability of civil society organizations (CSOs) to work independently, advocate for policy changes, oversee government activities and in coordination with the GOR promote inclusive reconciliation and consensus-building processes.

#### **4. STATEMENT OF WORK**

The assessment team shall perform the following activities organized into 3 steps:

##### **4.1. Data collection**

###### *4.1.1. Pre-travel informational meetings and information gathering.*

Prior to traveling to the field, the assessment team is expected to:

- Hold meetings with the Bureau Environmental Officer (BEO) in the appropriate USAID Washington bureau to ensure full understanding of USAID environmental procedures, the role of the regional bureau in environmental compliance, and purpose of this assignment. This would include policy decisions and approaches that the BEO and agency environmental advisor are taking as per their authority under Reg. 216.
- Gather and get acquainted with existing background information on Rwanda such as the country’s natural resources, geographical, ecological and biological specificities, current status of environment and biodiversity, institutional organization on entity and state level, key stakeholders and donors in environment and biodiversity, legislation related to the environment and biodiversity, and other relevant information required for the country assessment.
- Meet or speak with key stakeholders or managers at the World Bank, USDA Forest Service, US Fish & Wildlife Service and U.S.-based organisations including, International Resources Group, Wildlife Conservation Society, World Wildlife Fund or other organizations involved in biodiversity conservation in RWANDA or relevant regional efforts.
- While travelling to Kigali, make a stop in Nairobi to meet with the Regional Environmental Adivers and get their guidance because they are the ones who first look at the USAID/Rwanda environmental documents before their submission to the BEO.

###### *4.1.2. After arrival in the field*

The field team will conduct an overview and general analysis of the country’s environment , forestry and biodiversity and their current status. Upon arriving in Rwand, the team will:

- Meet with USAID/Rwanda ( Mission Service Center and SO7) to get a solid understanding of Mission program goals and objectives under its current Operational Plan; perspectives of

this assignment and specific interests for the team, including advice and protocol on approaching USAID partners and host country organizations with respect to this assignment. The team shall be aware of sensitivities related to an assessment exercise (i.e., the potential for raising expectations, and the need to be clear about the purpose of the assessment) and respect Mission guidance. The team will discuss organizations to be contacted and any planned site visits with the Mission and coordinate as required. SO7 Team will facilitate meetings with other USAID Strategic Objective teams ( SO6-Health/PEPFAR/PMI, SO5-Democracy and Governance)

- Hold meetings with donor organizations (e.g. Dutch Cooperation, UNDP/GEF), international NGOs(IGCP/AWF, DFGFI, WCS, ) and local ( ARECO, AREDI), relevant government agencies such as ORTPN and REMA, and other organizations that are knowledgeable about environment, biodiversity and tropical forestry conservation or are implementing noteworthy projects and gather information locally.
- Conduct at least three priority site visits which would supplement understanding of USAID’s programs , or of environment and biodiversity issues that arise in interviews and literature or would confirm information in previous assessments. One visit shall include the Destination Nyungwe Project whereby initiatives of integrating Health-Environment/biodiversity-Ecotourism are taking place in the Mountain Forest National Park. The site(s) for other field visits will be determined by the team during the assessment in consultation with USAID.

#### **4.2. Analysis**

- Evaluate how the recommendations of the previous ETOA (2003) and the updated FAA 118/119 assessment (2005) have been implemented by USAID/RWANDA and draw the lessons for the new ETOA and FAA 118/119 assessments.
- Assess and summarize the needs for environment, biodiversity and tropical forestry conservation in Rwanda based on key threats and opportunities and analysis of country, donor and NGO responses to meet these needs.
- Prepare a report on the status of environment, biodiversity, tropical forestry and conservation efforts in Rwanda and potential implications for USAID or other donor programming and environmental monitoring which shall define the actions necessary for conservation.

#### **4.3. Report**

This report will provide details on the threats and opportunities and major participants in the environment, biodiversity and forest conservation sectors of Rwanda, as well as information on current U.S. Foreign Assistance and USAID programming, with recommendations on actions necessary to conserve environment, forests and biodiversity. This document would contribute to meeting the legal requirements of FAA 118/119. That is why it shall include the following:

- The current status of environment, biodiversity and tropical forests in Rwanda based on current and available information. At the environment level, the report will document the state of key natural resources by quantifying trends in their management, biophysical condition, productivity, abundance, and distribution and by identifying threats (*e.g.*, degradation,

depletion, pollution) to which they are subjected. The status of biodiversity will include major ecosystem types, highlighting important, unique aspects of the country's biodiversity, including important endemic species and their habitats, genetic diversity, agricultural biodiversity, ecological processes and ecosystem services, and values and economics of biodiversity and forests. A map of potential natural vegetation and of land use or land/forest cover should be provided if available.

- Descriptions of natural areas of critical importance to biodiversity conservation, such as forests and wetlands critical for species reproduction, feeding or migration, if relevant. Particular attention should be given to critical environmental services and non-commercial services they provide (watershed protection, erosion control, soil, fuel wood, water conservation and amenity and recreation). It will also summarize how current land tenure arrangements affect conservation in Rwanda .
- An overview table and map of the status and management of **protected area system** in Rwanda including: an inventory of all declared and proposed areas (national parks, wildlife reserves and refuges, forest reserves, sanctuaries, hunting preserves and other protected areas).
- The inventory will identify the institution responsible for the protection and management of each decreed area, its date of establishment, area, and the protection status of each (i.e., staff in place, management plan published, etc.) In addition to this summary of the current protection and management status of **each protected area**, an overview of the major threats and challenges facing protected areas in Rwanda including vulnerability of areas to predicted changes in climate, and a brief summary of any recognized economic potential of these areas (including productive assets, environmental services and recreation and tourism opportunities) should be provided.
- Descriptions of plant and animal species that are **endangered or threatened** with extinction. Endangered species of particular social, economic or environmental importance should be highlighted and described, as should their habitats. Technical information resources such as the IUCN red list and their websites should be referenced for future Mission access as required. This section should not emphasize species counts, but look at the relation of endangered species and important habitat conservation areas and issues, and evaluate the pressure on those areas, including vulnerability to predicted changes in climate, and current efforts to mitigate pressures, including the participation and compliance with CITES and other international efforts.
- **Recent, current, and potential primary threats to environment and biodiversity**, whether they are ecological (i.e., fire, pests), related to human use (i.e., agriculture, contamination), or institutional (i.e., failed policy) or trans-boundary issues, as appropriate. These should emerge from a general assessment of national policies and strategies and their effectiveness, issues related to institutional capacity, trade, private sector growth, participation in international treaties, and the role of civil society.
- Conservation efforts, their scope and effectiveness. This section also should include recent, current and **planned activities** by donor organizations that support biodiversity and tropical forestry conservation, identification of multilateral organizations, NGOs, universities, and other local organizations involved in conservation, and a general description of responsible government agencies. A general assessment of the effectiveness of these policies, institutions, and activities to achieve biodiversity conservation should be included. Priority conservation needs that lack donor or local support should be highlighted.

- Analysis of the **current legislations** and **policies** related to the environment, forestry, biodiversity. This section should include identification of laws and policies related to protection and management of biological resources and endangered species. It should also point out any differences in laws and policies that require further harmonization. This section should also review international treaties signed and ratified, as well as those that Rwanda needs to sign in order to conserve and manage its biological resources more efficiently.
- An overview of the major environment, biodiversity and tropical forest conservation activities of the **commercial private sector** to identify ways to better foster private sector alliances. Of interest are the norms and standards followed by those commercial entities most engaged in management and use of Rwanda's tropical forests and tracts near protected areas, including tourism developers and tea producers. Consideration of policies promoted by the key relevant governmental ministries should also be included.
- An assessment of how **USAID's programs and operational plans** meet the needs for environment, biodiversity and tropical forestry conservation, consistent with Mission program goals and objectives, through strategic objectives. The assessment shall include **recommendations** on where U.S. comparative advantages and capabilities are likely to have the greatest impact. These issues and recommendations should be prioritized to identify those requiring the most immediate attention. This section shall identify opportunities and entry-points for USAID-Rwanda efforts that would positively influence the conservation of the environment, tropical forests and biodiversity and improve environmental management.

## 5. Expertise required

A three-person team with the following composition and expertise is required to conduct this analysis:

### **International Technical Assistance (2 persons):**

- Senior Level Natural Resources and Environmental Management Specialists with post-graduate qualifications in biology, zoology, forestry or closely related field in natural resource management or natural resource economics.
- Background in tropical biodiversity and natural resource conservation.
- Knowledge of USAID Strategic Planning process related to Environmental Threats and Opportunities Assessment and Tropical Forestry and Biodiversity (FAA Sections 118 and 119).
- Knowledge of 22 CFR 216 and of FAA 117 is also desirable.
- Significant experience in integrating health, environment, population and poverty reduction issues is desirable.
- Demonstrated expertise in assessing development programs for impacts on environment and tropical ecosystems.
- Demonstrated expertise in the design and production of environmental impact assessments (EIA).
- Experience in Eastern or Central African region and in Rwanda desirable.

### **Local Technical Assistance (1 person).**

- Senior Level Natural Resources and Environmental Management Specialist or **Environmental Policy Analyst** with demonstrated experience in Rwanda environmental law, the policy and



legal frameworks governing environmental management and biodiversity/forestry conservation in Rwanda and the analysis of relevant policies.

- Good contacts within Rwanda government agencies, NGOs, international donors, and private sector preferred.
- Proficiency both in English and French

## 6. DELIVERABLES:

The main deliverable is an Assessment Report (40 to 60) pages without appendices) for USAID/Rwanda that examines the environmental threats and opportunities, the biodiversity and the tropical forests conservation and other management related issues and identifies contributions and/or potential contributions to meeting identified conservation needs by the Mission's operational plans.

Other deliverables are the following:

- Work plan/schedule within two working days of start date.
- A copy of the draft report will be left with USAID/Rwanda at the out briefing prior to departure from Rwanda, in electronic as well as hard copy.
- Following a one week comment and review period, a revised final report incorporating all comments will be submitted within two weeks of the field work.
- Five copies of the bound final draft will be made available when the final is approved by the Mission.
- A short (10 pages) Environmental Annex to Annual Operational Plans, which consists of a summary and syntheses of the findings and recommendations of the full ETOA and FAA 118-119 analysis. The introduction to the Summary will include this statement: "The Environmental Annex is an analysis that examines environmental threats and opportunities inherent to the Mission's strategy and assesses the extent to which the Mission's strategy incorporates or addresses tropical forests and biodiversity concerns. This assessment does not substitute for the Initial Environmental Examination (IEE). The Mission is responsible for ensuring that an IEE or a Request for a Categorical Exclusion is conducted for all activities funded by USAID."

## 8. ANTICIPATED LEVEL OF EFFORT

The LOE for this assignment is a total of 55 person-days, to be allocated as follows:

Pre– travel meetings:	2 persons x 3	= 6 person-days
Travel	: 2 persons x 2	= 4 person-days
Field-work	: 3 persons x 12	=36 person-days
Report	: 3 persons x 3	= 9 person-days
<b>Total</b>		<b>=55 person-days</b>

The consultancy will be carried out within the period of June 9 through June 21, 2008. About 15 days will be in-country, three days preparation and wrap-up, and 4 days travel. The international consultants will oversee the work of the local-hire consultant. The international consultants will work under the technical direction of the Bureau Environmental Officer. The Senior Regional Environmental Officer based at USAID/REA, Nairobi and the Mission Environmental Officer will have an advisory role.

## 9. Schedule and Logistics

Meetings in Washington, DC, will take place between April 7, 2008 and April 11, 2008. The team will coordinate logistical arrangements with the USAID/Rwanda Mission Environment Officer. The Mission will assist the team by providing key references and contacts as well as logistical support where necessary. USAID/Rwanda's Program Office will also help facilitate meetings with other Mission SO Team Leaders or their staff to fully brief the team on USAID's program and future vision for their strategy.

Field work in Rwanda will take place from April 14 to April 25, 2008. The report is due within 2 weeks after the field work.

## 10. 6. SELECTED REFERENCE DOCUMENTS

In order to build on the work that has already been done, the assessment team is encouraged to consult the following documents:

- GOR (2005), Environment Organic Law N° 04/2005 OF 08/04/2005
- GOR (2005), Land Organic Law N° 08/2005 of 14/07/2005
- GOR (2006), Law N° 16/2006 of the 03/04/2006 on organization, operation and attributions of REMA
- MINECOFIN (2007), Economic Development and Poverty Reduction Strategy
- MINITERE -The Ministry of Lands, Environment, Forestry, Water and Mines (2003): Environment Policy
- MINITERE (2003), National Strategy and Action Plan for the Conservation of Biodiversity in Rwanda,
- MINITERE (2003), Rwanda's National Great Apes survival plan 2003-2008 ( Final Draft)
- MINITERE (2004), National Land Policy
- MINITERE (2006), National implementation plan of the Stockholm Convention on Persistent Organic Pollutants (POPs) in Rwanda( 2007-2025)
- MINITERE (2005), The national bio-safety framework for Rwanda ( Draft)
- MUSAHARA H (2007), Economic Analysis of Natural Resource Management, PEI/REMA/UNEP/PNUD.
- NISR (2005), Demographic and Health Survey.
- NISR and World Food Program (2006) Comprehensive Food Security and Vulnerability Analysis (CFSVA)
- NISR (2006), Rwanda Development Indicators
- ORTPN (2005) National Park Management Plans
- REMA/Poverty-Environment Initiative (2007), Pilot Ecosystem Assessment of Bugesera, UNEP/UNDP
- REMA/Poverty Environment Initiative (2007), Rwanda Guidelines for Mainstreaming Environment in the Economic Development and Poverty Reduction Study,
- REMA/Poverty Environment Initiative ( 2007), Poverty –Environment Indicators & Strategies for monitoring them within the framework of the EDPRS,
- Twagiramungu Fabien (2006), Environmental Profile of Rwanda, European Commission in Rwanda
- USAID/Rwanda (2003), Environmental Threats and Opportunities Assessment.
- USAID (2005), Biodiversity Conservation, a guide for USAID staff and partners [http://pdf.usaid.gov/pdf\\_docs/Pnade258.pdf](http://pdf.usaid.gov/pdf_docs/Pnade258.pdf)

- USAID (2005), Tropical Forestry and biodiversity( FAA118 and 119) analyses: lessons learned and best practices form recent USAID experiences.
- USAID ( 2005), Best practices for Biodiversity and tropical forest assessments
- WCS/CARE/IGCP(2005), The socio-economic status of People living near protected areas in the Central Albertine rift,
- WCS (2003), The Biodiversity of the Albertine Rift

#### List of useful websites

- |   |  |
|---|--|
| ▪ Albertine Rift Programme – WCS            | <a href="http://www.albertinerift.org">http://www.albertinerift.org</a>                              |
| ▪ Convention on Biological Diversity        | <a href="http://www.biodiv.org">http://www.biodiv.org</a>  |
| ▪ Environmental Alert                       | <a href="http://www.envalert.org">http://www.envalert.org</a>  |
| ▪ Institute of Tropical Forest Conservation | <a href="http://www.itfc.org">http://www.itfc.org</a>  |
| ▪ IUCN Red List (2006)                      | <a href="http://www.redlist.org">http://www.redlist.org</a>  |
| ▪ National Forestry Authority               | <a href="http://www.nfa.org.ug">http://www.nfa.org.ug</a>  |
| ▪ MINITERE                                  | <a href="http://www.minitere.gov.rw">www.minitere.gov.rw</a>   |
| ▪ Ramsar Convention on Wetlands             | <a href="http://www.ramsar.org">http://www.ramsar.org</a>  |
| ▪ ORTPN                                     | <a href="http://www.ortpn.gov.rw">http://www.ortpn.gov.rw,</a>                                       |
| ▪ United Nations Environment Program        | <a href="http://www.unep.org">www.unep.org</a>   |
| ▪ Convention on Biological Diversity        | <a href="http://bch-cbd.naturalsciences.be/rwanda/">http://bch-cbd.naturalsciences.be/rwanda/</a>    |
| ▪ USAID/Rwanda                              | <a href="http://www.usaid.or.ug">http://www.usaid.or.ug</a>  |
| ▪ Wildlife Conservation Society - WCS       | <a href="http://www.wcs.org">http://www.wcs.org</a>  |
| ▪ Great Ape Trust of Iowa                   | <a href="http://www.greatapetrust.org">www.greatapetrust.org</a>                                     |
| ▪ ENCAP                                     | <a href="http://www.encapfrica.org/biodiversity.htm">http://www.encapfrica.org/biodiversity.htm.</a> |
| ▪ National Institute of Statistics          | <a href="http://www.statistics.gov.rw">www.statistics.gov.rw</a>                                     |

## **ANNEX B**

### **FOREIGN ASSISTANCE ACT SECTIONS 118 AND 119**

#### **Part I, Section 118\73\ - Tropical Forests**

(a) Importance of Forests and Tree Cover.--In enacting section 103(b)(3) of this Act the Congress recognized the importance of forests and tree cover to the developing countries. The Congress is particularly concerned about the continuing and accelerating alteration, destruction, and loss of tropical forests in developing countries, which pose a serious threat to development and the environment. Tropical forest destruction and loss--

(1) result in shortages of wood, especially wood for fuel; loss of biologically productive wetlands; siltation of lakes, reservoirs, and irrigation systems; floods; destruction of indigenous peoples; extinction of plant and animal species; reduced capacity for food production; and loss of genetic resources; and

(2) can result in desertification and destabilization of the earth's climate. Properly managed tropical forests provide a sustained flow of resources essential to the economic growth of developing countries, as well as genetic resources of value to developed and developing countries alike.

(b) Priorities.--The concerns expressed in subsection (a) and the recommendations of the United States Interagency Task Force on Tropical Forests shall be given high priority by the President--

(1) in formulating and carrying out programs and policies with respect to developing countries, including those relating to bilateral and multilateral assistance and those relating to private sector activities; and

(2) in seeking opportunities to coordinate public and private development and investment activities which affect forests in developing countries.

(c) Assistance to Developing Countries.--In providing assistance to developing countries, the President shall do the following:

(1) Place a high priority on conservation and sustainable management of tropical forests.

(2) To the fullest extent feasible, engage in dialogues and exchanges of information with recipient countries--

(A) which stress the importance of conserving and sustainably managing forest resources for the long-term economic benefit of those countries, as well as the irreversible losses associated with forest destruction, and

(B) which identify and focus on policies of those countries which directly or indirectly contribute to deforestation.

(3) To the fullest extent feasible, support projects and activities--

(A) which offer employment and income alternatives to those who otherwise would cause destruction and loss of forests, and

(B) which help developing countries identify and implement alternatives to colonizing forested areas.

(4) To the fullest extent feasible, support training programs, educational efforts, and the establishment or strengthening of institutions which increase the capacity of developing countries to formulate forest policies, engage in relevant land-use planning, and otherwise improve the management of their forests.

(5) To the fullest extent feasible, help end destructive slash-and-burn agriculture by supporting stable and productive farming practices in areas already cleared or degraded and on lands which inevitably will be settled, with special emphasis on demonstrating the feasibility of agroforestry and other techniques which use technologies and methods suited to the local environment and traditional agricultural techniques and feature close consultation with and involvement of local people.

(6) To the fullest extent feasible, help conserve forests which have not yet been degraded, by helping to increase production on lands already cleared or degraded through support of reforestation, fuelwood, and other sustainable forestry projects and practices, making sure that local people are involved at all stages of project design and implementation.

(7) To the fullest extent feasible, support projects and other activities to conserve forested watersheds and rehabilitate those which have been deforested, making sure that local people are involved at all stages of project design and implementation.

(8) To the fullest extent feasible, support training, research, and other actions which lead to sustainable and more environmentally sound practices for timber harvesting, removal, and processing, including reforestation, soil conservation, and other activities to rehabilitate degraded forest lands.

(9) To the fullest extent feasible, support research to expand knowledge of tropical forests and identify alternatives which will prevent forest destruction, loss, or degradation, including research in agroforestry, sustainable management of natural forests, small-scale farms and gardens, small-scale animal husbandry, wider application of adopted traditional practices, and suitable crops and crop combinations.

(10) To the fullest extent feasible, conserve biological diversity in forest areas by--

(A) supporting and cooperating with United States Government agencies, other donors (both bilateral and multilateral), and other appropriate governmental, intergovernmental, and nongovernmental organizations in efforts to identify, establish, and maintain a representative network of protected tropical forest ecosystems on a worldwide basis;

(B) whenever appropriate, making the establishment of protected areas a condition of support for activities involving forest clearance or degradation; and

(C) helping developing countries identify tropical forest ecosystems and species in need of protection and establish and maintain appropriate protected areas.

(11) To the fullest extent feasible, engage in efforts to increase the awareness of United States Government agencies and other donors, both bilateral and multilateral, of the immediate and long-term value of tropical forests.

(12) To the fullest extent feasible, utilize the resources and abilities of all relevant United States Government agencies.

(13) Require that any program or project under this chapter significantly affecting tropical forests (including projects involving the planting of exotic plant species)--

(A) be based upon careful analysis of the alternatives available to achieve the best sustainable use of the land, and

(B) take full account of the environmental impacts of the proposed activities on biological diversity, as provided for in the environmental procedures of the Agency for International Development.

(14) Deny assistance under this chapter for--

(A) the procurement or use of logging equipment, unless an environmental assessment indicates that all timber harvesting operations involved will be conducted in an environmentally sound manner which minimizes forest destruction and that the proposed activity will produce positive economic benefits and sustainable forest management systems; and

(B) actions which significantly degrade national parks or similar protected areas which contain tropical forests or introduce exotic plants or animals into such areas.

(15) Deny assistance under this chapter for the following activities unless an environmental assessment indicates that the proposed activity will contribute significantly and directly to improving the livelihood of the rural poor and will be conducted in an environmentally sound manner which supports sustainable development:

(A) Activities which would result in the conversion of forest lands to the rearing of livestock.

(B) The construction, upgrading, or maintenance of roads (including temporary haul roads for logging or other extractive industries) which pass through relatively undegraded forest lands.

(C) The colonization of forest lands.

(D) The construction of dams or other water control structures which flood relatively undegraded forest lands.

(d) PVOs and Other Nongovernmental Organizations.--Whenever feasible, the President shall accomplish the objectives of this section through projects managed by private and voluntary organizations or international, regional, or national nongovernmental organizations which are active in the region or country where the project is located.

(e) Country Analysis Requirements.--Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of-

(1) the actions necessary in that country to achieve conservation and sustainable management of tropical forests, and

(2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.

(f) Annual Report.--Each annual report required by section 634(a) of this Act shall include a report on the implementation of this section.

## Part I, Section 119\75\ - Endangered Species

(a) The Congress finds the survival of many animal and plant species is endangered by overhunting, by the presence of toxic chemicals in water, air and soil, and by the destruction of habitats. The Congress further finds that the extinction of animal and plant species is an irreparable loss with potentially serious environmental and economic consequences for developing and developed countries alike. Accordingly, the preservation of animal and plant species through the regulation of the hunting and trade in endangered species, through limitations on the pollution of natural ecosystems, and through the protection of wildlife habitats should be an important objective of the United States development assistance.

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\75\ 22 U.S.C. 2151q. Sec. 119, pars. (a) and (b) were added by sec. 702 of the International Environment Protection Act of 1983 (title VII of the Department of State Authorization Act, Fiscal Years 1984 and 1985, Public Law 98-164; 97 Stat. 1045).

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(b) \75\ In order to preserve biological diversity, the President is authorized to furnish assistance under this part, notwithstanding section 660,\76\ to assist countries in protecting and maintaining wildlife habitats and in developing sound wildlife management and plant conservation programs. Special efforts should be made to establish and maintain wildlife sanctuaries, reserves, and parks; to enact and enforce anti-poaching measures; and to identify, study, and catalog animal and plant species, especially in tropical environments.

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\76\ Section 533(d)(4)(A) of the Foreign Operations, Export Financing, and Related Programs Appropriations Act, 1990 (Public Law 101-167; 103 Stat. 1227), added ``notwithstanding section 660" at this point.

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(c) \77\ Funding Level.--For fiscal year 1987, not less than \$2,500,000 of the funds available to carry out this part (excluding funds made available to carry out section 104(c)(2), relating to the Child Survival Fund) shall be allocated for assistance pursuant to subsection (b) for activities which were not funded prior to fiscal year 1987. In addition, the Agency for International Development shall, to the fullest extent possible, continue and increase assistance pursuant to subsection (b) for activities for which assistance was provided in fiscal years prior to fiscal year 1987.

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\77\ Pars. (c) through (h) were added by sec. 302 of Public Law 99- 529 (100 Stat. 3017).

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(d) \77\ Country Analysis Requirements.--Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of-

(1) the actions necessary in that country to conserve biological diversity, and

(2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.

(e) \77\ Local Involvement.--To the fullest extent possible, projects supported under this section shall include close consultation with and involvement of local people at all stages of design and implementation.

(f) \77\ PVOs and Other Nongovernmental Organizations.-- Whenever feasible, the objectives of this section shall be accomplished through projects managed by appropriate private and voluntary organizations, or international, regional, or national nongovernmental organizations, which are active in the region or country where the project is located.

(g) \77\ Actions by AID.--The Administrator of the Agency for International Development shall-(1) cooperate with appropriate international organizations, both governmental and nongovernmental;

(2) look to the World Conservation Strategy as an overall guide for actions to conserve biological diversity;

(3) engage in dialogues and exchanges of information with recipient countries which stress the importance of conserving biological diversity for the long-term economic benefit of those countries and which identify and focus on policies of those countries which directly or indirectly contribute to loss of biological diversity;

(4) support training and education efforts which improve the capacity of recipient countries to prevent loss of biological diversity;

(5) whenever possible, enter into long-term agreements in which the recipient country agrees to protect ecosystems or other wildlife habitats recommended for protection by relevant governmental or nongovernmental organizations or as a result of activities undertaken pursuant to paragraph

(6), and the United States agrees to provide, subject to obtaining the necessary appropriations, additional assistance necessary for the establishment and maintenance of such protected areas;

(6) support, as necessary and in cooperation with the appropriate governmental and nongovernmental organizations, efforts to identify and survey ecosystems in recipient countries worthy of protection;

(7) cooperate with and support the relevant efforts of other agencies of the United States Government, including the United States Fish and Wildlife Service, the National Park Service, the Forest Service, and the Peace Corps;

(8) review the Agency's environmental regulations and revise them as necessary to ensure that ongoing and proposed actions by the Agency do not inadvertently endanger wildlife species or their critical habitats, harm protected areas, or have other adverse impacts on biological diversity (and shall report to the Congress within a year after the date of enactment of this paragraph on the actions taken pursuant to this paragraph);

(9) ensure that environmental profiles sponsored by the Agency include information needed for conservation of biological diversity; and

(10) deny any direct or indirect assistance under this chapter for actions which significantly degrade national parks or similar protected areas or introduce exotic plants or animals into such areas.

(h) \77\ Annual Reports.--Each annual report required by section 634(a) of this Act shall include, in a separate volume, a report on the implementation of this section.

## ANNEX C

# ENVIRONMENTAL ANALYSIS — RWANDA

(Based on the Environmental Threats and Opportunities Assessment, July 2008)

### I. Introduction

USAID/Rwanda is required to periodically examine its programming and planning through an environmental lens and specifically biodiversity and tropical forestry conservation. Such an examination is a mandatory technical requirement of operating units strategy statements (see USAID's Automated Directive System, ADS 201.3.4.11). The last analysis of this type completed in Rwanda was the initial 2003 Environmental Threats and Opportunities Assessment (ETOA) with an update annex added in 2005. In June 2008 biodiversity and tropical forests were again scrutinized under an updating exercise. The 2008 ETOA Update, building on the 2003 assessment and the 2005 Annex, describes the status of and actions necessary to conserve and protect biodiversity and tropical forests in Rwanda.<sup>1</sup>

This Annex examines environmental threats and opportunities inherent to the Mission's strategy, and assesses the extent to which that strategy incorporates tropical forests and biodiversity concerns. It is not a substitute for an Initial Environmental Examination (IEE). Each SO team is responsible for ensuring that a relevant IEE, or Request for a Categorical Exclusion, is conducted at the SO-level for all USAID-funded activities.

### II. Background

**A. FAA Section 118 Requirements - Tropical Forest Conservation.** In response to the accelerated loss of tropical forests worldwide, the U.S. Congress enacted Section 118 of the FAA, which acknowledges the important role tropical forests and tree cover play in developing countries (in the daily lives of their people, and in their economies overall). Section 118 recognizes the financial value of tropical forests; it also cites benefits that are not directly financial in nature: forests as wildlife habitats, as diverse genetic resource pools, and as protection against erosion and siltation of waterbodies and loss of soil fertility and floods.

Section 118 states that USG support to developing countries shall, to the fullest extent feasible: help end destructive agricultural practices; help conserve forests that have not yet been degraded; support activities that will conserve and rehabilitate forested watersheds; support training, research, and other activities that will lead to sustainable practices for timber harvesting; and support research to develop alternatives to forest destruction.

**B. FAA Section 119 Requirements - Biodiversity.** The U.S. Congress enacted Section 119 of the FAA in response to the irreparable loss of plant and animal species occurring in many developing countries, and the environmental and economic consequences of that loss. Section 119 addresses biodiversity conservation concerns by encouraging USAID to furnish assistance to protect and maintain wildlife habitats, develop sound wildlife management and plant conservation programs, establish and maintain wildlife sanctuaries, enforce anti-poaching measures, and identify and study animal and plant species.

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<sup>1</sup> This Annex was prepared for USAID/Rwanda's planning purposes; it consists of a summary and synthesis of the findings and recommendations of the ETOA. The complete ETOA can be obtained by contacting Timothy Karera, Mission Environmental Officer, USAID/Rwanda.

Section 119 states that USAID's ongoing and proposed actions shall not inadvertently endanger wildlife or critical habitats, harm protected areas, or have other adverse impacts on biological diversity. It also says that USAID programs shall, to the fullest extent feasible, support policies, training and education, and long-term agreements and other types of cooperation efforts that will result in the conservation of biodiversity.

### III. Rwanda's Biodiversity and Tropical Forests

**Biodiversity.** From a biodiversity perspective, Rwanda boasts some of the most biologically significant areas on the African continent, with the majority of these areas protected in three national parks. For vertebrate species, the Albertine Rift -- including Volcano (PNV) and Nyungwe National Park (NNP) in Rwanda -- is the richest area in Africa. This region ranks first out of 119 terrestrial eco-regions of Africa for its endemic vertebrate species (species that occur nowhere else) and second in terms of threatened species. The entire Albertine Rift, from northwest Uganda through Rwanda, Burundi, Western Tanzania and eastern Democratic Republic of Congo (DRC), is recognized as an "Endemic Bird Area" by Birdlife International and as a biodiversity "Hotspot" by Conservation International. The Central Albertine Rift (CAR) is the focus of a Tripartite Declaration (Rwanda, DRC, Uganda) for natural resources management.

The third national park, Akagera, in the country's southeast, also protects a wide range of flora and fauna diversity. It is predominately a savanna ecosystem with numerous small lakes that are recharged by wetlands and rivers, and has a range of vertebrate species that rival other more known regions of East and Southern Africa.

Rwanda shelters 2,150 species of plants, and the assumption is that the degree of endemism is quite high. The UNEP World Conservation Monitoring Centre lists eight species of trees as either threatened or of "conservation concern" in its tree conservation database. The American Museum of Natural History lists 87 species of amphibians and reptiles in Rwanda. The only reptile species listed with concern is a tortoise. Rwanda is one of Africa's top birding countries; an incredible 670 different species have been recorded. Four species of birds are threatened with extinction: the shoebill stork found in Akagera; Grauer's rush warbler found in PNV, Nyungwe, and the swamps of Rugezi; the kungwe apalis found in the Nyungwe; and the African or Congo bay owl.

Rwanda contains 151 different types of mammal species, 11 of which are currently threatened and none of which is endemic. The country is particularly well known for its 14 to 16 species of primates, most prominent among them the world's most endangered ape, the mountain gorilla found in PNV. Others are the mountain monkey in the Nyungwe National Park, the endangered chimpanzee in Nyungwe and the golden monkey, endemic at a certain altitude in PNV.

**Forests.** Rwanda's afro-montane forests include Nyungwe National Park (newly conferred status), the Gishwati and Mukura Forest Reserves, and the Volcano National Park (PNV). Because Gishwati and Mukura have been used for cattle grazing and resettlement, only small isolated patches of forest remain there, in inaccessible areas. Nyungwe National Park is globally, as well as nationally, important for the conservation of several restricted-range species found only in the Albertine Rift eco-region in Africa. The reserve is home to 13 species of primate, 1,068 plant species, 85 mammal, 278 bird, 32 amphibian, and 38 reptile species. In all 62 species of fauna and about 250 plant species are endemic to the Rift.

Nyungwe's socioeconomic importance is as significant as its biological importance. The Park's area is the watershed for over 70 percent of Rwanda; its streams feed both the Congo and the Nile basins. It thus protects the watershed of not only surrounding communities but also communities much further downstream. The buffer zone around the forest has been planted with economically important species and is a source of building poles and firewood for local populations. Honey production and the harvesting of medicinal plants are other important economic activities. Commercial tea plantations adjacent to the national park also add a valuable buffer zone to the forest resource within the boundary.

Volcano National Park (PNV) is one of the oldest protected areas in Africa—established by King Albert of Belgium in 1929 in an effort to set aside the Virunga Mountains in the DRC, Rwanda, and Uganda to save the habitat of the last representatives of the mountain gorilla. Over half the world's mountain gorilla population is found in the three national parks that share the Virunga Mountain massif. The PNV contains 245 species of plants, 115 species of mammals, 187 species of birds, 27 species of reptiles and amphibians, and 33 species of arthropods. Among the plants, 17 species are threatened, of which 13 species of orchids are internationally protected. Many plant and animal species in the park other than the gorilla have gone unstudied. On the Rwanda side of the Park there is no buffer area and local community farmlands offer a very visible contrast to forests that align the protected area's boundary.

Gallery forests are strips of forest along watercourses or extending from wetlands. In Rwanda their area has been significantly reduced by clearing for agriculture, bush fires, and cutting for fire and construction wood. Gallery forests are now found only in the east along the Akagera River system, covering an area of less than 200 ha. The largest are found within the Akagera National Park boundary. Gallery forests contain a number of rare, endemic species, some of which have potential for modern and traditional medicine, but their commercial exploitation could have negative environmental consequences if no safeguards are put in place.

Rwanda's national parks are not only a significant source of income for the country, but also provide invaluable ecosystem services for the Rwandan people. In terms of hydrological cycling, for example, they ensure clean water, erosion control, climate regulation, etc. One recent estimate of Nyungwe's value for its ecosystem services (watershed and biodiversity protection, carbon sequestration and storage, recreation and tourism) was more than US \$285 million. Clearly, the maintenance of healthy and functioning national parks, with their associated biodiversity and surrounding areas, is key to a sustainable future for Rwanda.

Overall, Rwanda's protected areas cover more than 8 percent of its territory. The majority of the natural forests and biodiversity lie within the protected areas. The extent and location of the remaining forest land and the protected areas are illustrated in the figures and table that appear at the end of this annex.

#### **IV. Tropical Forestry and Biodiversity Conservation in Rwanda**

Since 2003 Rwanda has made significant progress to establish a stronger foundation for its conservation policies and environmental activities. Some of the important changes that have impacts on forests, biodiversity and the environment include:

- Passage of the Organic Law No. 04/2005;
- Establishment of the Rwanda Environmental Management Authority (REMA) under Law No. 08/2006;
- Implementation of a government Decentralization Policy and legislation;
- Development and implementation of a land reform process;
- Establishment and implementation of a revenue sharing fund for communities adjacent to protected areas, and
- Provision to the public and private sectors with tools that require the environment to be an integral part of the solutions to critical economic issues with the implementation of the Economic Development and Poverty Reduction Strategy (EDPRS) following the recommendations of the 2020 Vision.

The Organic Law is the most significant baseline conservation legislation since 2003. It declares Rwanda's adherence to at least 10 international conventions concerning biodiversity, endangered species and habitat, climate change, persistent pollutants, pesticides, bio-safety, etc. This law serves to:

- Conserve the environment, people and their habitats;
- Set up fundamental principles related to protection of environment;
- Discourage any activities that may degrade the environment;
- Promote the social welfare of the population while considering equal distribution of the existing wealth;
- Consider the durability of the resources with a special emphasis on equal rights to present and future generations;
- Guarantee to all Rwandans sustainable development which does not harm the environment and the social welfare of the population; and
- Establish strategies of protecting and reducing negative effects on the environment and improving/restoring the degraded environment.

The Rwanda Environmental Management Authority (REMA) is, since late 2005, functional, under solid leadership and with a dynamic staff. It is forging relationships and establishing roles at both the national and district levels. It oversees the compilation of State of the Environment Reports and the development and implementation of Environmental Action Plans. It has also established relationships with international organizations as it is the focal point for almost all international environment conventions that the GOR has ratified.

Decentralization of government authority and decision-making to the district levels is allowing communities and community-based organizations (CBOs) to become more active in conservation and has helped develop confidence in their participation and the positive impacts it is having on their livelihoods. The establishment of the revenue sharing fund by Rwandan Tourism and National Parks Office (ORTPN) has bolstered this impact to districts bordering the three national parks. Five percent of all tourism revenues is allocated in the following ratios: 40 percent to Parc National des Volcans, 30 percent to Akagera National Park and 30 percent to Nyungwe National Park. These funds have been used to build schools,

construct and extend water supply systems, provide health facilities and services, and the like. Most importantly these are additional incentives for local communities to help protect and promote the biodiversity and the other attributes that attract tourists to these protected areas.

NGOs have continued to play important roles for conservation and protection of Rwanda's natural assets, especially in and around protected areas. They are better coordinated than they were five years ago. And they contribute substantially to raising public awareness about critical environmental issue and fostering alternative livelihoods for communities that rely on products and services from lands within the protected areas.

EDPRS has built on the foundation established by the land reform process, NGO savvy in raising awareness, and decentralization to foster better public-private partnerships that benefit the environment. The Government of Rwanda truly recognizes the importance of tourism, and ecotourism as a critical part of the nation's economic transformation and the fact that without a viable conservation and protection strategy all of the country will suffer. It has also recently signed a lease, via ORTPN, with a private investment company whereby Akagera National Park will be operated and managed by that company under the terms of a 49-year lease agreement.

Rwanda is party to several important transboundary agreements that impact on forest conservation, biodiversity and water resources. One, with the Democratic Republic of the Congo and Uganda, has provided valuable lessons in the process of transboundary cooperation, engendered mainly through the International Gorilla Conservation Programme (IGCP). Pooling resources and even working through periods of conflict, environmental leaders from Rwanda, Uganda and the Democratic Republic of the Congo envisioned, developed and put into operation a 10-year transboundary management plan for a region of the Albertine Rift. Of equal importance is the fact that others have already started to capitalize on this experience. Nyungwe National Park staff, supported by the Wildlife Conservation Society and USAID, is also using the lessons learned from IGCP's work to liaise and work with staff in Kibira National Park in Burundi which shares a boundary with NNP.

## **V. Main Threats to Biodiversity and Tropical Forests**

Despite the important gains that have been made for conservation and biodiversity protection in the past five years significant threats to their existence and well-being remain prominent. The most significant threats from the 2003 ETOA remain and include:

- Population pressure
- Energy pressure
- Agricultural inefficiencies and soil erosion
- Waste disposal issues
- Institutional weaknesses and inefficiencies
- Degradation of wetlands and lack of clean water
- Climate change

**Population pressure.** Rwanda's population growth over the last 4 decades has been unprecedented – from approximately 2.6 million in 1960 to 8.2 million in 2002 (National Census Service, 2005). In 2007, it was estimated at 9.3 million and is likely to reach 10.8 million in 2012. The annual population growth rate was 3.1% in 2002, one of the highest in

sub-saharan Africa, but declined to about 2.6% in 2007. Population density is about 343 people per km<sup>2</sup>, the highest in Africa, but in some districts such as Musanze in the north and Huye in the South, it exceeds 500 people/km<sup>2</sup>. Almost 60 percent of the population lives below the poverty line and cannot meet their basic human needs. These facts mean enormous pressure on the environment and make protecting, let alone conserving, the remaining forest and biological resources a most formidable task. Soils for cultivating, trees for fuel and shelter, biodiversity habitats for the genetic fabric of life, and water for everything are under constant pressure for their use from just about everywhere.

**Institutional weaknesses and inefficiencies.** It was noted above that the legal and policy framework for conservation and environmental protection has improved significantly during the past five years. There are still enormous gaps, inefficiencies, and lack of practical implementation experience. A new Forestry Law remains in draft form and is not operational. A wildlife policy remains on the shelf, and there is not a strategy in place that protects and regulates use of Rwanda's critical water resources and wetlands. Without these important resource governance tools ecosystems remain very vulnerable to the on-going misuse of their products and services.

The institutions that are working to protect the environment and deal with the threat issues typical of a growing economy are young, and for the most part, the people working in them are inexperienced. They often come up short in terms of the professional training that is required and the knowledge that experience usually brings. There is also lack of coordination and communication as many of those charged with protecting the environment are trying to cope with an overload of responsibilities that result from understaffing and a lack of knowledge about effective management in general.

**Energy pressure.** The majority of Rwandans use wood for their energy needs. Factoring in the population growth rate this means more trees are needed from less land area required to grow them. And because of no comprehensive strategy to address the problem the government has been taking an unsustainable band-aid approach. Even though Rwanda has traditionally used a viable agroforestry approach in its farming systems, wood for fuel is continuing to come up short. If this threat is to be mitigated, more needs to be done in terms of managing and conserving remaining tree stocks outside of protected areas, tree planting, strategies for harvesting and transport, and for more effective stoves for burning the fuel.

**Degradation of wetlands and lack of clean water** remain significant issues. A comprehensive water and wetlands policy would do much to alleviate these problems and enable the ecosystem services dependent on soils and water to function better. A particularly significant threat is stream channelization to drain wetlands for agriculture. This causes "downcutting" of the stream beds and significant increases in erosion and sedimentation. Today, all downstream users are susceptible to more marginal water quality and greater risk from water-borne pollutants that originate from urban areas and agricultural lands. There is a government effort to curb erosion by creating bench terraces throughout the country's thousands of steep hills but it is subject to controversy due to its radical nature. Other aspects of the debate include the bench terraces high cost, their environmental effectiveness and with the continuous maintenance, their sustainability

**Agricultural inefficiencies.** Historically, Rwanda has traditionally had productive farming systems coupled with complementary agroforestry techniques. Negative impacts today stem from the extreme pressure on the soils, literally wearing them out, due to the very high level



of people trying to eke an existence from smaller and smaller plots of land. Education and awareness is needed today on farming systems that avoid use of chemical fertilizers and pesticides, help maintain and support crop diversification efforts, promote rational soil conservation techniques such as progressive terracing, use integrated pest management, and encourages cooperative food security planning among local and district governments and farmers.

**Climate changes** are apt to have important impacts on Rwanda's existing forests and on biodiversity. Small changes in temperature and rainfall could be devastating to flora and habitats that are important to wildlife ... critical components in the country's equation for drawing tourists, researchers and others. An erosion of any genetic diversity, or further destruction of the environment will affect not only Rwandans, but also all those downstream from Rwanda -- just about all of central and northeastern Africa that are part of the Congo and Nile Basins. Rwanda's protected areas are not only critical in terms of their flora and fauna diversity, they are also fragile and most likely vulnerable to small changes in climate. The GOR is working to address these risks and has started to develop strategies that might help them cope when change comes.

**Waste disposal issues.** Medical and industrial waste also poses a threat not only to the environment but also the physical health of Rwandans. An example is the medical waste in the form of pesticide plastic sachets, hand gloves, nose masks, and packaging which has been in contact with pyrethroid insecticide. Proper disposal is imperative to ensure the safety of the environment and to mitigate the threat to human health. Industrial waste, in the form of coffee washing/depulping stations discharge untreated waste which threatens watersheds with high levels of carbohydrates and organic matter and reduces available oxygen in the receiving water affecting downstream fishponds, drinking water sources, and fragile wetlands/swamps that are key to water management.

## **VI. Recommendations for Improved Biodiversity and Tropical Forest Conservation In Rwanda**

This section provides a list of suggested actions that can help to address the main threats identified in the previous section. The lists are not intended to be exhaustive, but are topical ideas for possible action. Many are discussed in the 2008 ETOA Update and in Section VIII.

### **Population pressure**

- Support community-based projects that link Population, Health and Environment (PHE) around protected areas;
- Support income generating projects to provide alternative livelihoods;
- Develop market infrastructure to encourage further income generation and alternative livelihoods;
- Support projects that remove people's reliance on forest by engaging them in commercially viable projects (i.e. sericulture, apiculture, cultivation of medicinal plants);
- Promote community forest plantations with native species;
- Promote agricultural intensification away from forest blocks;
- Promote agro-ecological techniques in agricultural production to help reduce forest loss;
- Promote environmental education;
- Encourage behavioral changes from traditional practices to holistic approaches;

- Support food security projects, particularly related to agriculture intensification, diversification, and commercialization to decrease pressures on resources;
- Develop market infrastructure to encourage further income generation and alternative livelihoods; and
- Encourage family planning and education endeavors to complement such efforts, as well as social programs to mitigate migration effects.

### **Institutional weaknesses and inefficiencies**

- Continue to support ORTPN capacity building for its protected area staff in management and technical areas;
- Support District Environmental Officers in community liaison, conflict resolution and planning;
- Work with ORTPN, REMA and the Forest Department to resolve conflict and inaction that pertains to the use and management of buffer zone plantations around Nyungwe National Park;
- Support practical training and continued education in ecological monitoring, watershed monitoring, policy reform, and sustainable financing;
- Assist central regulatory agencies with crafting (and then implementing) hands-on (how-to) instructions for implementing rules and regulations, monitoring processes, chain of custody, etc. to make them less dependent and vulnerable to outside assistance;
- Work with the government institutions responsible for protecting forest resources and conserving biodiversity in providing clear and easily understood language related to policies and laws;
- Assist institutions charged with conserving and protecting the environment to develop strategies and action agendas that can resolve the problems that the GOR has (usually) inadequately addressed by issuing “environmental instructions”;
- Provide assistance in acquisition and training of GIS hardware and software to regulatory agencies to make them self-sufficient in using these tools and generating their own maps, overlays and analyses; and
- Assist with practical management training aimed at conflict resolution, communication and coordination

### **Energy pressure**

- Support intensive reforestation programs through environmental education and awareness-raising activities;
- Support policy and legislative action that promotes fuel wood plantations on private land;
- Assist in the development of a strategic action plan for forestry and forest management in areas outside of protected areas;
- Promote the sustainable use of forest products for the benefit of local communities;
- Improve forest sector governance, especially at the district level;
- Help the forestry industry become more competitive and sustainable;
- Assist in the development and enforcement of legal texts connected to forest exploitation and that comply with environmental impact assessment provisions;
- Support local pilot forestry projects;
- Support carbon sequestration schemes;
- Support public and private efforts to safely tap the methane resources under Lake Kivu;
- Support strategies that examine other alternative energy sources or technologies that will reduce dependence on fuel wood for cooking; and

- Alternative fuel sources and tree plantations

### **Degradation of wetlands and lack of clean water**

- Assist government efforts to develop and implement a comprehensive watershed and wetlands strategy and monitoring system;
- Promote best practices for the treatment of wastewater from coffee washing stations and work with the GOR to establish standards and monitoring procedures for wastewater flushed into watercourses from these stations;
- Help establish community-based management schemes for wetlands;
- Disseminate better agricultural practices and soil conservation techniques, especially those associated with terracing techniques;
- Work with the public and private sector to undertake actions that will stop channelization in wetlands, rivers, and streams; and
- Help public and NGO efforts to raise awareness of the importance of wetland conservation and watershed protection.

### **Agricultural inefficiencies**

- Work with community organizations and district level environmental and agricultural officers to discourage the use of pesticides, chemical fertilizers and herbicides;
- Promote crop diversification, integrated pest management and rational soil conservation techniques;
- Disseminate better agricultural practices and soil conservation techniques;
- Help to mitigate risks associated with radical terracing techniques and encourage the GOR to promote alternatives that are more sustainable and less labor intensive;
- Engage district-level and national interests to actively communicate and participate in cooperative food security planning;
- Support soil conservation practices, especially on upland areas; and
- Support tree nurseries, reforestation projects, and tree plantations to counter deforestation.

### **Climate change**

- Explore Rwanda's participation in carbon sequestration trading projects;
- Adaptation measures need to be explored and discussed for Rwanda's most vulnerable areas to prepare for climate change;
- Support measures to plant trees; and
- Continue to provide assistance in emergencies and disasters provoked by climate disturbances (population displacement due to floods or drought).

### **Waste disposal issues**

- Waste disposal at coffee washing stations
  - Work with REMA to find cost-effective solutions that adhere to international standards to resolve pollution issues;
  - Promote new pulping machines that minimize water consumption without comprising the quality of coffee processing;
  - Promote sustainable waste water management of coffee washing stations by scaling up the Cyarumbo coffee washing station (see Section 5); and

- Institute compost management training to coffee washing station owners to ensure efficient use of coffee pulps and enhance soil characteristics.
- Medical waste management
  - Ensure incinerators at all USAID assisted clinics meet the safety and environmental requirements (site selection, construction, emissions, burned residues maintenance, and protection of operational staff);
  - Provide USAID assisted health centers and clinics with incinerator maintenance manuals and training to operational staff manipulating medical waste on a daily basis; and
  - Find a sustainable and safe way to dispose of Presidential Malaria Initiative Indoor Residual Spraying waste in concert with PMI Washington.

## **VII. Current USAID Interventions to Conserve Tropical Forests and Biodiversity**

USAID provides very little direct support to biodiversity and forest conservation efforts in Rwanda. The USAID/Rwanda operating budget is dominated (more than 90%) by programs within the health sector (SO6) and this is unlikely to change in the short-term. Under its Economic Growth Objective (SO7), USAID/Rwanda gives direct support to the *Increased Rural Incomes through Improved Biodiversity Conservation* program, better known as the “Destination Nyungwe Project”. Activities are intertwined in three components: biodiversity conservation, ecotourism and rural enterprise development and health. The total budget is US\$5.0 million over the 2006 to 2009 life of the project. (The total USAID/Rwanda budget request for FY 2009 is US \$162 million; US \$110 million of this is for HIV/AIDS programming.)

The biodiversity component of the project is aimed at increasing the professional capacity of ORTPN staff that manages Nyungwe National Park (NNP) and working with the Park’s neighboring communities to mainstream environmental and sustainable use issues into district development plans. The health component works with these same communities to strengthen clinical and community capacity in providing and promoting family planning and maternal and child health. The ecotourism component also works with the communities and districts to bolster and coordinate ecotourism planning for NNP with ORTPN, local government and private sector investors. There is also direct assistance for ecotourism infrastructure, its planning, construction and use inside the Park boundary.

Environmental concerns within other activities funded under the Economic Growth SO are being addressed. Pollution from coffee washing stations (assisted under the SPREAD project) in the form untreated organic solids is dumped into streams from the wash water. Very little has been tested and organized to treat this effluent that severely reduces oxygen content and water quality downstream during the season when stream flows are waning. More (see the next section) needs to be done to mitigate this problem. Within the Essential Oils project, USAID funds help to employ widows and orphans to construct passive progressive terracing to control erosion and sedimentation and to increase soil fertility using improved cropping techniques. The use of fuel wood for obtaining distillates under this project is also a concern that needs to be addressed more strategically. And food aid distributions under SO6 are being used to construct terraces that the GOR is promoting, but of a type that is controversial due to questions about their impacts and their sustainability. Although the food aid program is due to end in 2009 the debate is real and USAID needs to be a part of the discussion to help resolve the issues related to radical terracing technology.

SO7 also works with other Mission SOs to facilitate IEEs and to address other relevant environmental issues on an “as needed” basis in other projects.

### **VIII. OPPORTUNITIES TO CONSERVE TROPICAL FORESTS AND BIODIVERSITY**

The 2008 ETOA Update notes that there are four specific opportunity areas in the environment where technical assistance could be effective in present-day Rwanda. These are:

- Increased assistance to the Rwanda Environmental Management Authority (REMA);
- Directed assistance to developing legislation and policies focused on safeguarding the environment and more importantly, assisting with applying them; and
- Continued strengthening of the development of environmental public-private partnerships and their links to local communities.
- Continued support for public education and raising awareness about environmental issues and for engaging decentralized entities in environmental management

Historically, USAID’s assistance to environmental management authorities, at least on the scales attempted, has not always been successful. REMA, today, has focused and motivated leadership and, with the recent recruitment of a number of staff, is actively engaged in developing a talented and idealistic group of professionals. It does still need technical and organization assistance to streamline and promote its mission and clarify staff responsibilities. can still use guidance and assistance with its mission and with the majority of its major tasks. But, for the most part REMA knows what it is about and is working hard to get there. USAID assistance would be most valuable in the practical application of models, the implementation of regulations and the “how-tos” of actually monitoring compliance and working those lessons into its own management structure. Continued training of its professional cadre, especially to bolster its numbers, is sorely needed. REMA, as well as other institutions with environmental jurisdictions could use straight-forward assistance in acquiring, training and using GIS software and peripherals to generate spatial information in-house. Not only would this facilitate and reinforce its regulatory role, but also do away with the current costly (and sometimes inefficient) practice of using outside contractors to collect and produce this information.

Worldwide, USAID has developed a comparative advantage in the practical application of governance tools and techniques. These hands-on, practical approaches can be invaluable to fledgling institutions that are trying to grasp the implications and ins and outs of implementing environmental policies. The Destination Nyungwe project, ORTPN and local district officials are currently “learning by doing” while they work with local communities. These experiences and lessons have direct application in other areas of Rwanda and USAID has a responsibility to promote and distribute these lessons. They can also be of value to central government institutions and there needs to be a greater effort to coordinate and communicate these lessons can benefit all parties. The experiences and lessons learned under the Democracy and Governance SO should also be of value here, too.

The ETOA points out that activities of the Destination Nyungwe Project help address opportunities associated with population growth, energy use (from forest plantations), and professional capacity building within ORTPN. Efforts here to work with the private sector to coordinate investment opportunities and working with communities are very valuable and go a long way to strengthening development efforts. USAID has a significant opportunity to help

expand these efforts to other districts adjacent to protected areas and to build on the lessons acquired in NNP.

Similarly under the SPREAD project, the efforts to assist small-scale, specialty coffee entrepreneurs yield social, technical and political know-how in the operation of their coffee-washing stations as well as more knowledge about public/private partnerships in the sector. These stations discharge significant amounts of effluent into streams, usually untreated. In addition to helping mitigate the effluent issues by researching and constructing cost-effective settling ponds, USAID can also help inform Rwanda and coffee entrepreneurs about the dangers and risks associated with point source pollutants and also about acceptable world standards associated with coffee-washing. As the GOR policy to double the number of these coffee washing stations is implemented the adoption of these techniques and standards can only help to make Rwanda's specialty coffees more acceptable in the world market. And they will also help reduce the risks to the environment and all those using the water downstream. USAID should be directly engaged in helping to address these issues as the coffee washing stations increase on the landscape.

Public awareness and education, such as in the coffee-washing example just mentioned, is a very definite opportunity for USAID and other donors. USAID is an established "brand" in the country, primarily associated with assistance in the health sector. This awareness can be used to work with districts, communities, other government institutions, and other donors to support continued educational efforts and public relations efforts aimed at environmental issues.

In no area is this more important than with water and wetlands. Water is Rwanda's greatest natural resource and it is increasingly at risk from improper use, outright destruction of the resource and lack of any concrete policy to regulate and monitor its health. One case in point shows up in the GOR's development strategy, the EDPRS, where planning aims to stimulate growth and secure infrastructure by increasing irrigated agriculture and also creating more electrical capacity by constructing numerous small, micro-hydro power centers. Both actions will result in a significant increase in the consumption of water resources, the use of wetlands, and other riparian resources. But no where in the strategy is there concern about the impacts on these water-related resources or plans to monitor the effects of such actions. There is a significant opportunity for USAID to work with the GOR and other donors, not just to draw attention to these threatening gaps, but also to help educate and raise awareness about the importance and fragility of water in Rwanda and to help implement local strategies that are more "environmentally friendly".

USAID's experience and knowledge gained in its essential oils project, especially as it pertains to the energy requirements for obtaining the distillates, can be an important entry point to help address Rwanda's fuel wood crisis. The anticipated demand of this small business when it becomes fully operational is estimated to the equivalent of 5 hectares of 15-year old eucalyptus grown in a plantation, per year. Demands like this one are reported to be small relative to the residential population demand that requires more than 90 percent of its energy needs to come from fuel wood. The GOR has issued stopgap environmental "directives" in an attempt to address threats from over cutting, but a comprehensive and enforceable policy is desperately needed. USAID's global and regional experience, combined with the lessons being learned in Rwanda, should be called upon to help the country resolve this issue that directly impacts the lives of almost every single citizen.

USAID/Rwanda's current and planned budgets are very small. The funded activities do contribute to mitigating some of the threats to the environment, biodiversity and tropical forestry conservation in the country. But given the opportunities for addressing an even wider range of threats, USAID's global leadership in the environment sector, its leveraging possibilities with CARPE and other African experiences, more funding for environment-related activities in Rwanda would have an important and visible impact. And, with its experience in natural resources governance and public-private partnerships there is also an opportunity to step into a leadership role and to leverage action among donors and private sector participants in Rwanda's environmental sector.

## **IX. CONCLUSION**

This annex is a summary and synthesis of the Environmental Threats and Opportunities Assessment (ETOA) conducted in June 2008 for USAID/Rwanda. Most the nation's forested lands and its biodiversity lies within the borders of protected areas that cover slightly more than 12 percent of the land area. There have been significant gains in efforts to conserve and protect natural resources in the past five years; much of this coming with proactive institutional initiatives, revenue sharing with communities and public-private partnerships. Important threats remain mostly due to Rwanda's high population density, the population growth rate and extreme levels of poverty that result in the unsustainable uses and demand on natural resources. In addition, the environmental institutions that oversee these resources are weak due to their youth, inadequate number of trained professionals and their poor communication and coordination skills/experience.

There are important opportunities for donors to provide assistance. USAID, with its extensive global experience in biodiversity and protected areas, forest management planning, and natural resources governance, is well-placed to work with the GOR, NGOs and the private sector to lead efforts aimed at resolving these threats.

Figure 1. The location of protected areas in Rwanda



Table 1. Rwanda's Protected Area System

Name	IUCN category <sup>1</sup>	Management Responsibility	Date Established	Area (km <sup>2</sup> )	Location	Latest Management Plan	No. of Staff
Akagera National Park	II	Dubai World <sup>2</sup>	1934	1,085	1.45'00 S 30.38'00 E	2006	78
Nyungwe National Park	II	ORPTN	2005	1,013	2.30'00 S 29.14'00 E	2005	108
Volcano National Park	II	ORPTN	1929	140	1.28'41 S 29.30'00 E	2004	103
Gishwati Forest Reserve	IV	For Dept	1933	61	1.47'00 S 29.23'00 E	-	-
Mukura Forest Reserve	IV	For Dept	1933	20	1.59'00 S 29.31'00 E	-	-

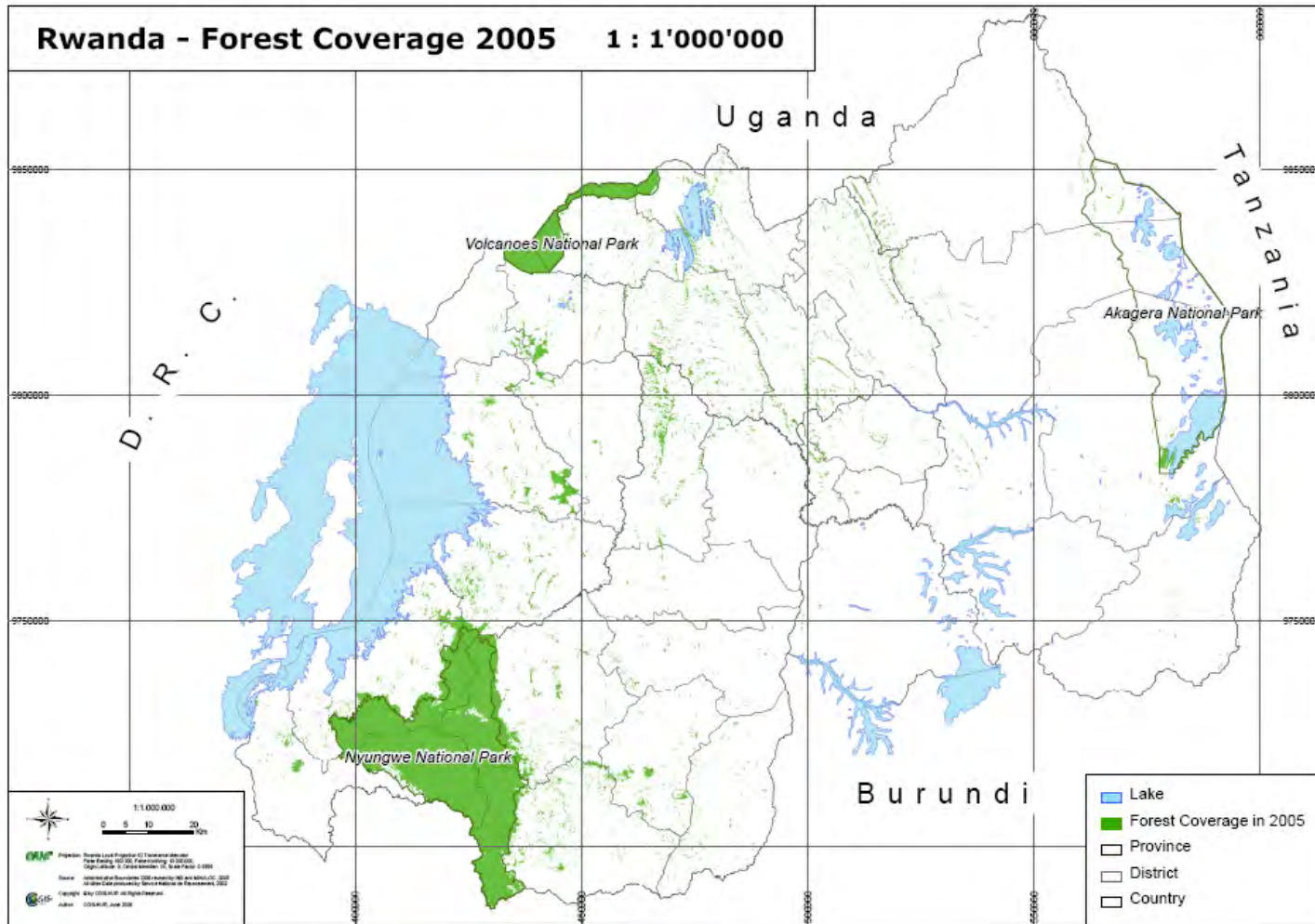
<sup>1</sup> IUCN defines protected areas based on management objectives. The two categories into which Rwanda's protected areas fall are:

- **Category II: National Park:** protected area managed mainly for ecosystem protection and recreation. **Definition:** Natural area of land and/or sea, designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation inimical to the purposes of designation of the area and (c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible.
- **Category IV: Habitat/Species Management Area:** protected area managed mainly for conservation through management intervention. **Definition:** Area of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species.

<sup>2</sup> The GOR, through ORPTN, signed a 49-year lease agreement with Dubai World Rwanda in 2008 to conduct the management of ANP as well as the operation of the tourism facilities within the Park boundary.



Figure 2. Extent of forest cover in Rwanda, 2005



## ANNEX D

### BIOGRAPHIES OF THE 2008 ETOA UPDATE TEAM

**Dr. Steve Dennison.** Dr. Dennison has more than 30 years experience in evaluations, project management, and natural resources conservation and protection in Southeast Asia, Central and South Asia, Africa, North America, the Caribbean and Eastern Europe. He has been the Team Leader for this ETOA Update and has served in a similar capacity on eight other evaluations and assessments including four multi-disciplinary teams for USAID projects in the Central Asian Republics, Madagascar, Nigeria and the Philippines. He served as a team member on almost a dozen others. Dr. Dennison has also been directly responsible for managing long-term USAID contracts and projects for other donors. The majority of his technical assignments have focused on protected area planning and assistance to local community groups and institutions that rely on natural resources and sustainable conservation practices for their livelihood and economic well-being.

**Lance Gatchell.** Mr. Gatchell is a hydrologist with the United States Forest Service. He holds a Bachelor's degree in agricultural engineering and a Master's degree in bio-resource engineering from Oregon State University. Mr. Gatchell's career includes several years of international experience in Palau, Indonesia and Morocco where he worked in water resources management and eco-tourism development. His scientific expertise includes surface water hydrology, groundwater hydrology, watershed restoration, and wetlands function. His work focuses on resolving resource conflicts that have resulted from economic development pressure on ecosystem services.

**Anecto Kayitare.** Over the past 18 years, Anecto Kayitare has worked with environment and development programs in the Great Lakes region of Africa. His expertise includes building partnerships for conservation with a broad range of stakeholders, management of multi-donor projects, strategic planning, organizational development and project implementation. Mr. Kayitare has assisted development and humanitarian projects with numerous donors including the World Bank, UNDP and several international NGOs. He holds a degree in agronomy from the University of Kisangani (DROC) and has a Masters degree in Environmental and Development Policy from the University of Sussex/UK. Mr. Kayitare is currently the Regional Transboundary Officer and Rwanda Country Representative for the International Gorilla Conservation Program.

**Stephanie Otis.** Ms. Otis is a resource management specialist with seven years experience in conservation, natural resource policy, and integrated community development in Central America and Africa. Her areas of technical experience include agriculture, agroforestry, wildlife management, and local participation in the forms of economic development projects and co-management of protected areas. She has led field research of human-wildlife conflict around four protected areas in Kenya in collaboration with the Kenya Wildlife Service in order to revise park management plans and to develop land-use management plans in surrounding communities. She is currently working at Chemonics International as an Associate in the Africa Region.

**Charles Twesigye-Bakwatsa.** Mr. Twesigye-Bakwatsa is a natural resources management specialist with 12 years experience in environmental development projects. Working predominantly in Burundi, Kenya, Rwanda and Uganda, he has led and participated with teams undertaking trans-boundary environmental analyses, project design for natural

resources interventions, assessments of environmental governance frameworks and institutional capacity; and evaluation related to poverty reduction policies. Mr. Twesigye-Bakwatsa has provided training on poverty reduction strategies, youth livelihoods and women's participation, and in an academic setting, lectured on land use planning and EIAs. At the time of this assessment he was capitalizing on his professional interests in natural resources governance, rural development and decentralization to help operationalize the national development plans of Rwanda (EDPRS) and Uganda (PEAP/NDP).

## **ANNEX E**

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## **ANNEX F**

# **ENVIRONMENTAL LEGAL AND POLICY FRAMEWORK IN RWANDA**

(Reviewed from 2003 ETOA report)

### **A. The National Environmental Policy Framework**

#### **A1. The National Policy Framework for Environmental Management**

Rwanda's policy framework for environmental management is grounded in four key documents: the National Environment Policy 2003, the Economic Development and Poverty Reduction Strategy (EDPRS), Vision 2020, and the Land Policy 2004, which are reviewed below. As this is a foundation for environmental management in Rwanda, there is an urgent need to build sufficient institutional and human resource capacities to effectively implement these policies. The implementation mechanisms should also include economic incentives and disincentives and stricter enforcement.

##### **A1a. Historical Perspective**

Initiatives on environmental conservation and protection began in 1920 under colonial administration with large-scale tree planting, followed by creation of Volcano National Park in 1925 and Akagera National Park in 1935. Campaigns to conserve soil through terracing began in 1949 but were abandoned immediately after independence due to the negative connotations associated with the use of forced labor to build the terraces.

In 1975, National Tree Day was institutionalized and in later years the GOR set annual environmental themes: habitat (1977), animal husbandry (1978), soil protection and conservation (1980), rural water supply (1981), anti-erosion (1982), tree planting (1983), and rehabilitation of war-damaged areas (1992).

In April 1992, the Ministry on Environment and Tourism (MINETO) was created to coordinate all the environmental activities being carried out by different ministerial departments. Rwanda's first National Environmental Strategy and Action Plan were approved on May 21, 1991. This document guided the MINETO until the tragic events of 1994, which affected the course of all programs in Rwanda, not just environment.

##### **A2. The Current National Environmental Strategy**

In light of the changes that followed the 1994 war and genocide, the National Environmental Strategy was amended in June 1996. Building on this, a new National Environment Policy and National Biodiversity Strategy and Action Plan were formulated in 2003. This strategy enumerates the principles and priorities of environmental management, notably:

- Alleviating poverty, food insecurity, and the energy crisis
- Planning development in light of the characteristics and potential of the ecosystems concerned
- Minimizing deforestation and promoting biodiversity

- Dealing with the question of the future of the wetlands
- Managing ecological, biological, and climatic changes at the national level
- Managing the urban environment and controlling pollution

The immediate objectives of this strategy are to:

- Stop the degradation of lands and forests and enhance their regeneration through a sustainable, balanced ecological approach
- Fight against urban and other pollution and eliminate sources of illnesses caused by the environment
- Maintain sufficient resources to insure the food security of the population in both the short and the long term
- Regenerate, renew, and diversify domestic sources of energy

To reach these objectives, this policy is guided by the following principles:

- The importance of the environment as a whole
- The importance of taking into account the human and social environment
- The necessity of both a long-term vision and a proactive approach
- The obligation to establish practical priorities

Given these, the strategy has the following objectives:

- Assign responsibilities, mobilizing all partners
- Integrate environmental concerns into all decisions, particularly those related to resources and land
- Manage natural resources and land sustainably
- Restore and maintain a safe environment
- Promote environmental knowledge in general, with special attention to how it affects both people and nature, emphasizing the ecological, cultural, and economic roles of the environment
- Use environmental management approaches adapted to the particularities of different regions of Rwanda.

### **A3. Rwanda's Poverty Reduction Strategy (PRSP)**

As Rwanda emerged from the transitional period characterized by emergency humanitarian work and adhoc projects not grounded in clear policy or action plans, one of the priority issues was to streamline and coordinate development activities through clear policies, strategies and plans. The first Poverty Reduction Strategy paper (PRSP) was approved in 2001, which was a comprehensive participatory bottom-up planning process from 1999 – 2001. The PRSP was expected to address environmental concerns through its six priorities for public action:

1. *Rural development and agricultural transformation.* Activities that directly affect the capacity of the poor to increase their incomes, those that affect agriculture and environment, land, nonagricultural development, loans, rural energy, and rural infrastructure, and rural public works that are highly labor-intensive.

2. *Human development*. Activities that influence the quality of life of the poor in such areas as health, family planning, education, water, and habitat. Habitat is particularly important because it is so closely related with water provision.
3. *Economic infrastructure*. Roads, energy, and communication to support economic development in both urban and rural areas.
4. *Governance*. Security, constitutional reforms, judicial systems, decentralization, departmental strategies, responsibility and transparency, and public service reform.
5. *Private sector development*. Promoting investment, reducing costs and business risks and promoting exports.
6. *Institutional capacity building*. A priority that affects all sectors to which the concept of institutional structure applies and that promotes competitiveness in both public and private sectors.

The strategy goes on to define fundamental programs for reducing poverty and protecting the environment as part of the first domain of priorities for agricultural transformation. In particular the first fundamental program promotes support to agriculture and animal husbandry and related environmental protection activities. In this program, intensive agricultural and environmental activities must be carried out together in order to manage water resources, control soil erosion, and improve soil fertility.

The PRSP was implemented during 2002-2005 and the independent evaluation concluded that although environment was indicated as crosscutting, it did not receive sufficient attention. These lessons were instrumental in designing the second poverty reduction strategy, the Economic Development and Poverty Reduction Strategy (EDPRS).

### **The Economic Development and Poverty Reduction Strategy (EDPRS)**

Rwanda's EDPRS (2007 – 2012) builds on the relatively impressive achievements in human capital development during the PRSP 1. But it also represents a rapid departure from the PRSP 1 which focussed on social sectors (health, education, water and sanitation), by giving greater priority to economic growth sectors, hence economic development and poverty reduction. The rationale for the shift was that focussing on social sectors was not sustainable without generating an economic growth to support them. The EDPRS has three flagship programmes, which provide strategic guidance to general and sectoral priority setting; resource mobilisation and public expenditure allocations; and coordination of policy implementation.

- a) *Sustainable Growth for Jobs and Exports* will be driven by an ambitious, high quality public investment program aimed at systematically reducing the operational costs of business, increase the capacity to innovate, and widen and deepen the financial sector. This means heavy investment in “hard infrastructure” by the GoR to create strong incentives for the private sector to increase its investment rate in subsequent years.
- b) *Vision 2020 Umurenge* – is essentially about decentralisation and the main mechanism for delivering poverty reduction through integrated interventions. It will accelerate poverty reduction by promoting pro-poor actions at the grassroots especially in rural areas. Already, 30 sectors (the poorest sector in each of 30 districts) have been selected for piloting the Concept of Vision 2020 Umurenge, borrowing from the Millennium Villages concept. Planned integrated activities include labour intensive public works,



cooperatives development, provision of productive skills and enhancing access to productive skills, among others.

- c) *Participatory and democratic Governance* will provide an anchor for pro-poor growth by building on Rwanda's reputation as a country with a low incidence of corruption and a regional comparative advantage in "soft infrastructure". This will help create efficiency and effectiveness in service delivery including securing property rights and reducing the cost of doing business, which will ultimately accelerate growth and stability.

In order to implement the EDPRS strategy, the sectoral allocation of public expenditure will be distributed to maintain momentum in the social sectors– education, health and water and sanitation– while also targeting agriculture, transport and ICT, energy, housing and urban development, good governance and rule of law, proper land use management and environmental protection.

Thus the main targets for the EDPRS during the period 2007-2012 draw from the PRSP I lessons and entail: accelerating growth and poverty reduction; widening and deepening the financial sector; developing skills for a knowledge-based society, so as to reduce employment in agriculture; promoting science, technology and innovation for economic growth; raising agricultural productivity and ensuring food security; scaling up manufacturing and services sectors' contribution to overall economic growth; managing the environment and natural resources optimally and sustainably; and building economic infrastructures including roads and power stations.

#### **A4. Vision 2020 *Umurenge***

In Rwanda's Vision 2020 *Umurenge*, environment is among the priorities; it addresses sustainable management of national holdings, the environment, and such natural resources as soils, water, energy, and biodiversity. For managing and protecting natural resources and the environment, Rwanda plans to reach the following goals by 2020:

- Reduce the percentage of the population dependent on agriculture from 90 to 50 percent
- Increase and update environmental protections adapted to sustainable management of natural resources
- Reduce by up to 60 percent the rate of morbidity related to environmental degradation
- Decrease the number of fuel wood users from 50 to 24 percent.

To reach this objective, Vision 2020 states that Rwanda has to:

- Integrate an environmental aspect into all official policies and decision-making processes, and into all education, public awareness, extension, and development programs
- Promote participation by members of local communities, especially women and youth, in environmental protection and management
- Use the principle of prevention to alleviate negative environmental effects of socioeconomic activities
- Diversify energy sources and make them more accessible to the population to alleviate the pressure on biomass

- Establish the principle that “polluter pays” for environmental damage, and strengthen punitive measures to insure compliance and environmental safety
- Assess the environmental impact of any proposed project or development program
- Plan for the development of industrial sites to better control their effects on the environment and the population
- Promote nonpolluting technologies for transport, storage, and elimination of industrial products and waste
- Apply environment-related legislation to mining and mineral debris
- Rehabilitate old mining areas
- Reinforce the institutions concerned with local and imported product quality control and standards
- Build a statistical database on natural resources and the environment and a quick alert system to help mitigate natural disasters, and create a fund to support victims of natural disasters
- Institute and appropriately fund the Rwanda Environmental Management Authority (REMA)
- Cooperate with other nations and international institutions for environmental protection
- Ensure that public institutions, the private sector, civil society, donors, and local communities collaborate to more efficiently manage natural resources and protect the environment.

## **A5. National Environment Policy**

The National Environment Policy was approved in 2003, and is the basis, alongside the Organic Law on Environment, for environmental protection and conservation activities in Rwanda.

Chapters 1 through 4 of the policy set the scene. They sketch in the history of environmental policy in Rwanda and outline environmental protection and conservation in such key sectors as soils, climate, vegetation, natural resources, protected areas, energy and water resources, land, and demography. The principal current threats to the Rwandan environment are also analyzed and key terms (e.g., environment, biotope, waste, natural resources, and sustainable development) are defined.

### **A5a. Policy Objectives**

Chapter five outlines the objectives and principles of Rwanda’s national environmental policy. The major objectives are to improve the standard of living and the sustainable use of natural resources and to protect and manage natural areas for balanced and sustainable development. The specific objectives of the environmental policy are to:

- Improve the health of the Rwandan people and promote their socioeconomic development through the sustainable management and utilization of natural resources and the environment
- Integrate environmental aspects into all policies, planning, and implementation activities carried out at the national, provincial, and local levels with total participation of the population
- Conserve and restore ecosystems and maintain dynamic ecology and systems health, especially national biological diversity

- Optimize sustainable use of natural resources
- Sensitize the population to environmental values and the relationships between the environment and development
- Ensure the participation of both individuals and communities in activities aimed at improving the environment, with particular attention to women and young people
- Ensure that the basic needs of Rwandans today and those of future generations are satisfied

### **A5b. Underlying Principles**

The principles on which the policy is based are that

- Each person is entitled to live in a safe environment and has a duty to maintain the environmental welfare of all.
- The economic development of Rwanda must be based on sustainable use of natural resources.
- The right to the land is a priority for sustainable management of natural resources.
- Long-term food security depends on sustainable management of natural resources and the environment.
- Use of nonrenewable resources must be minimized and recycling used where possible.
- Technologies that are socially accepted and accessible must be disseminated if natural resources are to be used efficiently.
- The costs of environmental damage and degradation must be taken into consideration in planning for public and private investments and must be minimized wherever possible.
- Socioeconomic incentives and disincentives must go hand in hand with legislative measures to convince the people to invest in a sustainable environment.
- Legislation to promote capacity building must be a priority if natural resources and the environment are to be managed sustainably.
- Activities that favor incentives for the rational use and sustainable management of natural resources and environment must be given priority.
- Planning for environmental management must be integrated and multisectoral.
- A system must be created for environmental monitoring and evaluation and information obtained through this system must be disseminated to the public.
- Opportunities for communities and individuals to sustainably manage their resources must be facilitated.
- Women and young people must be encouraged to become active in formulating policy, planning programs, making decisions, and managing programs.
- Both government and public awareness and understanding of environmental issues must be promoted.

### **A5c. Political Options and Strategic Actions**

Chapter six addresses political options and strategic actions for various sectors, among them:

- Population and territory management
- Land management
- Water resources management

- Valleys
- Agriculture
- Animal husbandry
- Fishing
- Forests and protected areas
- Energy
- Gender and environment
- Transport and communication
- Mines
- Industry and commerce
- Sanitation and health
- Education, information, and research
- Climate and natural catastrophes
- Macroeconomics
- The institutional and judicial domain
- International cooperation

#### **A5d. Institutional and Judicial Arrangements**

Chapter seven proposes institutional and judicial arrangements for implementing the environmental policy. This chapter proposes the creation of:

- The National Environmental Council, as a political instrument for coordination
- The Environmental Authority, as an implementing instrument – REMA was established in accordance with the provisions of article 67 of the Organic Law No. 4/ 2005.
- The Environmental Fund
- The Environmental Tribunal, as an instrument of conflict resolution
- Environmental Committees from Provincial and District levels down to sector and cell levels. These committees have recently been established, and REMA has organized training, sensitization and orientation activities for them.

#### **A6. Organic Law (No. 4/2005)**

The Organic Law is a comprehensive piece of legislation that outlines almost all standard procedures and actions to protection, promote conservation of environment and natural resources in Rwanda. It was prepared with the assistance of the United Nations Environment Program (UNEP through UNDP). This law outlines the major principles of environmental management and protection; it is in part inspired by international conventions that Rwanda has signed. Thus, the protection and rational management of the environment and natural resources are based on the following principles:

- *Precaution.* Preventive steps should result from an environmental evaluation of programs, projects, or other socioeconomic activities, to avoid useless expenditures and environmental degradation, which is often significant and irreversible.
- *Lasting and fair allocation of natural resources between generations*
- *Polluter pays*
- *Public participation*

- *International cooperation.*

Certain aspects of this legal framework may affect USAID and other donor activities, among them:

- Article 11, which regulates the management and use of agricultural land
- Article 14, which regulates imports and exports of any animal or vegetable products
- Article 19, which addresses the control of substances contributing to air pollution
- Article 24 and 25, which establish standards for managing waste (especially sewerage, hospital, and other dangerous wastes).
- Article 36, 37, and 38, which impose on project developers the obligation to perform environmental impact assessments (EIAs) and detail how they must be organized (these articles specify that the expense of an EIA will be born by the project promoter).
- Article 45, which stipulates standards for environmental protection and for imported products—though the document does not specify whether these are existing standards or how they will be defined. (The standards do not apply to exported products.)
- Article 72, 73, 74 and 75, which prohibit all types of waste in wetlands and rivers

The Organic law does authorize criminal prosecution for violators, but it does not cover:

- Biosafety and genetic transfer
- Environmental standards for commercial activities
- Management of pesticides and their environmental impact
- Quarry management and environmental norms for mining operations

The general observation is that the Organic Law on environment provides comprehensive mechanisms to safeguard protect and conserve the environment. The main concern, however, is that formulation of subsidiary legislations to effectively operationalize various provisions of the law is slow; the institutional capacity to enforce the law in a way that is transparent, participatory and pro-people, is yet to be developed. Equally, the ETOA team, as some of the stakeholders consulted, is concerned that there is insufficient awareness about the environmental laws and its subsidiary instructions are issued and enforced without sufficient preparation and awareness raising, which impact on livelihoods and rights of the population that are forced to comply.

## **A7. Forest Policy and Legislation**

### **A7a. The National Forestry Policy**

The ETOA team noted that despite the importance of forest and tree resources to the livelihoods and economy of Rwanda, the country had never had a forest policy until 1988 (National Forestry Policy, MINITERE 2004), when the first one was enacted. This was, however, not implemented because of the war and genocide. The present policy was formulated in 2004, a year after the end of the transitional government. It also came into effect after the country had lost two-thirds of the forest estate in 4 decades which was attributed to weak forestry governance and over-dependency on forest resources.

The vision of the Forestry policy, 2004 is to meet, on a sustainable basis, the population's needs for wood and other forest products and services. The main targets are forest cover to comprise at

least 30% of the national territory; and to have at least 85% of farmland under agro-forestry by 2020. An interesting aspect of the present forest policy is the focus on promoting gender, fostering public-private partnerships and enhancing international cooperation in forest management. It also creates the national Forest Protection Service, which will deal with forest encroachment and extension.

### **A7b. Forestry Legislation**

Law N° 47/1988 announced on December 5, 1988 and officially published on February 1, 1989 is still governing forestry activities. This law covers soil protection, conservation, and restoration, which could play an important role in watershed protection, particularly where reforestation is required. Article 4.2 specifies the contents of communal forest plans and requires an inventory of communal lands threatened by erosion or degradation that may require reforestation as a means of conservation and restoration. Unfortunately, because this inventory has never been done, this provision does not play the role envisioned for it in protecting watersheds. Article 28 stipulates that national parks, the banks of lakes and streams, and marshes with woody vegetation belong to the national forest estate, but has no implementing regulations to identify how it might be applied.

The decree of 18 December 1993 requires that prior authorization from the Forestry Department before wood is cut and sold. The decree specifies sanctions for offenders and taxes to be paid before a permit is issued to cut and sell.

### **A7c. Draft Forestry Legislation**

As part of the implementation of the 2004 forest law, two draft legislations have been prepared – one comprehensive law on forestry, and a law establishing the National Forestry Authority (NAFA). The law establishing NAFA has been approved and is undergoing final signature and awaiting gazettments by the Ministry of Justice. The draft law on forestry is going through the consultative process before it is sent to cabinet. The ETOA team could not access the draft legislations as their circulations are still limited.

## **A8. Laws on Fishing and Aquiculture**

### **A8a. Existing Legislation**

A draft law on fisheries management was passed by Parliament at the beginning of July 2008. The laws now in force are from the colonial period and mainly regulate fishing and the introduction of new fish species and the importation of water hyacinth. Specifically,

- Ordinance N° 325/Agri (1947) prohibits introduction of exotic fish species into bodies of water in Rwanda.
- Ordinance N° 51/162 (1955) prohibits retention, culture, multiplication, sale, and transportation of the *Eichornia crassipes*, the water hyacinth.
- O.R.U. N° 52/55 (1955) prohibits using narcotics to catch fish in the lakes and rivers of Rwanda.

- O.R.U. N° 52/160 (1955) states that in all the lakes of Rwanda, it is prohibited to fish with nets with a mesh less than 4 cm in size or with nets of more than 1 km long. It is also prohibited to lay a dormant net less than 50 m from the bank.
- O.R.U. N° 552/97 (1959) prohibits fishing with seines in the interior lakes of Rwanda except in Lake Kivu, although fishing with seines may be authorized for research purposes.
- In Circular N° 1900/07024 (1997) MINAGRI regulates fishing as follows:
  - Before fishing every person or every association must have a license issued by the Director of Regional Agricultural Services for that area.
  - This license is valid for one year; it is bought by paying 2000 FFW to the public revenue authority.
  - Every boat used in fishing must be registered and easily identified;
  - No fishing nets may be used with meshes less than 4 cm in size.
  - No dormant nets may be laid less than 25 m from the bank.
  - No fish may be caught by beating or by using narcotics or nets whose dimensions are prohibited.

### **A8b. Draft Legislation**

A draft law on fishing and aquaculture has been passed by the Chamber of Deputies (lower house of parliament) and is due to be approved by Senate. The draft law has been prepared with support from the Inland Lake Fisheries Management Support Project (PAIGELAC) funded by the African Development Bank. The draft law and details of its formulation process were inaccessible.

## **A9. Water Resource Management Legislation**

### **A9a. Existing Legislation**

Several ministries have responsibility for managing water resources- Ministry of Water Energy and Natural Resources (MINERENA) (hydroelectricity, food, and potable water), Ministry of Agriculture and Animal Resources (MINAGRI) (irrigation and drainage for agriculture, aquaculture, and fishing), and the Ministry of Lands, Environment, Forestry and Mines (MINITERE) (environmental management). There is no law regulating management of water resources except one dating from January 7, 1974 on pollution and the contamination of springs, lakes, and rivers. This ordinance requires the territorial authority to determine the zones of protection of lakes, rivers, or parts of rivers used as, or having the potential to be used as, potable water sources. MINIRENA has finalized drafting a new water law but the draft has yet to be approved by Cabinet. The one additional law that applies in this area is :

The protection and management of lakes and their shorelines, rivers and streams and stream banks are provided for in the Organic Law determining the protection and conservation of environment.

## **A10. Land Resources Legislation**

### **A10a. Organic Law determining the use and management of land in Rwanda<sup>1</sup>**

The Organic Law No 08/2005 determining the use and management of land in Rwanda is probably the most comprehensive legislation on the management of one of Rwanda's most valuable natural resource – land. Chapter 2 categorizes rural and urban land for purposes of developing it and provides for the management and use of land, including institutional structures for land governance. Article 8 establishes land commissions at national, provincial, Kigali city, districts/ towns and other decentralized levels. Article 20 provides for land consolidation for purposes of rational and optimal use of rural land for production. It is perhaps this provision that is guiding the ongoing green revolution and the planned re-organization of rural settlements to clustered (Umudugudu) settlements.

An important part of this legislation for ETOA, is article 12 which provides for reserved public lands for purposes of environmental and natural resources conservation – lakes and water ways; lands accommodating natural water sources and water points; public lands for environmental protection such as natural forests, national parks, public botanical gardens, and tourist sites, among others. Others relate to public utilities such as roads and related infrastructures. In addition, Article 55 waves any rights of land owners to mineral resources buried in his/ her land as well as other natural resources found in the sub-soil, and gives exclusive rights over those resources to the state. Article 67 imposes land tax to land owners.

Another area of interest is in transfer of land rights through sale, lease, mortgage or otherwise provided for in articles 33-35. The law addresses concerns for women and children in the decision making regarding disposal or transfer of family land. Article 35 requires consent of all family members in case a representative (usually the household head) is disposing off or transferring the property.

Over the last 2 years, the Government has implemented a land reform program (mainly with support of DFID) focusing on land tenure, land access and increasing the commercial transactions relating to land. A National Land Centre was established in 2007 and is piloting the land registration and titling. It targets to have all land registered and titled by 2010.

### **A10b. Subsidiary Legislation**

A Presidential Order N°53/01 establishing the National Land Centre and providing for its functioning created the Registrar of Land Titles in Rwanda and empowers him/ her to manage the Land Centre. A series of other Presidential and Ministerial Orders operationalizing the Land Law are being drafted. Most of these relate to registration and transfer of land; and operationalization of Land Tribunals at district and lower levels. .

## **A11. Protected Areas Legislation**

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<sup>1</sup> Official Gazette of the Republic of Rwanda Year 44 No. 18. September 15, 2005. Law No. 08/2005 of July 14, 2005. Organic Law determining the use and management of land in Rwanda.



## **A11a. Existing Legislation**

- The Decree of 26 November 1934 (Belgian Congo National Parks Institute) creating Akagera National Park consists of a single article, “Is reserved, under the name of Akagera National Park, the part of Rwanda territory whose boundaries are indicated in the appendices of the present decree.”
- ORU N° 52/48 (1957) created the hunting area of Umutara in Byumba territory, and gave responsibility for regulating hunting in this game reserve to the General Vice Governor or a delegate. The use of traps and guns with silencers is prohibited.
- Ordinance N° 52/175 (1953) prohibits bush and grass fires.
- The Decree of 26 November 1934 established the boundaries of the National Park of Albert, which became Volcano National Park.
- ORU N°83 (1933) created the forest reserve of Nyungwe.
- Law decree of 26th /04/197 confirmed and modifying the ordinance of 1973 that created the Rwanda Office of Tourism and National Parks (ORTPN), which was the successor to the colonial National Parks Institute and Office of Tourism. The two major objectives of ORTPN are to:
  - Promote tourism and put into practice all means necessary to built tourism
  - Ensure that nature is protected, particularly fauna and flora and promote scientific research and encourage tourism in such a way that these two activities are compatible with the protection of nature.
- Decision N° 3 of the Cabinet Meeting of July 29, 1997, following recommendations of the Inter-ministerial Commission changed the boundaries of the Akagera National Park, reducing its area from 250,000 ha to 90,000 ha.

## **A12. Specific Legislation for Wildlife and Protected Areas Management**

The Office of Tourism and National Parks (ORTPN) has been restructured, creating separate Agencies under it, for Wildlife management and Tourism Development. The restructuring process was facilitated by the International Gorilla Conservation Project (IGCP) at the request of the Ministry of Commerce, Industry, Cooperatives and Tourism. The objective was to improve ORTPN’s management capability and performance by creating two separate institutions within the agency to address: (1) protected area management (the Rwanda Conservation Agency); and (2) tourism promotion (the Rwanda Tourism Agency). A wide range of stakeholders took part in the process, initiated in January 2002. In the final report, submitted in June 2002, one of the key recommendations was that priority be given to the legislative process for establishing these two institutions. In the law responding to this recommendation the most important provisions are:

- The ORTPN now consists of two independent agencies: the Rwandan Tourism Agency and the Rwandan Conservation Agency, both under the authority of the Board of directors.
- The ORTPN has legal status and financial and administrative autonomy.
- It is under the authority of the Ministry of Commerce, Industry, and Tourism (MINICOM). Though its headquarters are in Kigali, the Rwandan capital, they can be transferred anywhere within the country if necessary.
- The objective of the Rwandan Tourism Agency objective is to promote tourism using whatever means will make the greatest contribution:
  - Establish the presence of Rwanda in international exhibitions.

Publish catalogs and site cards.  
 Promote a network of people to accompany tourists in important markets.  
 Use information technology to promote Rwandan tourism.  
 Build partnerships with operators of international and regional travel agencies.  
 Communicate with travel agents who specialize in the Rwanda experience.  
 Begin, coordinate, and facilitate tourism-related research.  
 Implement actions based on the strategic vision and policies identified by the ministry and multisector-based national plans.  
 Manage tourism to conform to national strategies and policies.  
 Create tourism plans.  
 Promote and diversify tourism services by identifying priority areas.  
 Promote community activities related to tourism.

The objective of the Rwandan Conservation Agency is to preserve the countryside and manage national parks and natural reserves, in particular:

- Ensure effective economic planning of tourist services in protected areas.
- Facilitate community tourism in territories close to protected areas.
- Begin the search for primates.
- Ensure tourist services for safaris and discovery of protected areas.
- Ensure good departments of reception, interpretation, and useful information for tourists from within as well as outside Rwanda.
- Ensure the efficiency and sustainability of tourist activities in protected areas.
- Ensure the efficient management of all tourist services, infrastructures, and activities in protected areas.
- Maintain the standards and operational efficiency of the public sector that insures tourism services inside protected areas and surrounding regions.
- Ensure the safety of tourists.
- Organize community tourism services for people living near protected areas.
- Ensure good communication with tourist agencies.

### **A13. National Land Policy**

The GoR elaborated a comprehensive land policy in 2003 and an Organic Law. These incorporate the following policy provisions:

- All Rwandans enjoy the same rights of access to land (implying that there can be no ethnic or gender discrimination).
- Title to all land should be registered so that it can be traded, except where doing so would fragment the land into plots less than 1 ha in area.
- Land use should be optimal. Households will be encouraged to consolidate plots to ensure that each holding is not less than 1 ha. There will also be a maximum size of 50 hectares allowed for any individual landowner. Families will be required to hold land in common to avoid fragmenting the land into parcels that are too small.
- Land administration will be based on a reformed cadastral system
- The rights of occupants of urban land will be recognized on condition that they conform to established rules.

The Organic Law on land specifies that:

- Persons occupying less than 2 ha and those with customary holdings of between 2 and 30 ha will be recognized as the rightful owners if they have a project and a development plan.
- Title deeds can only be transferred with the consent of all family members.
- A land tax will be imposed.
- Undeveloped land reverts to the state after three years.
- Holders of ubukonde land (originally distributed by the clan head) will have the same rights as other customary owners.

The objective of the land policy and law is to improve land management while giving occupant of the land security. The land policy calls for a minimum threshold of 1 ha for land holding although the law does not say so explicitly. The policy and law seek to reduce poverty by encouraging production efficiencies through a modern commercialized agriculture sector. This is already being implemented through a program termed “Green Revolution”. They make two critical assumptions: (i) families will pool land fragments together to create parcels large enough to qualify for development subsidies or receive special legal consideration and (ii) land will be further concentrated through sales.

Those who have reviewed the drafts in detail point out that:

- It is unclear whether lands under 1 ha in size will be eligible for title registration.
- The proposed policy forbids the allocation of “agro-pastoral” land to “nonprofessionals.”

Both these provisions could have major implications for Rwanda’s poor, but discussions with GoR officials and the land policy advisor for the Department for International Development (DFID) suggest that the policy and legislation are still very much in draft and have been subject to comment by a variety of organizations and individuals. Such discussions also suggest that the GoR will at first focus on land reform in urban areas, “where there is a greater desire for such action, and more willingness to pay.”

It is clear that while the GoR has made efforts to broaden the consultative process in planning for critical issues of land use, consultations and communications are often one way, from government to those who will be affected. While the GoR says consultation is taking place, many NGOs active in rural development and civil society activities have not actually seen the draft policy or law. There is thus an urgent need for the consultative process to be expanded to assure widespread input from local populations, NGOs, and others working at the grass roots before basic policy decisions are reached.

#### **A14. Wetlands Related Legislation**

Although wetlands are among the most important natural resources for Rwanda— both in terms of productivity and ecological functioning, they have been severely degraded and there is insufficient legal framework to protect them. A draft wetlands policy developed in 2004 by MINITERE was shelved pending detailed inventory and categorization of wetlands for production and protection. A master plan for marshlands exploitation developed by MINAGRI is more exploitative and focuses mostly on production.

Despite the absence of specific legislation on wetlands, there is increased protection of wetlands since the Organic Law on Environment was passed in 2005. Some activities (such as brick making) were outlawed in wetlands, and even where wetlands are under production, environmental impact assessment (EIA) is required. In the Gikondo valley, Kigali city, there are initiatives to re-locate industries and other economic activities. In effecting these activities, REMA is using the following provisions of the Organic Law on Environment;

Articles 67 and 68 require all activities likely to have significant environmental impacts to undergo EIA. Articles 83 – 85 prohibit dumping any waste in wetlands. Article 86 regulates pastoral and agricultural activities in/ around wetlands. In particular, such activities must be located a distance of at least 10 meters from the river or stream banks and 50 meters away from the lake shores. Cattle Kraals are restricted to at least 60 meters away from stream or river banks and at least 200 meters from lake shores. Article 87, prohibits construction of houses in wetlands (which are deemed to include rivers, lakes and stream banks). Construction of houses must be at least 20 meters away from swamp boundaries/ banks; and for tourism purposes, any building or structure requires the authorization of the Environment Minister, the Minister is also empowered to gazette swamps where construction and other activities are completely prohibited.

REMA has used these and other provisions of the organic law on environment to ban activities in wetlands but still has difficulties to regulate large scale farming where MINAGRI is promoting cultivation of rice, cereals, horticultural crops and other farming activities.

There is a Focal Point for the RAMSAR Convention in REMA who is in-charge of coordinating wetlands management issues but it appears that activities going on/around wetlands are not being actively monitored on a regular basis. The ETOA team is concerned that the MINAGRI seems to have a strong grip on wetlands management in the absence of a clear legal or institutional framework for wetlands management under the Ministry of natural resources or REMA, and that institutional coordination between important stakeholders notably MINIRENA, MINAGRI, ORTPN and districts, is weak, often leading to contradictions in policy formulation and implementation.

#### **A15a. Existing Legislation**

- The Decree of 6 June 1952 related to ground water, lakes, and swamps and their use. It emphasizes the importance of water and provides measures to conserve water.
- The Ordinance of 1 July 1914 on contamination of springs, lakes, and wetlands. This ordinance requires administrators to determine the zones of protection for wetlands that provide potable water and forbids the public to construct houses, industries, or schools in those areas or to fill them in with soil, stones, etc.

#### **A15b. Draft Legislation**

- A draft bill on the development of swamplands was written as early as 1988. Its objective is to increase the amount of lands used for agriculture; to increase agricultural productivity by intensifying agriculture especially on land that lends itself to it; to

improve farmer quality of life; to encourage farmer group activities and private initiatives; and to contribute to the general economic development and progress of the country.

The bill sets forth the larger task of preparing the marshes for preliminary implementation of environmental impact studies, but these cannot begin until the results of a baseline study have been published. The bill also calls for classification of marshes according to their location, area, hydraulic potential and ecological importance. Such a classification would determine the choice of swamps to be fitted out and swamps to be preserved for their crucial role in the conservation of biodiversity—swamps are the preferred and sometimes the only environments that support certain species of mammals, birds, and reptiles.

- A Draft Wetlands Policy on the conservation and management of wetlands presented in January 2003 supersedes the draft 1988 bill and to some extent responds to World Bank Rural Sector Support Project (RSSP) concerns about wetlands development in Rwanda. The bill, which is fairly comprehensive, addresses conservation and rational use issues in much more detail than the 1988 version.

The bill contains five titles:

1. General capacities, definitions, fundamentals, and objective principles
2. The legal status of wetlands
3. Institutions.
4. Incentive, preventive, and enforcement capacities
5. Final capacities.

Among aspects of the legislation that apply to the current ETOA study:

- **Article 1 of Title 1** fixes the general legal framework for conservation and the management of wetlands in Rwanda.
- **Article 2** makes the wetlands part of the common patrimony of the Rwandan nation and the world. Their conservation and management are necessary to maintain natural balances and are therefore of general interest.
- **Article 3** makes the wetlands a priority for the Rwandan Government because of their great economic, cultural, aesthetic, scientific, and recreational value, the disappearance of which would be irreparable.
- **Article 6** emphasizes that every person on Rwandan territory has the duty to contribute to the conservation and rational use of wetlands for their fundamental economic and ecological roles as regulators of water systems and biodiverse environments and as economic, cultural, aesthetic, scientific, and recreational resources.
- **Article 7** sets out the principles underlying the conservation and the durable management of wetlands:

The wetlands must be used in ways that are compatible with their natural functions and hydrological and ecological value.

An environmental impact study is required before any activity can be undertaken that may have a negative impact on the wetlands.

Special measures must be taken to protect wetlands, which are important globally and locally as ecosystems supporting a variety of species of fauna and flora, as well as for their cultural and aesthetic values, tourism potential, and irreplaceable hydrological and ecological functions.

The sustainable use of wetlands must be integrated into national and local approaches to managing natural resources through education of the public.

The conservation of wetlands and their flora and their fauna can be insured by integrating long-term national policies with international action through regional and international cooperation.

Every person whose behavior or activities may damage wetlands is subject to a tax or a royalty and would by implication be responsible for all measures of restoration, on the principle that the polluter pays.

- **Article 8** makes it clear that the draft law is intended to:

- Promote the conservation and rational use of wetlands

- Establish the fundamental principles of conservation and rational use and protection of wetlands against any form of degradation

- Insure the rational use of wetlands by protecting their ecological, economic, cultural, scientific, and recreational functions

- Protect the capacity of the wetlands to stock waters and control floods

- Regulate public access to and use of wetlands

- Promote research on wetlands

- Minimize and control pollution of wetlands

- Set up institutional mechanisms to check present and future progressive infringements on wetlands

- Promote regional and international cooperation in conservation and in sustainable management of wetlands

- **Article 9** applies the draft law to:

- Swamps

- Lakes

- Permanent rivers, streams, and brooks

- Seasonal, occasional, or irregular rivers, streams, and brooks

- Seasonal, occasional lakes, including the puddles of the flood plains

- Ponds and swamps

- Peat bogs

- Water sources

- Geothermal waters

- Fish-farming ponds;

- Irrigated land, including irrigation channels and rice fields

- Seasonally flooded agricultural land

- Reservoirs, dams, and other water-restraining areas

- Excavations, gravel and clay pits, sand quarries, mine shafts, and ballast

- Waste-water treatment sites, including sewage farms, sedimentation ponds, and oxidation ponds

## Canals and drainage ditches

This bill, however, appears to have been shelved and wetlands legislation has been initiated again with the inventory of wetlands commissioned under the World Bank funded Integrated Management of Critical Ecosystems (IMCE). Under this project, four Ministerial Orders (subsidiary legislations) are being drafted to regulate utilization, conservation and protection of wetlands.

### **B. Local Government**

#### **B1. The National Policy of Decentralization**

The National Policy of Decentralization adopted in May 2000 is based on the following principles:

- *Ensure national unity, indivisibility, and balanced development.* This principle is designed to avoid use of decentralization policy as an excuse to foster national disintegration and discriminatory development.
- *Ensure autonomy and local identity, interests, and diversity.* This principle encourages people to participate in identifying needs and local interests when plans are prepared so as to satisfy and mobilize the resources and energy required for executing the plans.
- *Separate political from administrative and technical authority.* By clearly defining roles and responsibilities, this principle aims to help avoid conflicts of interest and concentration of powers.
- *Harmonize responsibilities with the transfer of financial, human, and material resources.* Harmonizing the responsibilities and functions transferred with the human, financial, and material resources transferred will make the decentralization policy meaningful by rendering local communities answerable to their own planning initiatives, and the activities of managers answerable to their developmental plans.

The GoR's National Policy of Decentralization aims at empowering the Rwandan population to take responsibility for managing and utilizing resources, including natural resources and the environment. The policy requires that all objectives and duties be undertaken with respect for the environment. In fact, the purpose of principle (iii) of this policy is explicitly to:

Reinforce the awareness of the local environment as well as the capacity of the public administration to intervene to address environmental issues by availing itself of the planning, finances, management and control of activities where these services are provided and by making local leaders capable of developing structures and organizational capacities that take into consideration the environment and local needs.

Like the national environmental policy, the policy framework is adequate for decentralized environmental management. Responsibilities for environmental management are well defined; the policy clearly states that the district is in charge of water resources, tourism, and environmental protection. Responsibilities for urban entities such as cities, towns and municipalities are also defined; they include territory management, urban planning, road

construction, water provision, sanitation, waste treatment and disposal, maintenance of green spaces, and environmental protection and management.

### **Deepening decentralization**

The first phase of decentralization (2001-2003) succeeded in creating democratic governance structures at all levels up to village level- more than 10,000 people were involved in some sort of elected leadership in 106 districts, 1500 sectors and 8000 cells throughout Rwanda. For a country where governance was highly top-down and leaders appointed by higher authorities, decentralization partly achieved its objective of empowering the population. The evaluation of phase 1, however, concluded that the administrative units created were too weak and too costly to sustain, hence the decision to amalgamate them into fewer, more viable units.

In the context of environmental governance, an important observation about the recent reforms in the decentralization process is that until 2006, environment was largely not provided for in the districts and provincial administration structures– only a small desk in the Directorate of Infrastructures – but has now been established with an Environment Officer. According to REMA Director General, plans have also been finalized to place environment portfolio in the Directorate of Planning so that it is well positioned to oversee inclusion of environmental issues into all sectoral activities.

Here, there are a few policy implementation issues, in particular:

- Districts’ financial and institutional capacity to prioritize environment within its constrained budget resources; and the institutional machinery to implement all environmental activities including education and awareness. This is an uphill task for one technical officer in the districts.
- Capacity at the central Government level (e.g. REMA and Ministry of Natural Resources) to support the district in building capacity, undertaking monitoring and follow-up activities in environmental management, given that they are also constrained;
  - Inadequate institutional/ sectoral coordination and limited funding both from donor interventions and Government budget that go into environmental activities at district and grassroots level – including such technical aspects as biodiversity conservation and environmental impact assessment;

An important provision of the Environment Policy and Organic Law on Environment that has been operationalized is the creation of provincial, district, sector and cell committees for environmental management. These committees will be responsible for day-top-day planning, follow-up and coordination of activities to protect and manage the environment and encourage the direct and active involvement of the population in environmental activities. REMA has embarked on efforts to train them, and orient them about their responsibilities.

## **C. Other Pending Environmental Legislation**

### **C1. Plant Protection and the Use of Pesticides**

A Law determining the modalities and mechanisms for plant protection and regulating the use of pesticides has been approved by Cabinet and awaits parliamentary enactment. Originally



prepared by MINAGRI, it is now being spearheaded by RADA (Rwanda Agricultural Development Agency). This draft law when finally approved by parliament will be of great interest to several enterprises receiving support from USAID and other donors. It deals with:

- National phytosanitary monitoring and control
- Phytosanitary border inspections
- Regulation of pesticides
- Enforcement structures and their authority
- Criminal penalties for offenders.

MINAGRI annexed a presidential decree to the draft bill that specifies the membership of a Pesticide Commission: high-level representatives of ministries dealing with plant protection, the trade of imported plant products, environmental and human health, and the Bureau of Standards, as well as importers and users of pesticides. This decree will facilitate implementation of the law. Provisions regulating pesticides include:

- The approval process and authorization of products (Article.15, 16, 17, 19)
- Packaging and labeling (Article18)
- Prohibitions and exemptions (Articles 21, 22 and 23)

This bill gives all regulatory control of pesticides to MINAGRI, but it does not indicate that phytosanitary certificates will be required, even though MINAGRI presently requires and authorizes such certificates.

## ANNEX G

### IUCN THREATENED ANIMAL AND PLANT SPECIES<sup>1</sup>

Species	Population Trend
<b>Critically Endangered (6)</b>	
<u>Barbus ruasae</u>	Pop. trend: decreasing
<i>Status: Critically Endangered B1ab(ii,iii)+2ab(ii,iii) ver 3.1</i>	
<u>Chiloglanis ruzizensis</u>	Pop. trend: unknown
<i>Status: Critically Endangered B1ab(iii)+2ab(iii) ver 3.1</i>	
<u>Diceros bicornis (Black Rhinoceros)</u>	Pop. trend: increasing
<i>Status: Critically Endangered A2abcd ver 3.1</i>	
<u>Rhinolophus hilli (Hill's Horseshoe Bat)</u>	Pop. trend: decreasing
<i>Status: Critically Endangered B1ab(iii,v)+2ab(iii,v) ver 3.1</i>	
<u>Varicorhinus platystoma</u>	Pop. trend: decreasing
<i>Status: Critically Endangered B1ab(i,ii,iii)+2ab(i,ii,iii) ver 3.1</i>	
<u>Varicorhinus ruandae</u>	Pop. trend: decreasing
<i>Status: Critically Endangered B1ab(ii,iii)+2ab(ii,iii) ver 3.1</i>	
<b>Endangered (15)</b>	
<u>Apalis argentea (Kungwe Apalis)</u>	Pop. trend: decreasing
<i>Status: Endangered B1ab(i,ii,iii,v) ver 3.1</i>	
<u>Ardeola idae (Madagascar Pond-heron)</u>	Pop. trend: decreasing
<i>Status: Endangered C2a(ii) ver 3.1</i>	
<u>Barbus acuticeps</u>	Pop. trend: decreasing
<i>Status: Endangered A2bcd ver 3.1</i>	
<u>Barbus claudinae</u>	Pop. trend: unknown
<i>Status: Endangered B1ab(ii,iii)+2ab(ii,iii) ver 3.1</i>	
<u>Bradypterus graueri (Grauer's Swamp-warbler)</u>	Pop. trend: decreasing
<i>Status: Endangered B2ab(ii,iii,iv,v) ver 3.1</i>	
<u>Chlorocypha molindica</u>	Pop. trend: unknown
<i>Status: Endangered B1ab(iii)+2ab(iii) ver 3.1</i>	
<u>Crocidura lanosa (Kivu Long-haired Shrew)</u>	Pop. trend: decreasing
<i>Status: Endangered B1b(iii) ver 3.1</i>	
<u>Gorilla beringei (Eastern Gorilla)</u>	Pop. trend: decreasing
<i>Status: Endangered A4abcd ver 3.1</i>	
<u>Haplochromis erythromaculatus</u>	Pop. trend: decreasing
<i>Status: Endangered B1ab(iii)+2ab(iii) ver 3.1</i>	
<u>Leptopelis karissimbensis</u>	Pop. trend: decreasing
<i>Status: Endangered B1ab(iii) ver 3.1</i>	
<u>Lophuromys rahmi (Rahm's Brush-furred Rat)</u>	Pop. trend: unknown
<i>Status: Endangered B1ab(iii) ver 3.1</i>	

<sup>1</sup> IUCN 2008. 2008 IUCN Red List of Threatened Species. <[www.iucnredlist.org](http://www.iucnredlist.org)>. Downloaded on 12 November 2008.

<u>Lycaon pictus (African Wild Dog)</u>	Pop. trend: decreasing
<i>Status: Endangered C2a(i) ver 3.1</i>	
<u>Marcusenius victoriae (Victoria Stonebasher)</u>	Pop. trend: decreasing
<i>Status: Endangered A2bcde ver 3.1</i>	
<u>Pan troglodytes (Common Chimpanzee)</u>	Pop. trend: decreasing
<i>Status: Endangered A4cd ver 3.1</i>	
<u>Phodilus prigoginei (Congo Bay-owl)</u>	Pop. trend: decreasing
<i>Status: Endangered B1ab(i,ii,iii,v) ver 3.1</i>	
<b>Vulnerable (35)</b>	
<u>Acinonyx jubatus (Cheetah)</u>	Pop. trend: decreasing
<i>Status: Vulnerable A2acd; C1 ver 3.1</i>	
<u>Afrivalus orophilus</u>	Pop. trend: decreasing
<i>Status: Vulnerable B1ab(iii) ver 3.1</i>	
<u>Balaeniceps rex (Shoebill)</u>	Pop. trend: decreasing
<i>Status: Vulnerable C2a(ii) ver 3.1</i>	
<u>Callixalus pictus</u>	Pop. trend: decreasing
<i>Status: Vulnerable B1ab(iii) ver 3.1</i>	
<u>Cercopithecus hamlyni (Owl-faced Monkey)</u>	Pop. trend: decreasing
<i>Status: Vulnerable A4cd ver 3.1</i>	
<u>Cercopithecus lhoesti (L'hoest's Monkey)</u>	Pop. trend: decreasing
<i>Status: Vulnerable A4cd ver 3.1</i>	
<u>Chloropeta gracilirostris (Papyrus Yellow Warbler)</u>	Pop. trend: decreasing
<i>Status: Vulnerable C2a(i) ver 3.1</i>	
<u>Cryptospiza shelleyi (Shelley's Crimson-wing)</u>	Pop. trend: decreasing
<i>Status: Vulnerable C2a(i) ver 3.1</i>	
<u>Delanymys brooksi (Delany's Swamp Mouse)</u>	Pop. trend: decreasing
<i>Status: Vulnerable B1ab(iii) ver 3.1</i>	
<u>Falco naumanni (Lesser Kestrel)</u>	Pop. trend: decreasing
<i>Status: Vulnerable A2bce+3bce+4bce ver 3.1</i>	
<u>Glaucidium albertinum (Albertine Owlet)</u>	Pop. trend: decreasing
<i>Status: Vulnerable C2a(i) ver 3.1</i>	
<u>Hippopotamus amphibius (Common Hippopotamus)</u>	Pop. trend: decreasing
<i>Status: Vulnerable A4cd ver 3.1</i>	
<u>Hyperolius castaneus</u>	Pop. trend: decreasing
<i>Status: Vulnerable B1ab(iii) ver 3.1</i>	
<u>Hyperolius discodactylus</u>	Pop. trend: decreasing
<i>Status: Vulnerable B1ab(iii) ver 3.1</i>	
<u>Lophuromys mediceaudatus (Medium-tailed Brush-furred Rat)</u>	Pop. trend: decreasing
<i>Status: Vulnerable B1ab(iii) ver 3.1</i>	
<u>Muscicapa lendu (Chapin's Flycatcher)</u>	Pop. trend: decreasing
<i>Status: Vulnerable C2a(i) ver 3.1</i>	
<u>Nectarinia rockefelleri (Rockefeller's Sunbird)</u>	Pop. trend: stable
<i>Status: Vulnerable D1 ver 3.1</i>	

<u>Ocotea kenyensis</u>	
	<i>Status: Vulnerable A1cd ver 2.3</i>
<u>Panthera leo (Lion)</u>	Pop. trend: decreasing
	<i>Status: Vulnerable A2abcd ver 3.1</i>
<u>Papilio leucotaenia (Cream-banded Swallowtail)</u>	(needs updating)
	<i>Status: Vulnerable B1+2c ver 2.3</i>
<u>Phrynobatrachus acutirostris</u>	Pop. trend: decreasing
	<i>Status: Vulnerable B1ab(iii) ver 3.1</i>
<u>Phrynobatrachus bequaerti</u>	Pop. trend: decreasing
	<i>Status: Vulnerable B1ab(iii) ver 3.1</i>
<u>Phrynobatrachus versicolor</u>	Pop. trend: decreasing
	<i>Status: Vulnerable B1ab(iii) ver 3.1</i>
<u>Praomys degraaffi (De Graaff's Praomys)</u>	Pop. trend: decreasing
	<i>Status: Vulnerable B1ab(iii) ver 3.1</i>
<u>Prunus africana (Red Stinkwood)</u>	
	<i>Status: Vulnerable A1cd ver 2.3</i>
<u>Rhinolophus ruwenzorii (Ruwenzori Horseshoe Bat)</u>	Pop. trend: decreasing
	<i>Status: Vulnerable B1a+2b(ii,iii,iv,v) ver 3.1</i>
<u>Ruwenzorisorex suncoides (Ruwenzori Shrew)</u>	Pop. trend: unknown
	<i>Status: Vulnerable B2ab(iii) ver 3.1</i>
<u>Secamone racemosa</u>	
	<i>Status: Vulnerable A2c ver 3.1</i>
<u>Sylvisorex lunaris (Moon Forest Shrew)</u>	Pop. trend: decreasing
	<i>Status: Vulnerable B1ab(iii) ver 3.1</i>
<u>Synodontis ruandae</u>	Pop. trend: unknown
	<i>Status: Vulnerable D2 ver 3.1</i>
<u>Thamnomys kempii (Kemp's Thicket Rat)</u>	Pop. trend: unknown
	<i>Status: Vulnerable B1ab(iii) ver 3.1</i>
<u>Thamnomys venustus (Charming Thicket Rat)</u>	Pop. trend: decreasing
	<i>Status: Vulnerable B1ab(iii) ver 3.1</i>
<u>Torgos tracheliotos (Lappet-faced Vulture)</u>	Pop. trend: decreasing
	<i>Status: Vulnerable C2a(ii) ver 3.1</i>
<u>Trigonoceps occipitalis (White-headed Vulture)</u>	Pop. trend: decreasing
	<i>Status: Vulnerable C2a(ii) ver 3.1</i>
<u>Tropodiptomus kissi</u>	(needs updating)
	<i>Status: Vulnerable D2 ver 2.3</i>

## ANNEX H RWANDA SPECIES ON CITES APPENDICES I AND II<sup>1</sup>

Animal			
Scientific Name	Common Name	Scientific Name	Common Name
<i>Miniopterus schreibersii</i>	Common Bentwing Bat	<i>Civettictis civetta</i>	African Civet
<i>Perodicticus potto</i>	Potto Gibbon	<i>Felis silvestris</i>	Wild Cat
<i>Galago demidoff</i>	Demidoff's Dwarf Galago	<i>Leptailurus serval</i>	Serval
<i>Galago matschiei</i>	Dusky Bushbaby	<i>Panthera leo</i>	Lion
<i>Galago senegalensis.</i>	Lesser Bushbaby	<i>Panthera pardus</i>	Leopard
<i>Galago thomasi</i>	Thomas's Dwarf Galago	<i>Profelis aurata</i>	African Golden Cat
<i>Otolemur crassicaudatus</i>	Greater Bushbaby	<i>Orycteropus afer</i>	Aardvark
<i>Otolemur monteiri</i>	Silvery Greater Galago	<i>Loxodonta africana</i>	African Savannah Elephant
<i>Cercopithecus ascanius</i>	Black-cheeked White-nosed Monkey	<i>Diceros bicornis</i>	Black Rhinoceros
<i>Cercopithecus denti</i>	Dent's Monkey	<i>Hippopotamus amphibius</i>	Hippopotamus
<i>Cercopithecus doggetti</i>	Silver Monkey	<i>Cephalophus silvicultor</i>	Yellow-backed Duiker
<i>Cercopithecus hamlyni</i>	Owl-faced Monkey	<i>Damaliscus korrigum</i>	Topi
<i>Cercopithecus kandti</i>	Golden Monkey	<i>Hippotragus equinus</i>	Roan Antelope
<i>Cercopithecus lhoesti</i>	L'Hoest's Monkey; Mountain Monkey	<i>Philantomba monticola</i>	Blue Duiker
<i>Chlorocebus pygerythrus</i>	Vervet Monkey	<i>Tragelaphus spekii</i>	Sitatunga
<i>Colobus angolensis</i>	Angola Pied Colobus	<i>Kinixys belliana</i>	Bell's Hinged Tortoise
<i>Colobus guereza</i>	Eastern Black-and-white Colobus	<i>Kinixys erosa</i>	Common Tortoise
<i>Lophocebus albigena</i>	Grey-cheeked Mangabey	<i>Kinixys spekii</i>	Speke's Hinged Tortoise
<i>Papio anubis</i>	Olive Baboon	<i>Trionyx triunguis</i>	African Softshell Turtle
<i>Papio hamadryas</i>	Hamadryas Baboon	<i>Pelomedusa subrufa</i>	African Helmeted Turtle
<i>Piliocolobus tephrosceles</i>	Ugandan Red Colobus	<i>Pelusios castaneus</i>	Chestnut Terrapin
<i>Gorilla beringei</i>	Eastern Mountain Gorilla	<i>Crocodylus niloticus</i>	Nile Crocodile
<i>Pan troglodytes</i>	Chimpanzee	<i>Bradypodion adolfifriederici</i>	Ituri Chameleon
<i>Manis gigantea</i>	Giant Pangolin	<i>Chamaeleo anchietae</i>	Double-scaled Chameleon
<i>Manis temminckii</i>	Cape Pangolin	<i>Chamaeleo dilepis</i>	Flap-necked Chameleon
<i>Manis tetradactyla</i>	Black-bellied Pangolin	<i>Chamaeleo ellioti</i>	Mountain Dwarf Chameleon
<i>Manis tricuspis</i>	Three-cusped Pangolin	<i>Chamaeleo johnstoni</i>	Johnston's Chameleon
<i>Anomalurus derbianus</i>	Lord Derby's Flying Squirrel	<i>Chamaeleo laevigatus</i>	Smooth Chameleon
<i>Hystrix cristata</i>	Crested Porcupine	<i>Chamaeleo rudis</i>	Smooth Chameleon
<i>Aonyx capensis</i>	African Clawless Otter	<i>Chamaeleo schoutedeni</i>	Schouteden's Chameleon
<i>Hydrictis maculicollis</i>	Speckle-throated Otter	<i>Varanus niloticus</i>	Nile Monitor
<i>Ictonyx striatus</i>	Striped Polecat; Zorilla	<i>Python sebae</i>	African Rock Python
<i>Mellivora capensis</i>	Honey Badger	Trogonidae	Trogons
Ardeidae	All herons and egrets	Meropidae	Bee'eaters
Threskiornithidae	All ibis and spoonbills	Coraciidae	Rollers

<sup>1</sup> UNEP-WCMC 18 July, 2008 *UNEP-WCMC Species Database: CITES-Listed Species*.

[www.unep-wcmc.org/isdb/CITES/Taxonomy/country\\_list.cfm/isdb/CITES/Taxonomy/country\\_list.cfm?displaylanguage=eng&Country=RW&submit=Go](http://www.unep-wcmc.org/isdb/CITES/Taxonomy/country_list.cfm/isdb/CITES/Taxonomy/country_list.cfm?displaylanguage=eng&Country=RW&submit=Go)

Animal			
Scientific Name	Common Name	Scientific Name	Common Name
Podicipitidae	All grebes	Upipadae	Hoopoe
Falconidae	All falcons, kites, eagles	Phoniculudae	Scimitar bills
Strigidae	All woods hoopoes and scimitar bills	Dicruridae	Drongo
Aegypiidae	All vultures	Oriolidae	Orioles
<b>Anhinga rufa</b>	African darter	Paridae	Tits
Phalacrocoracidae	All cormorants	Remizidae	Penduline tits
Otididae	All Bustards	Timalidae	Akalats, Bablers
<b>Sagittarius serpentarius</b>	Secretary bird	Campephagidae	Cuckoo shrikes
Pelicanidae	All pelicans	Turdidae	Thrushes, Robins
Ciconidae	All storks	Sylviidae	Warblers
<b>Scopus umbretta</b>	Hanmerkop	Muscicapidae	Flycatchers
Gruidae	All cranes	Malaconotidae	Boubous, Goneleks
Bucerotidae	All hornbills	Prionopidae	Helmet shrikes
Alcedinidae	All kingfishers	Nectarinidae	Sunbirds
Hirundinidae	All swallows and martins	Zosteropidae	White eyes
Cuculidae	Cuckoos	<b>Balaeniceps rex</b>	Shoebill
Caprimulgidae	Nightjars		

Plant	
Family	Scientific Name
ASCLEPIADACEAE	<b>Ceropegia nilotica</b>
	<b>Ceropegia schliebenii</b>
	<b>Ceropegia stenantha</b>
	<b>Ceropegia stenoloba</b>
CYATHEACEAE	<b>Alsophila manniana</b>
	<b>Cyathea dregei</b>
	<b>Cyathea manniana</b>
LILIACEAE	<b>Aloe bukobana</b>
	<b>Aloe dawei</b>
	<b>Aloe lateritia</b>
	<b>Aloe macrosiphon</b>
	<b>Aloe myriacantha</b>
	<b>Aloe secundiflora</b>
	<b>Aloe secundiflora</b>
<b>Aloe volkensii</b>	
ROSACEAE	<b>Prunus africana</b>
ZAMIACEAE	<b>Encephalartos septentrionalis</b>

Note: There is a report by Gapusi and Mugunga (1997) which lists sixty different families of rare or threatened plant species in Rwanda, yet it needs to be updated and confirmed with scientists.

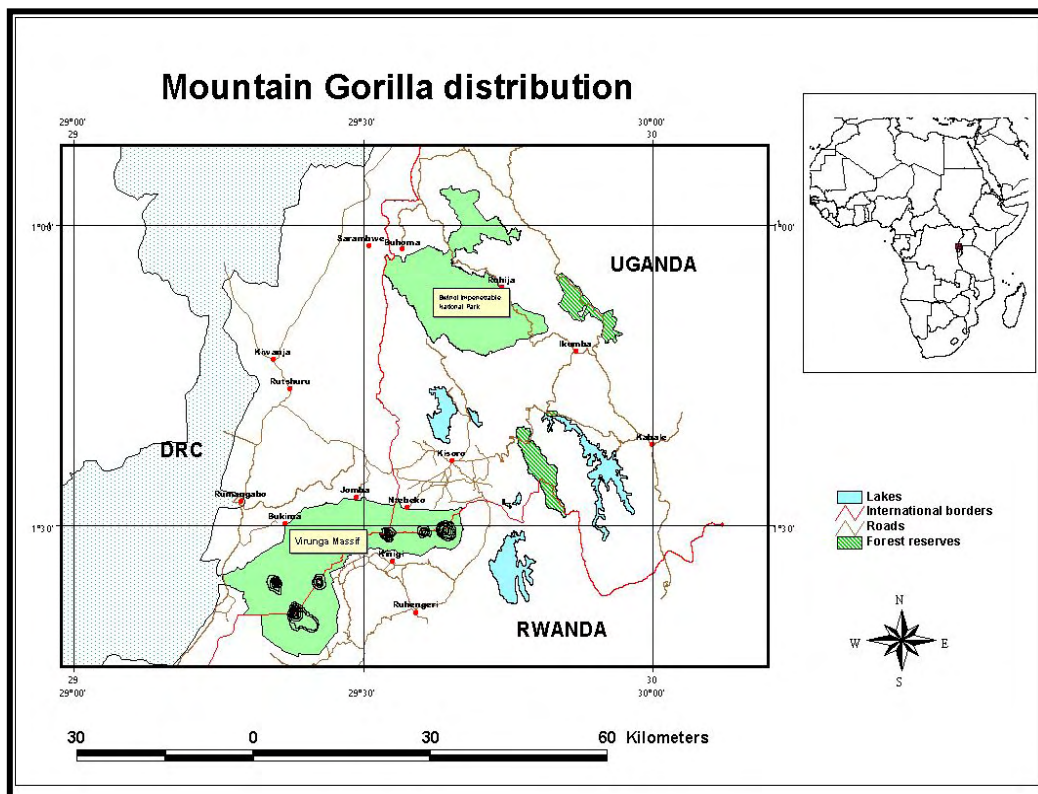
## **ANNEX I ADDITIONAL MAPS**

<b>Map</b>	<b>Map Title</b>
<i>Miscellaneous</i>	
<b>I-1</b>	<b>The location of protected areas in Rwanda</b>
<b>I-2</b>	<b>Distribution of mountain gorillas</b>
<b>I-3</b>	<b>Study area of the Rugezi wetland</b>
<b>I-4</b>	<b>Old administrative areas of Rwanda</b>
<i>Akagera National Park (ANP)</i>	
<b>I-5</b>	<b>Akagera National Park</b>
<b>I-6</b>	<b>Previous and current boundaries of Akagera National Park</b>
<i>Nyungwe National Park (NNP)</i>	
<b>I-7</b>	<b>Nyungwe Forest National Park and principal ORPTN stations</b>
<b>I-8</b>	<b>Location of Nyungwe National Park</b>
<b>I-9</b>	<b>Management zones in Nyungwe National Park</b>
<b>I-10</b>	<b>Nyungwe National Park administrative and buffer zones</b>
<b>I-11</b>	<b>Conservation priorities and sensitive areas in Nyungwe National Park</b>
<b>I-12</b>	<b>Endemic species richness in Nyungwe National Park</b>
<b>I-13</b>	<b>Human-caused degradation in Nyungwe National Park</b>
<b>I-14</b>	<b>Population pressure on Nyungwe National Park.</b>
<b>I-15</b>	<b>Uwinke trail network in Nyungwe National Park.</b>
<b>I-16</b>	<b>Distribution of chimpanzees in Nyungwe National Park</b>
<i>Volcano National Park (PNV)</i>	
<b>I-17</b>	<b>Protected areas of the Central Albertine Rift.</b>
<b>I-18</b>	<b>Volcano National Park and adjoining districts in Rwanda</b>
<b>I-19</b>	<b>Elevation contours in Volcano National Park</b>
<b>I-20</b>	<b>Animal distribution in PNV</b>
<b>I-21</b>	<b>Population density adjacent to PNV</b>
<b>I-22</b>	<b>Tourist sites outside PNV</b>
<b>I-23</b>	<b>Tourist zones inside the PNV</b>
<b>I-24</b>	<b>Areas vital to gorilla ecotourism</b>
<b>I-25</b>	<b>Illegal activities tracked in PNV, 2007</b>
<b>I-26</b>	<b>Home ranges of gorilla groups in PNV, 2007</b>
<b>I-27</b>	<b>Illegal activities in PNV relative to gorilla group ranges, 2007</b>
<b>I-28</b>	<b>ORTPN patrol coverage in PNV, 2007</b>

**Map I-1 The location of protected areas in Rwanda.**



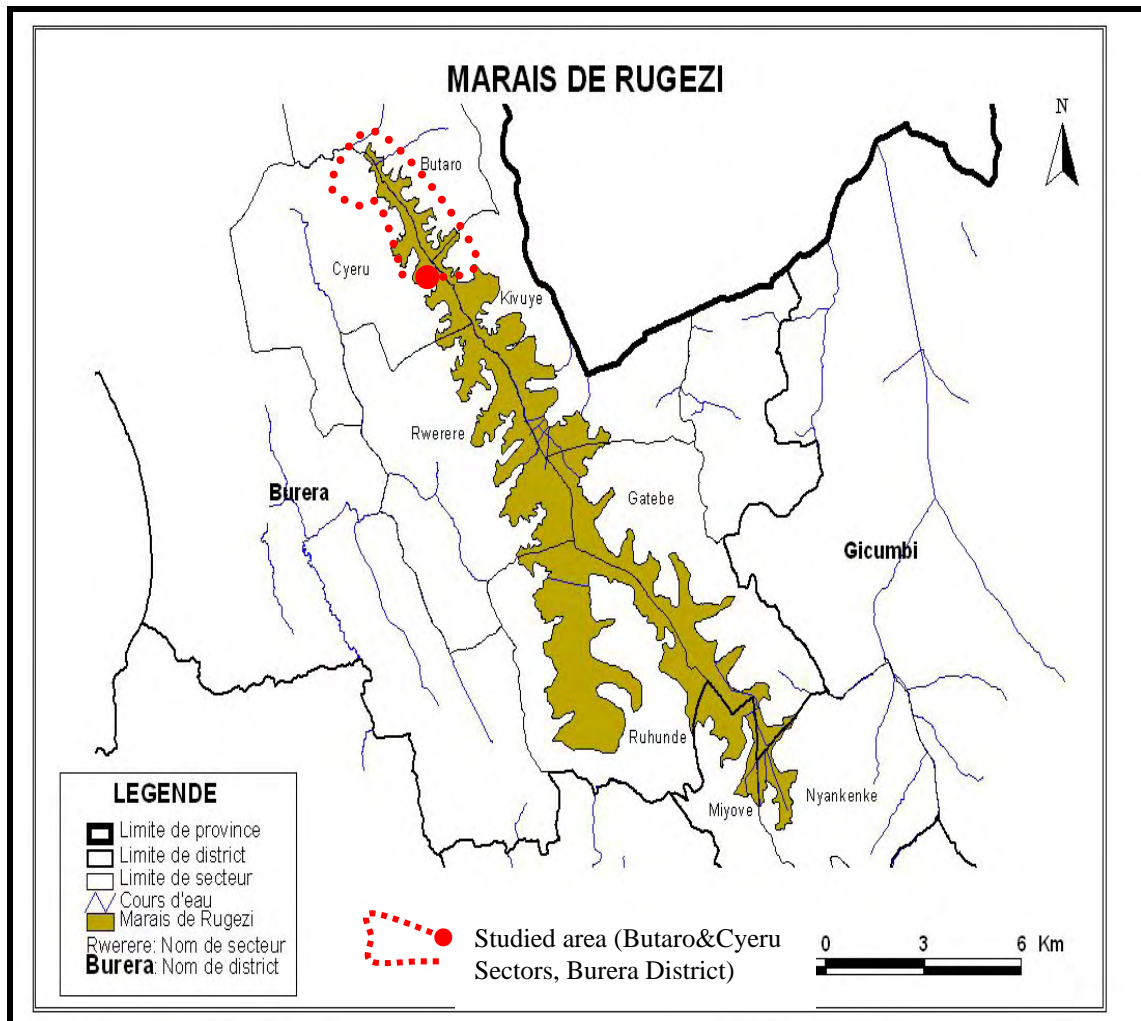
**Map I-2 Distribution of mountain gorillas.**



Source: Kayitare, 2008.



**Map I-3 Study area of the Rugezi wetland.**

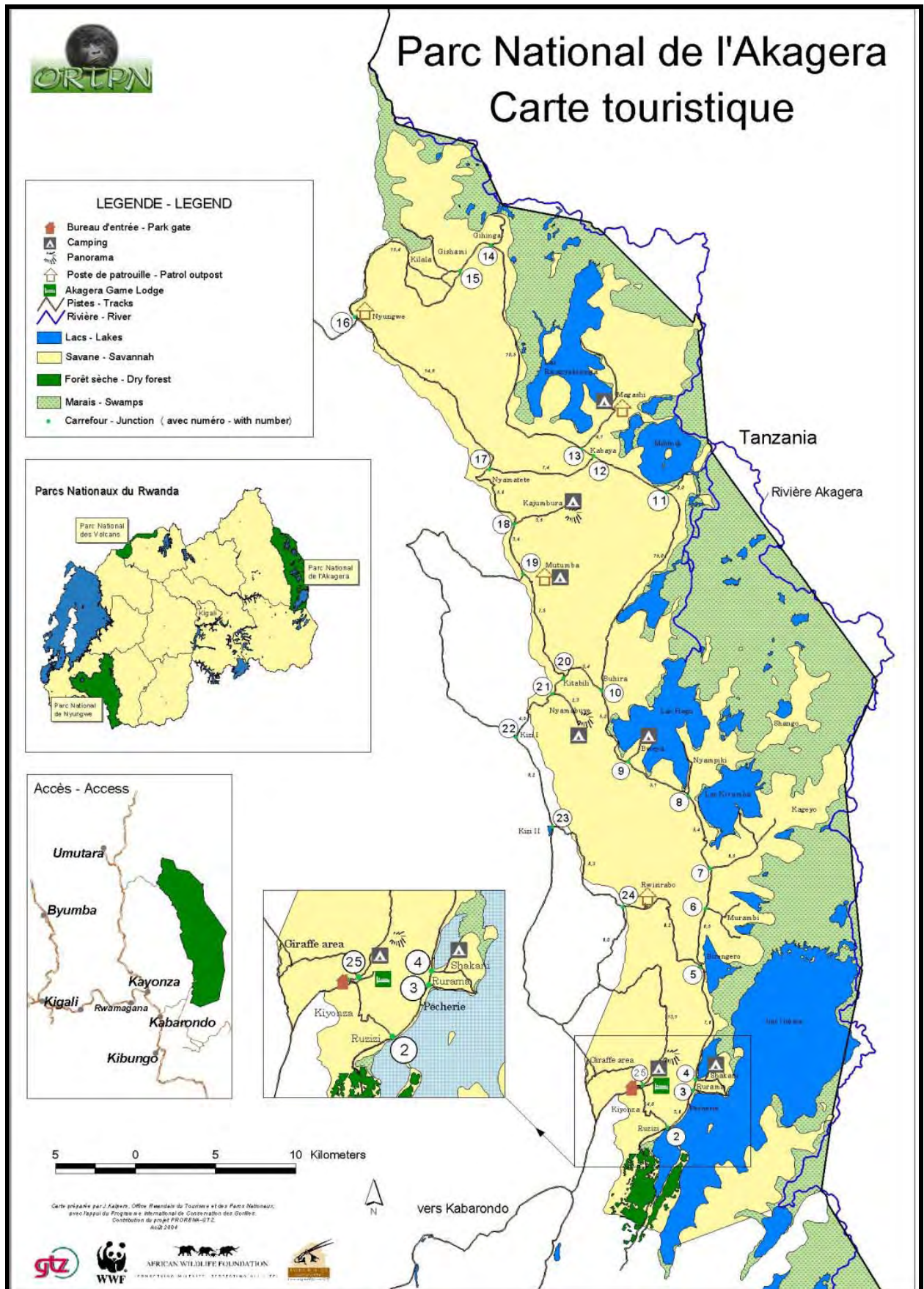


Source: Government of Rwanda, 2007a.

**Map I-4. Old administrative regions of Rwanda.**



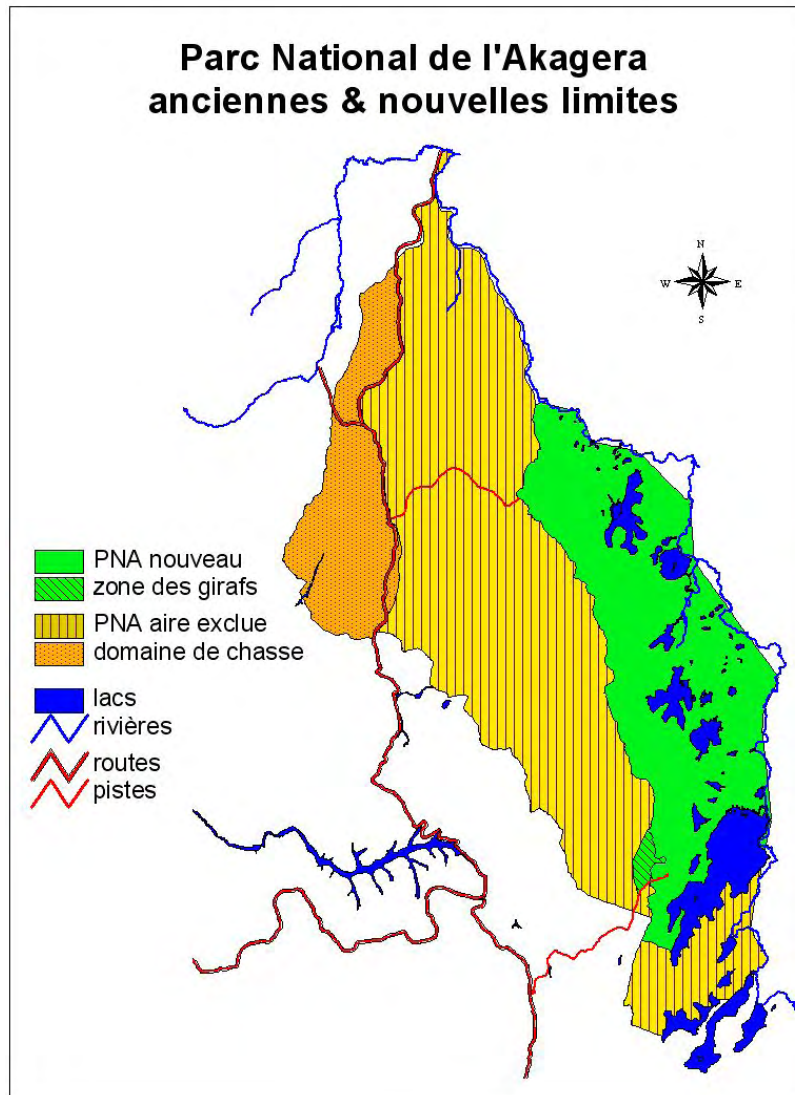
Map I-5. Akagera National Park.



Source: ORTPN, 2006.

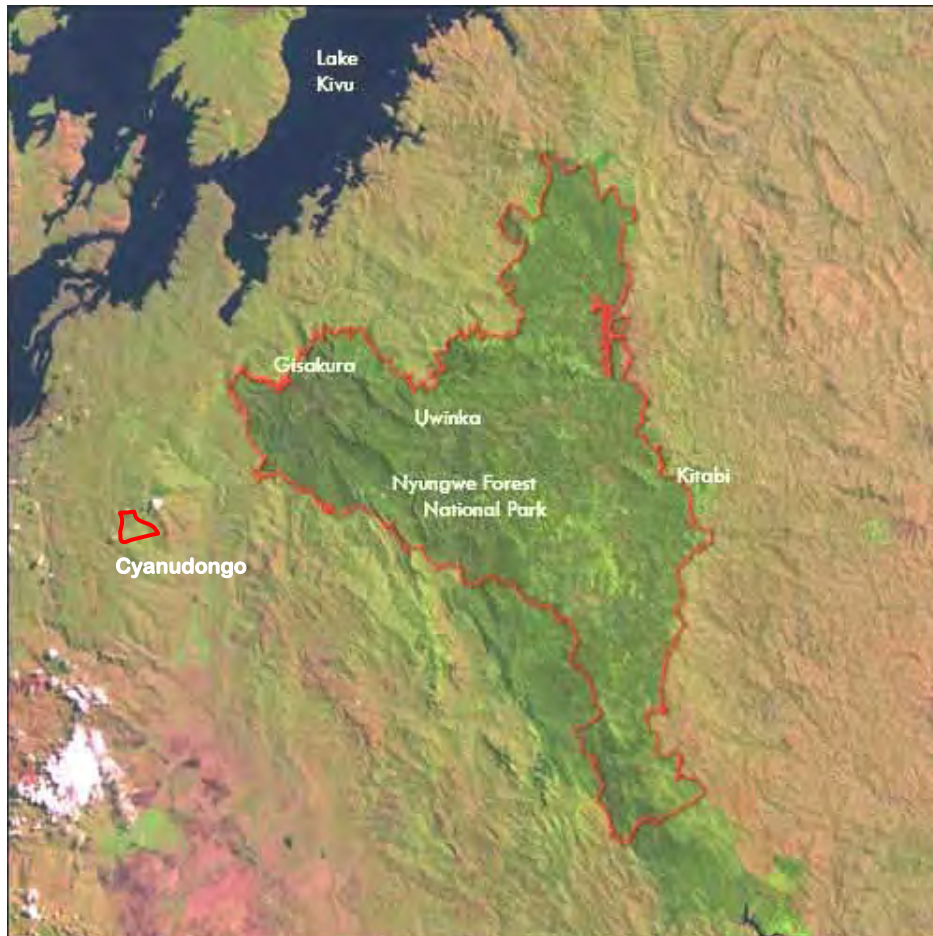


**Map I-6 Previous and current boundaries of Akagera National Park.**



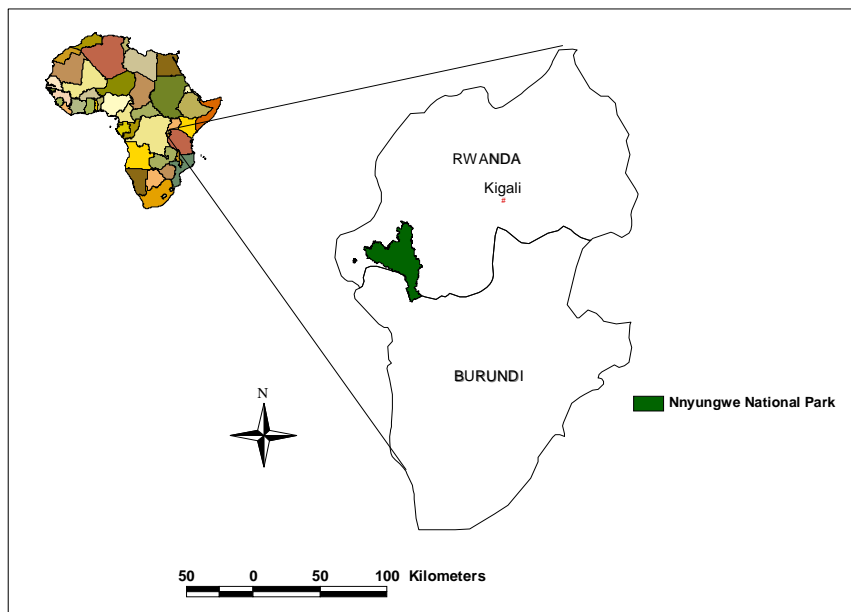
*Source: ORTPN, 2006.*

**Map I-7. Nyungwe Forest National Park and principal ORPTN stations.**



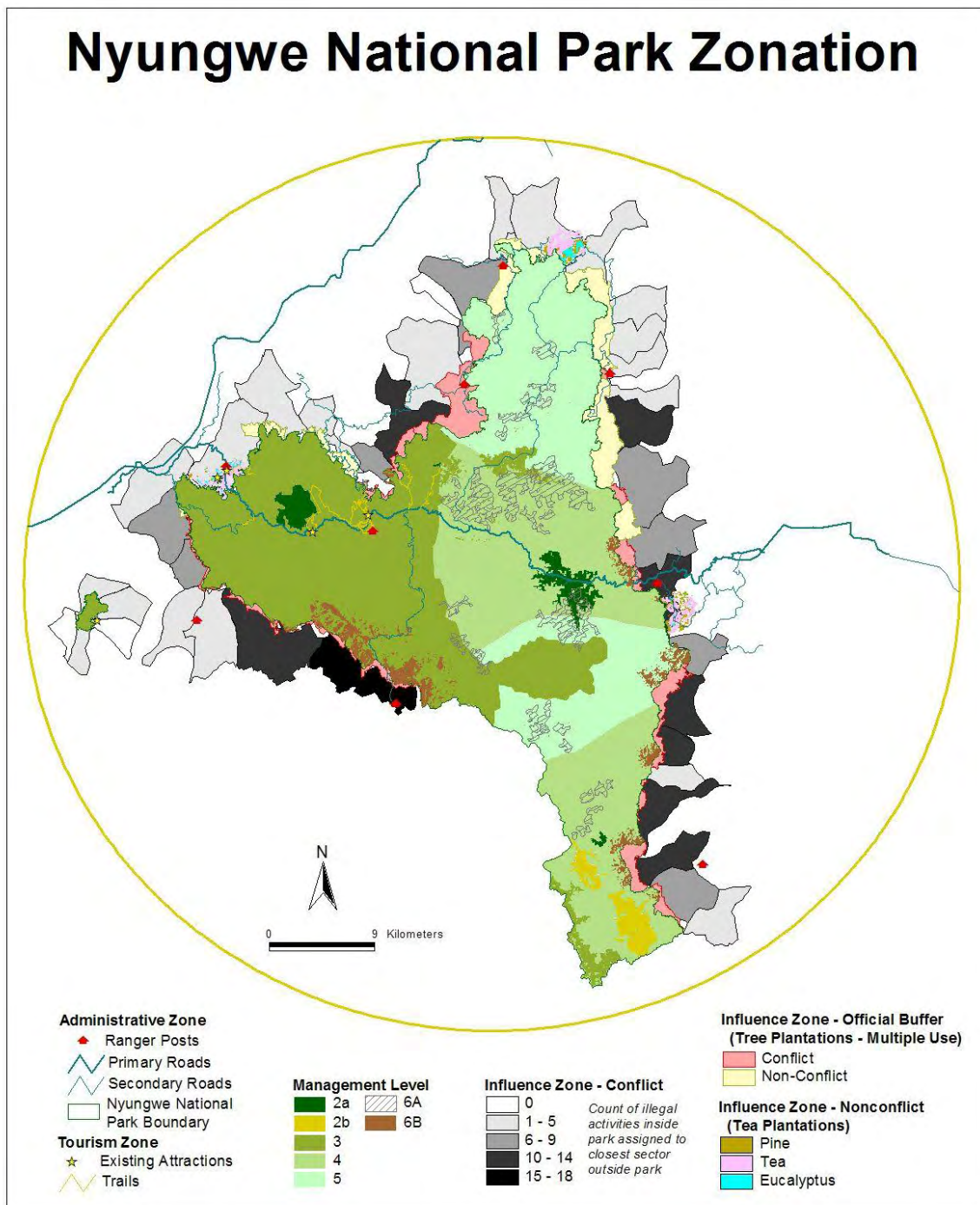
*Adapted from: NASA Earth Observation Data satellite imagery*

**Map I-8 Location of Nyungwe National Park**



*Source:IRG, Ltd., 2008.*

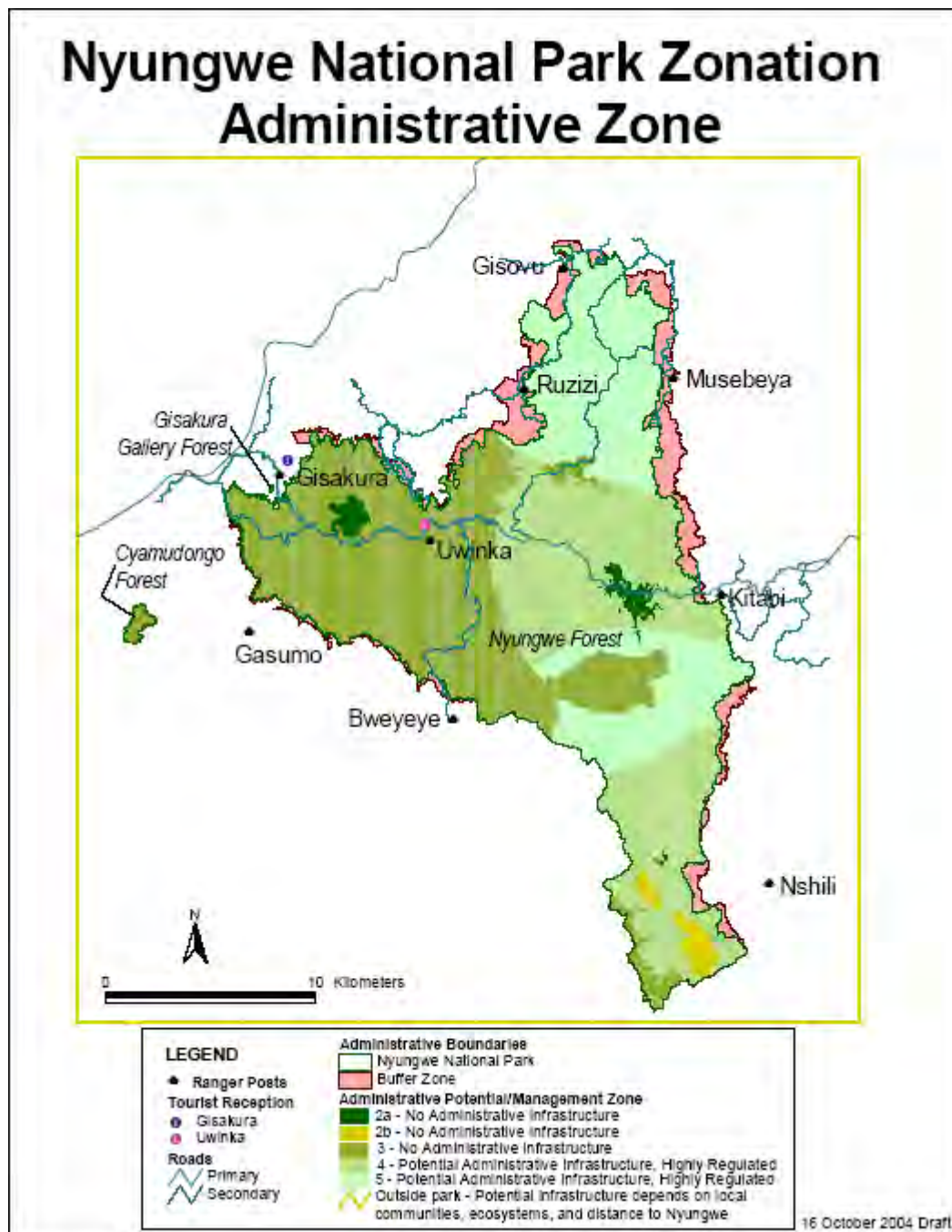
Map I-9 Management zones in Nyungwe National Park.



Source: ORPTN, 2005.

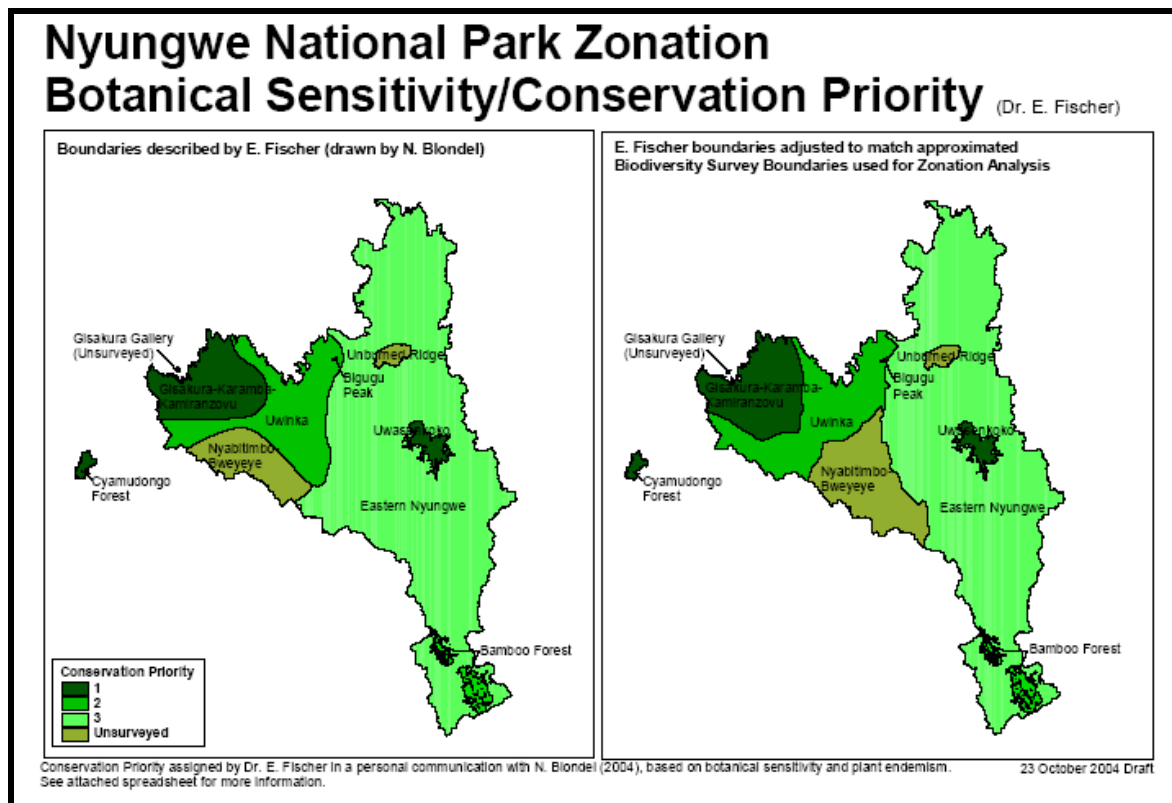


Map I-10 Nyungwe National Park administrative and buffer zones.



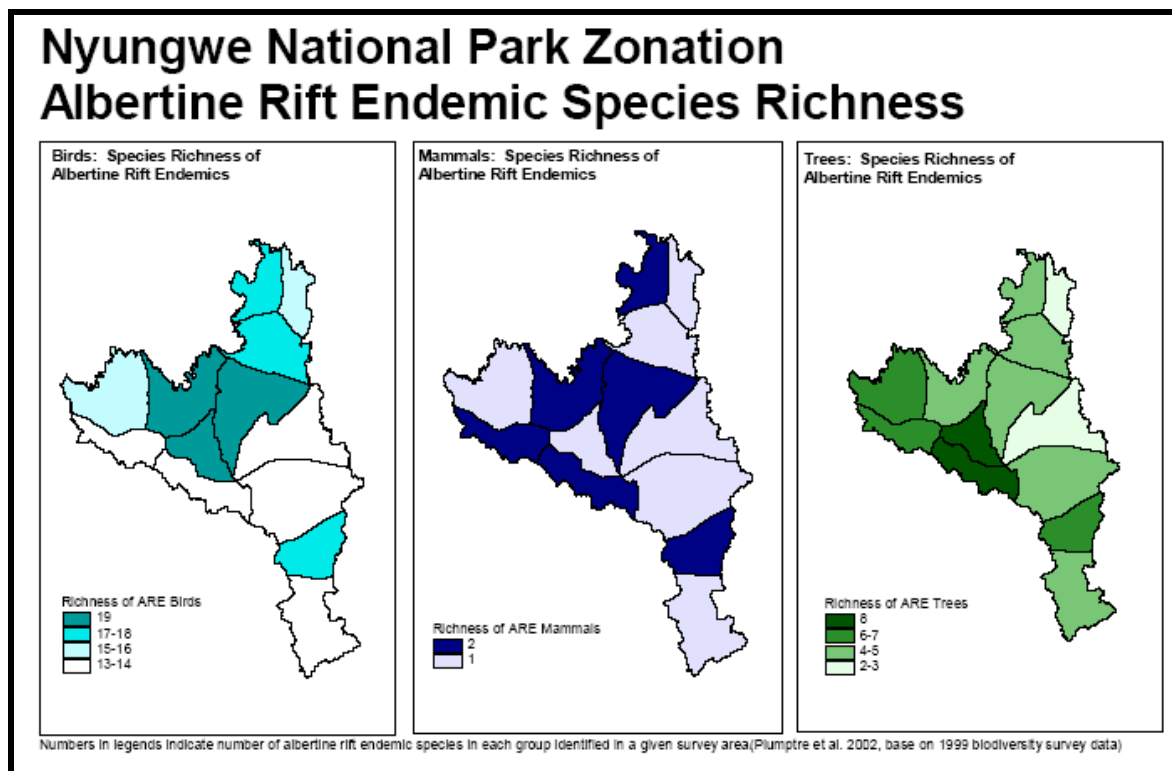
Source: ORPTN, 2005.

Map I-11 Conservation priorities and sensitive areas in Nyungwe National Park.



Source: ORPTN, 2005.

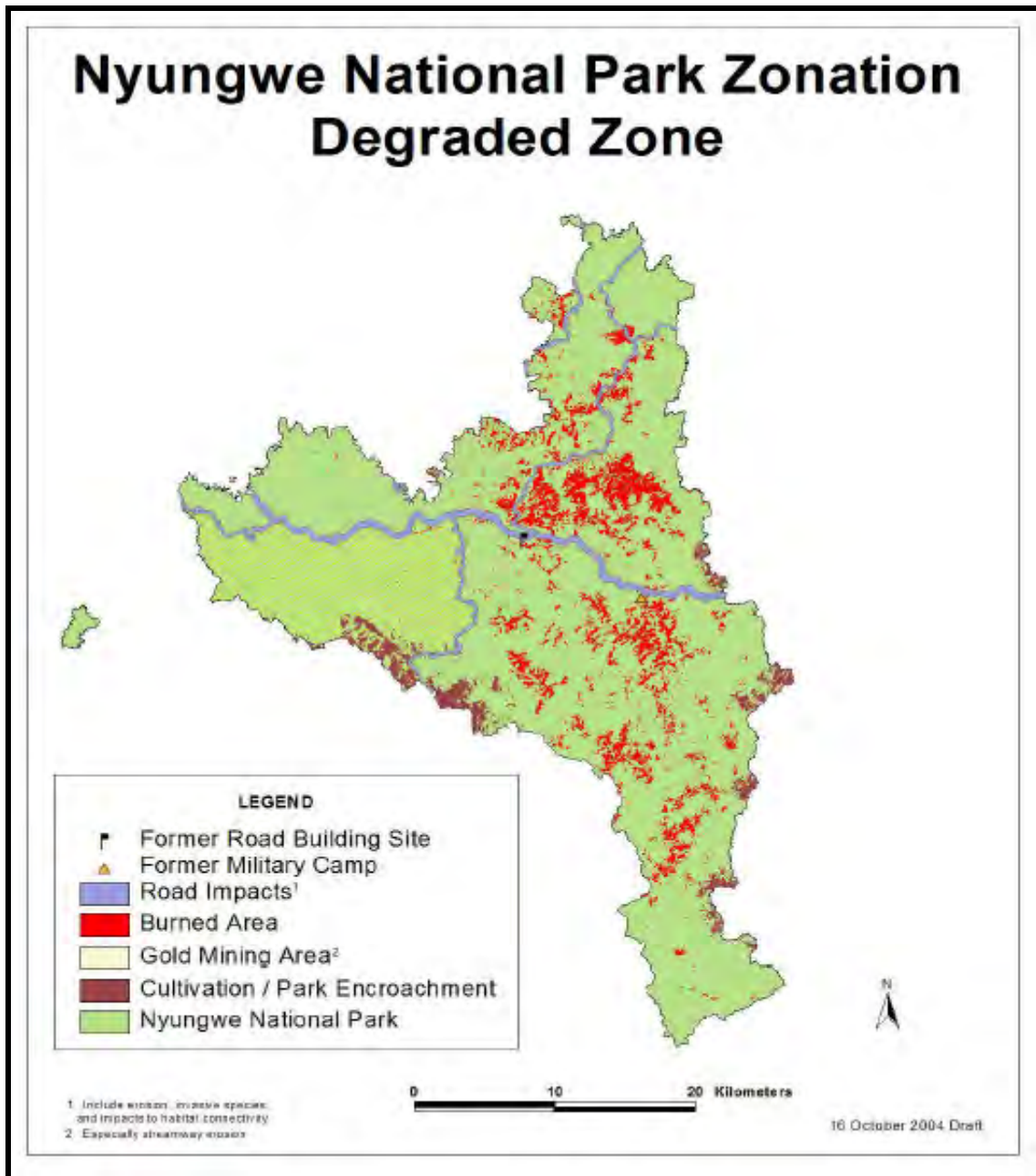
Map I-12 Endemic species richness in Nyungwe National Park



Source: ORPTN, 2005.

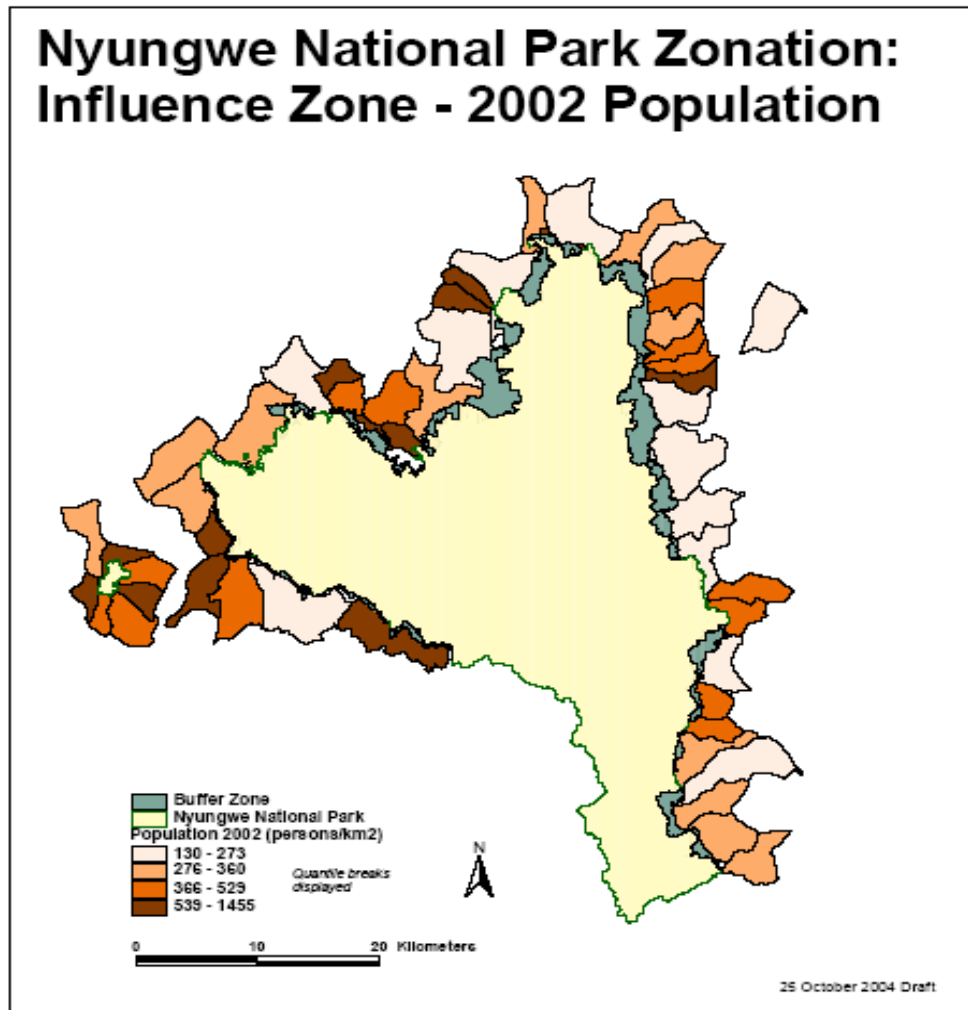


Map I-13 Human-caused degradation in Nyungwe National Park.



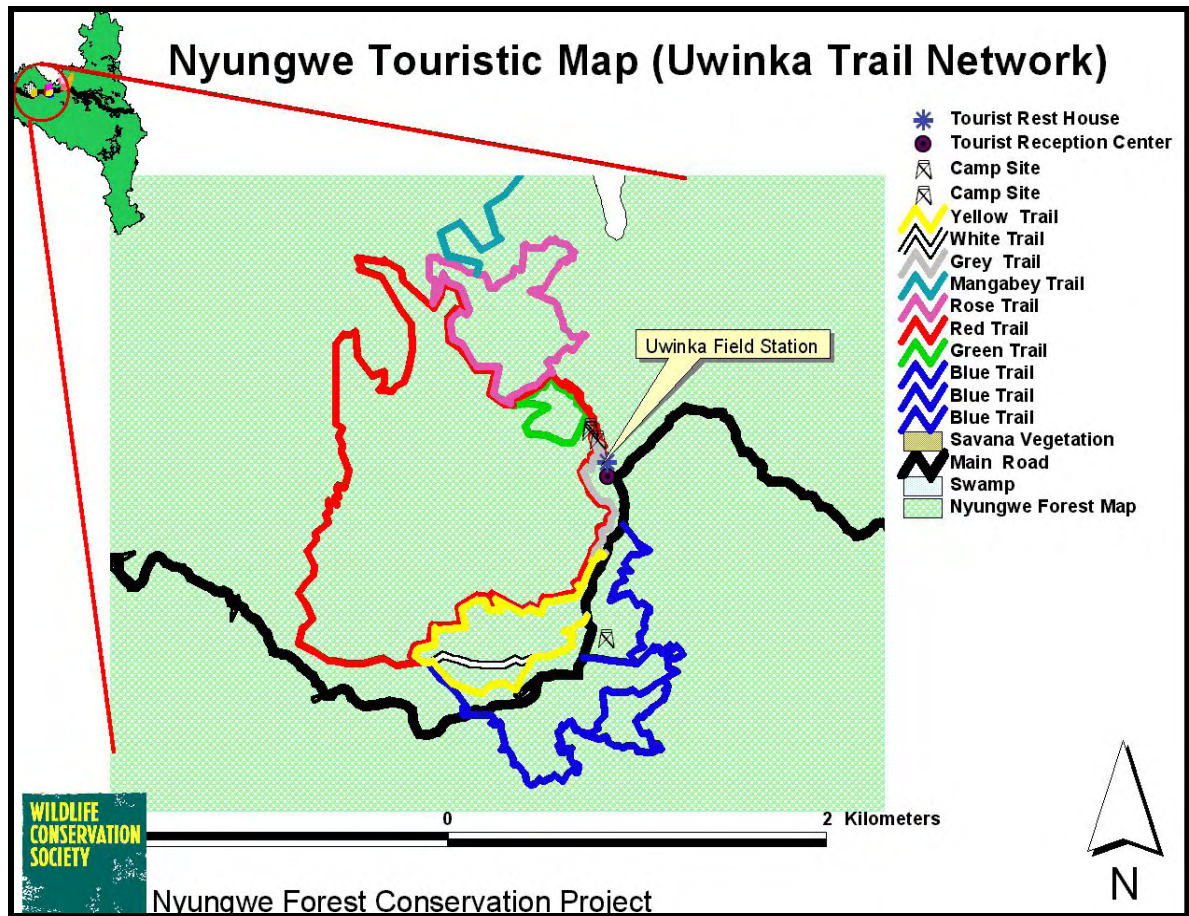
Source: ORPTN, 2005.

Map I-14 Population pressure on Nyungwe National Park.



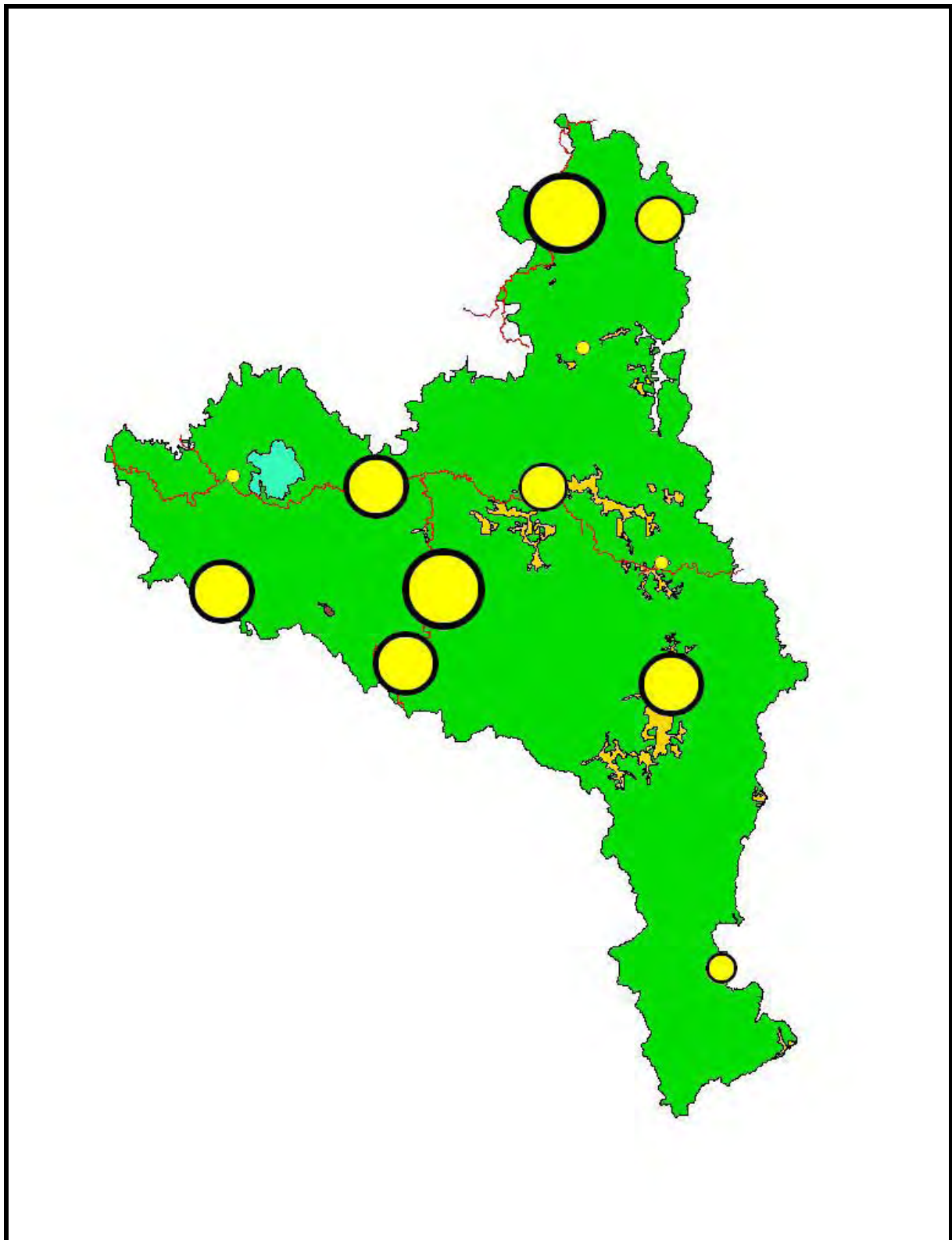
Source: ORPTN, 2005.

Map I-15 Uwinke trail network in Nyungwe National Park.



Source: ORPTN, 2005.

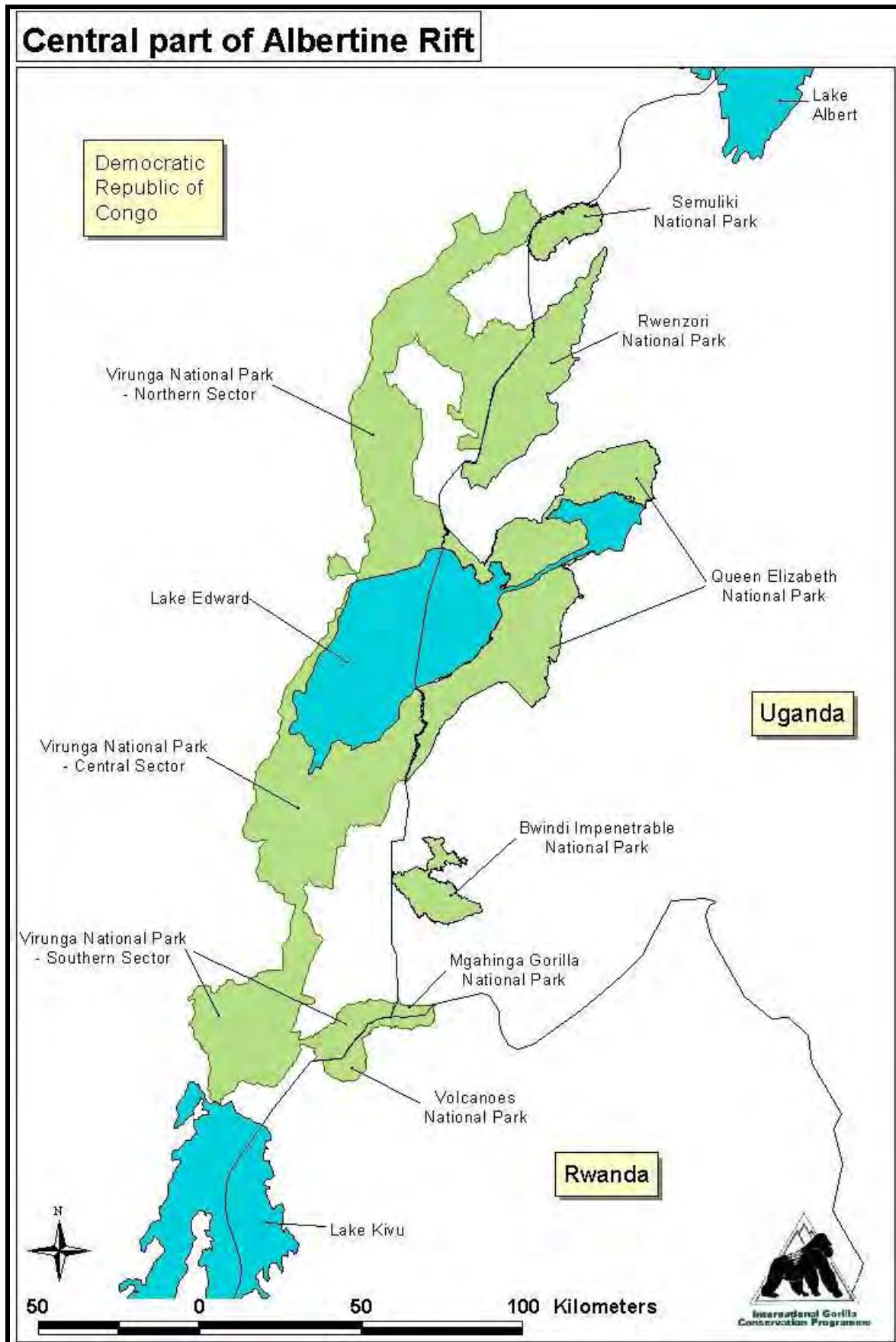
**Map I-16 Distribution of chimpanzees in Nyungwe National Park. (The larger the circle, the higher the population density.)**



*Source:* Government of Rwanda, 2003.

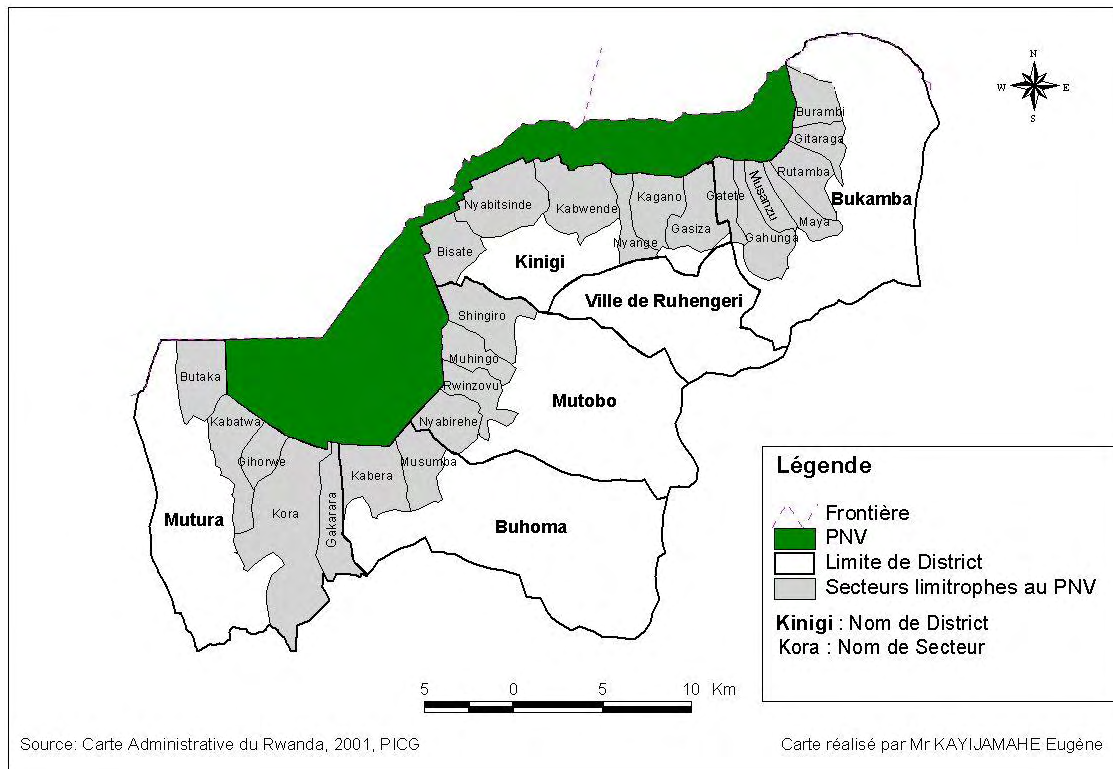


Map I-17 Protected areas of the Central Albertine Rift.



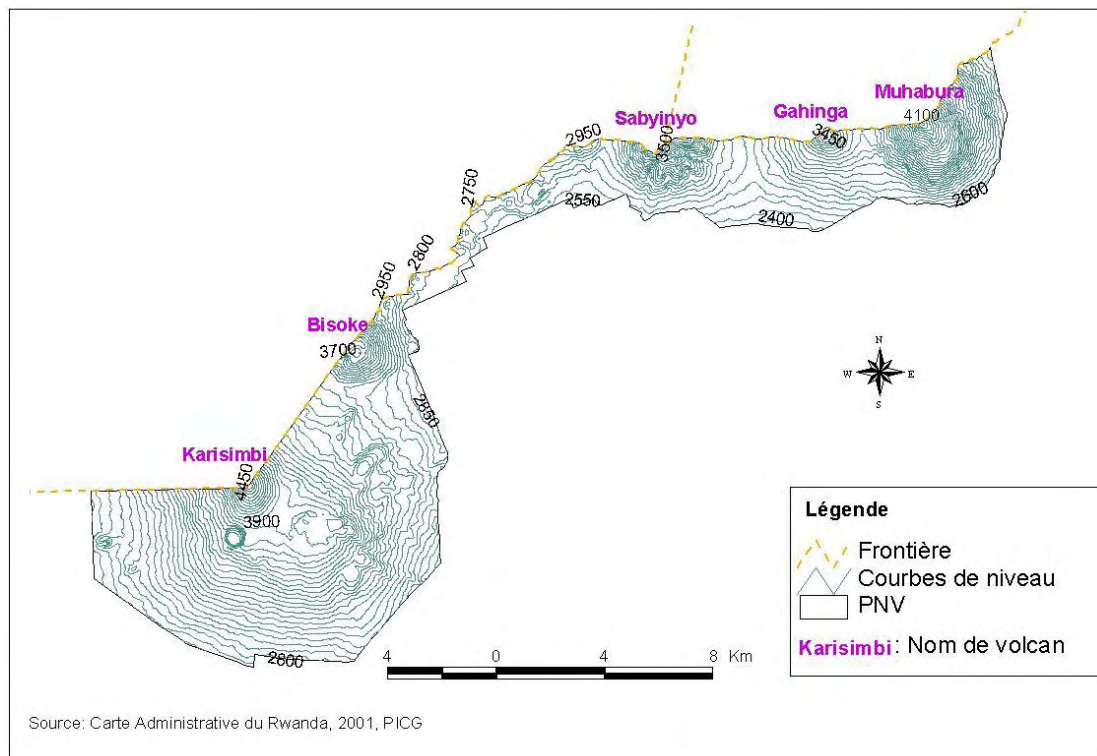
Source: IGCP, 2006.

**Map I-18 Volcano National Park and adjoining districts in Rwanda**



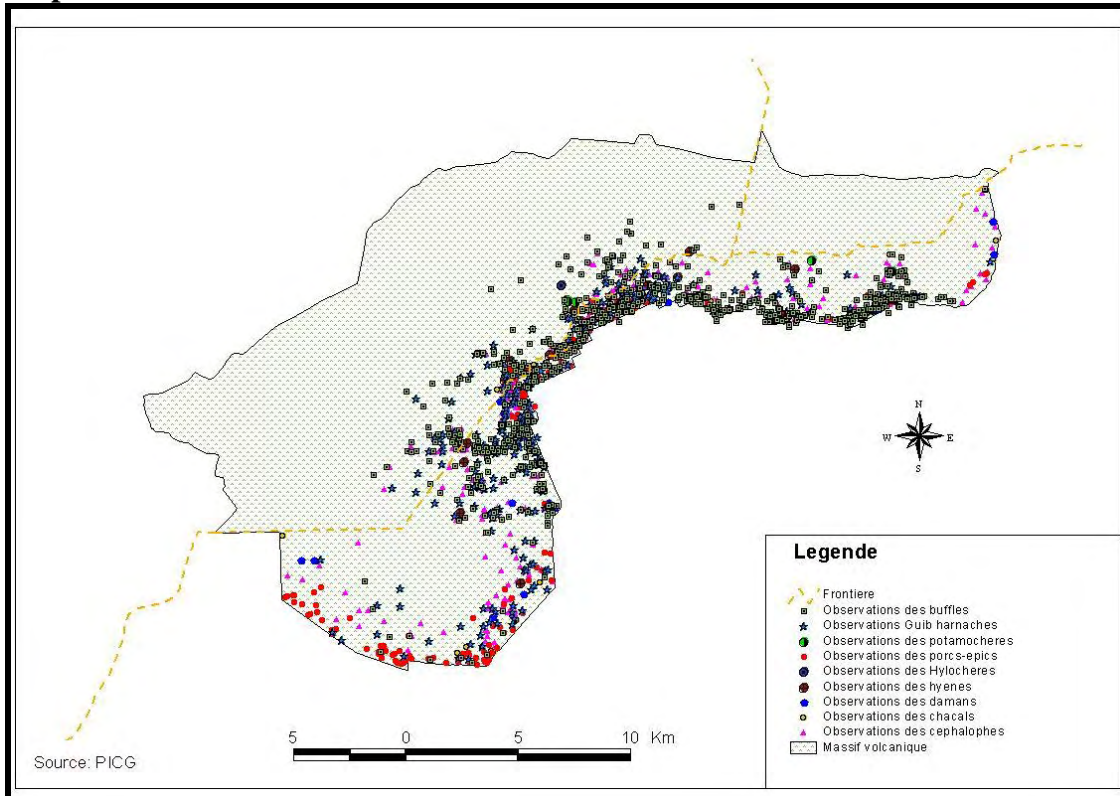
Source: Rwanyiziri and Kayijamahe, 2005.

**Map I-19 Elevation contours in Volcano National Park.**



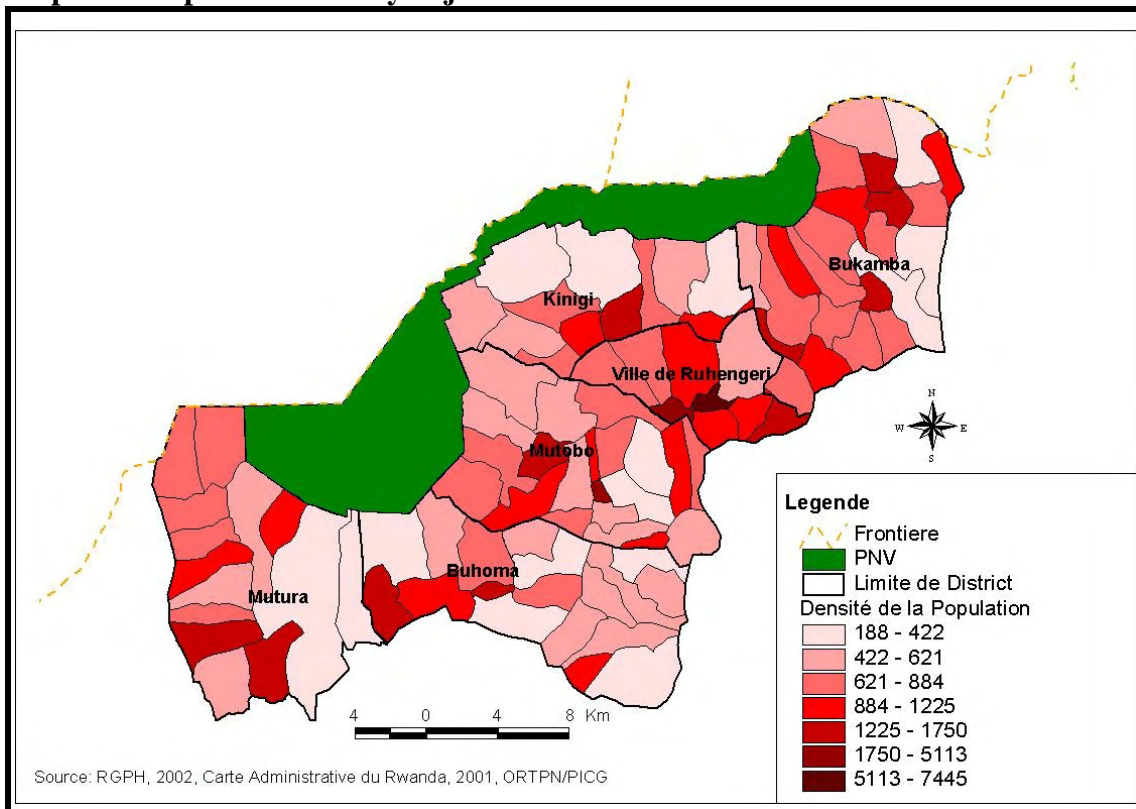
Source: Rwanyiziri and Kayijamahe, 2005.

**Map I-20 Animal distribution on PNV**



Source: Rwanyiziri and Kayijamahe, 2005.

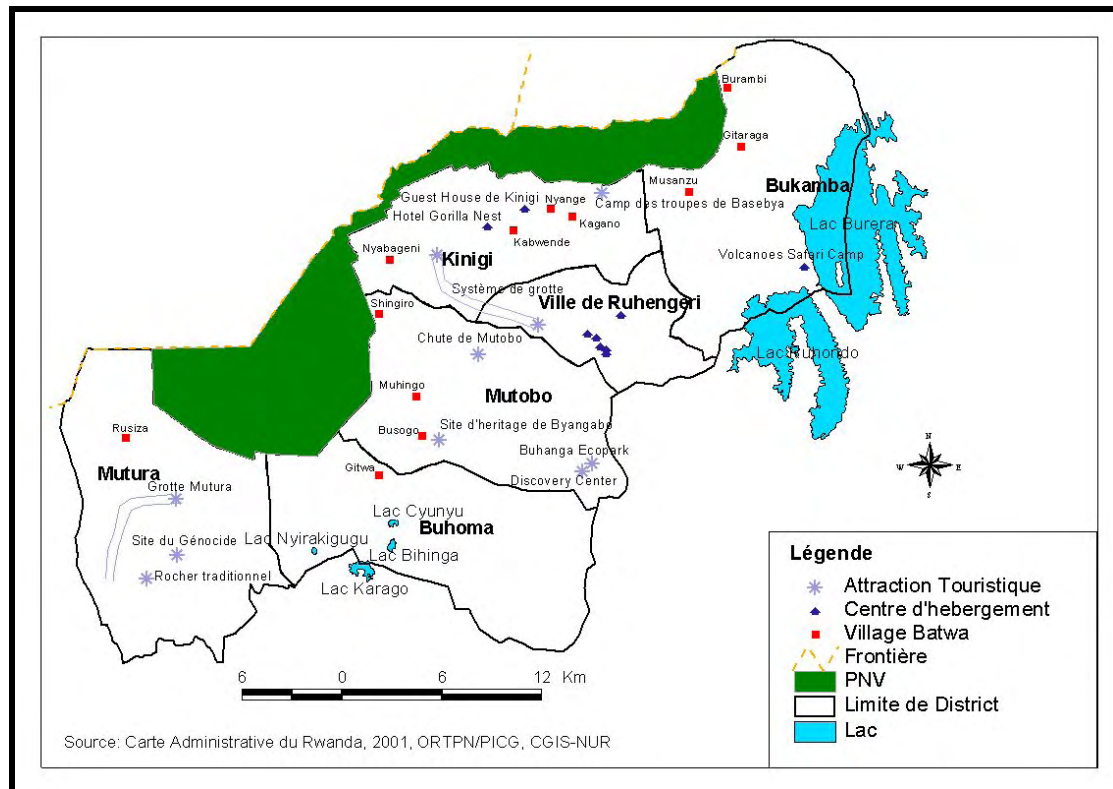
**Map I-21 Population density adjacent to PNV.**



Source: Rwanyiziri and Kayijamahe, 2005.

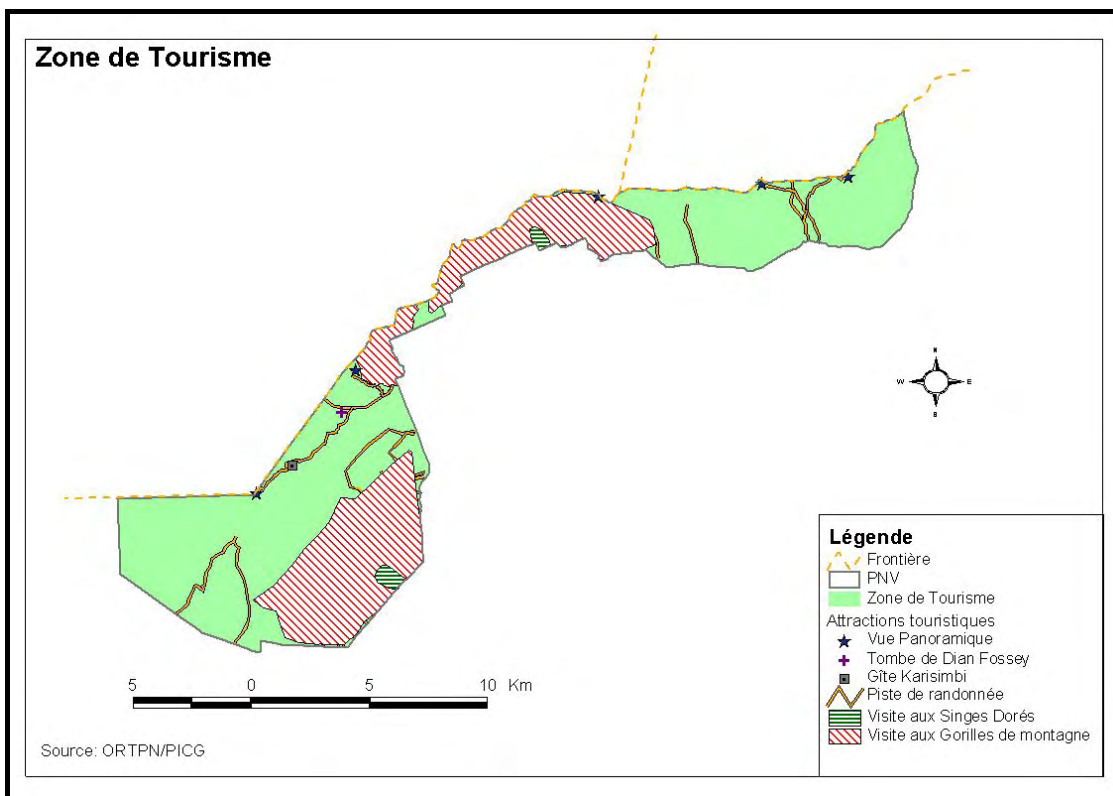


**Map I-22 Tourist sites outside PNV.**



**Source: Rwanyiziri and Kayijamahe, 2005.**

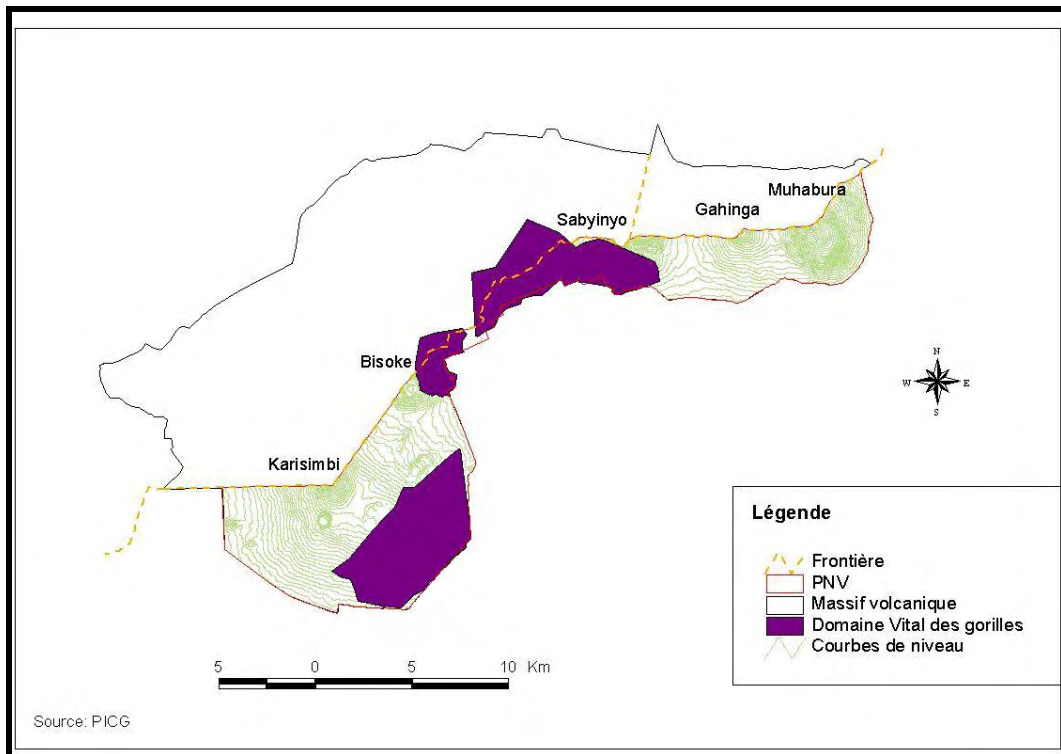
**Map I-23 Tourist zones inside PNV.**



**Source: Rwanyiziri and Kayijamahe, 2005.**

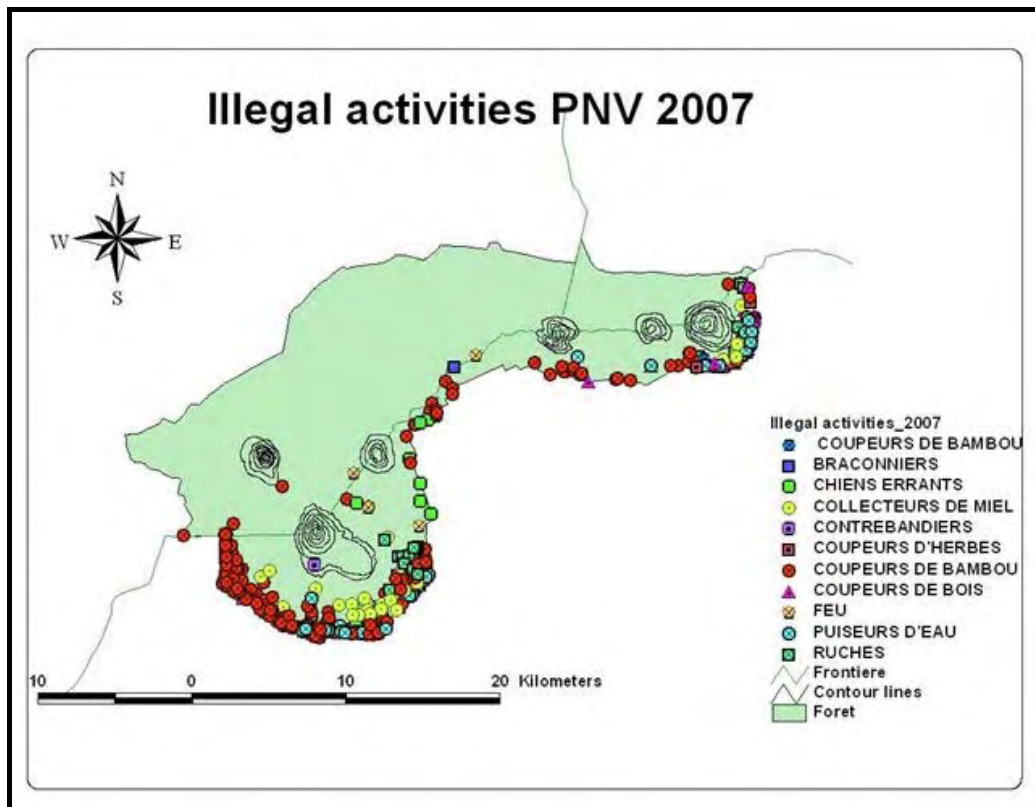


**Map I-24 Areas vital to gorilla ecotourism.**



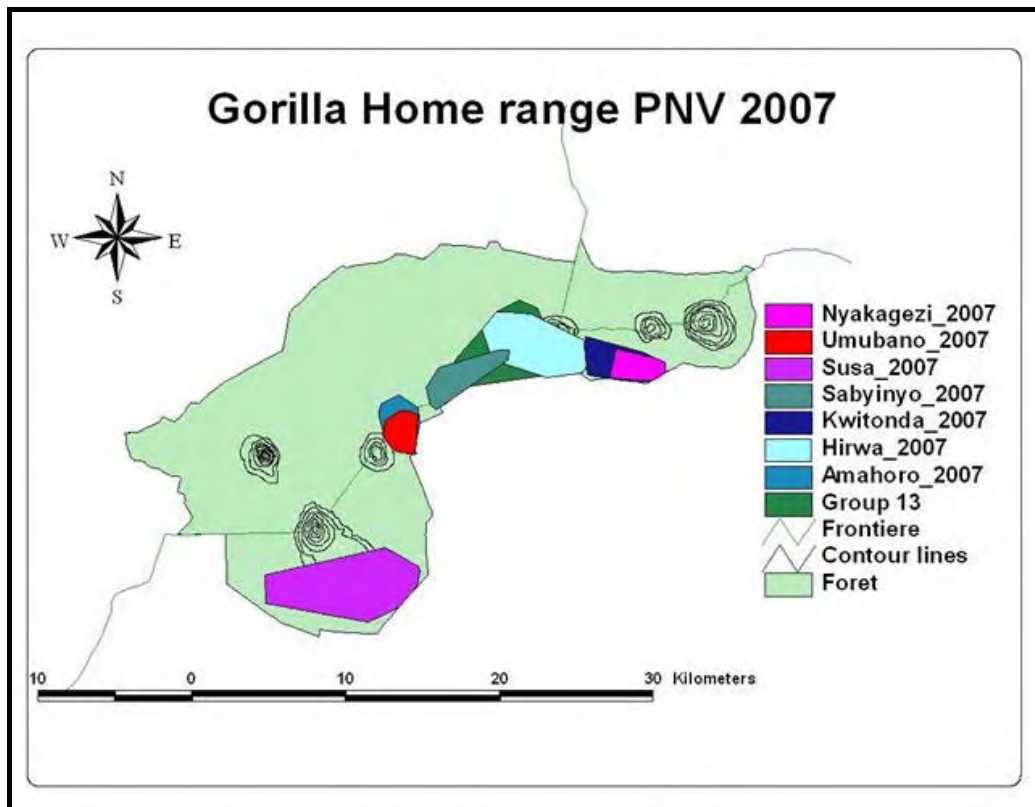
Source: Rwanyiziri and Kayijamahe, 2005.

**Map I-25 Illegal activities tracked in PNV, 2007.**



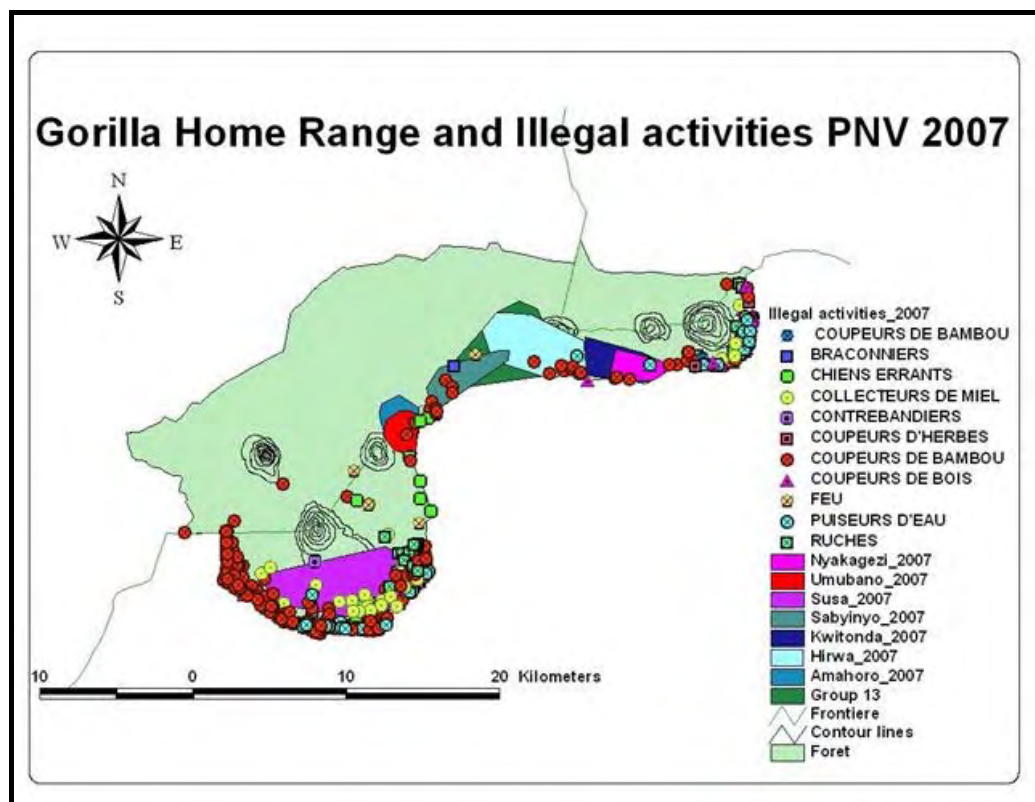
Source: ORTPN, 2008.

Map I-26 Home ranges of gorilla groups in PNV, 2007.



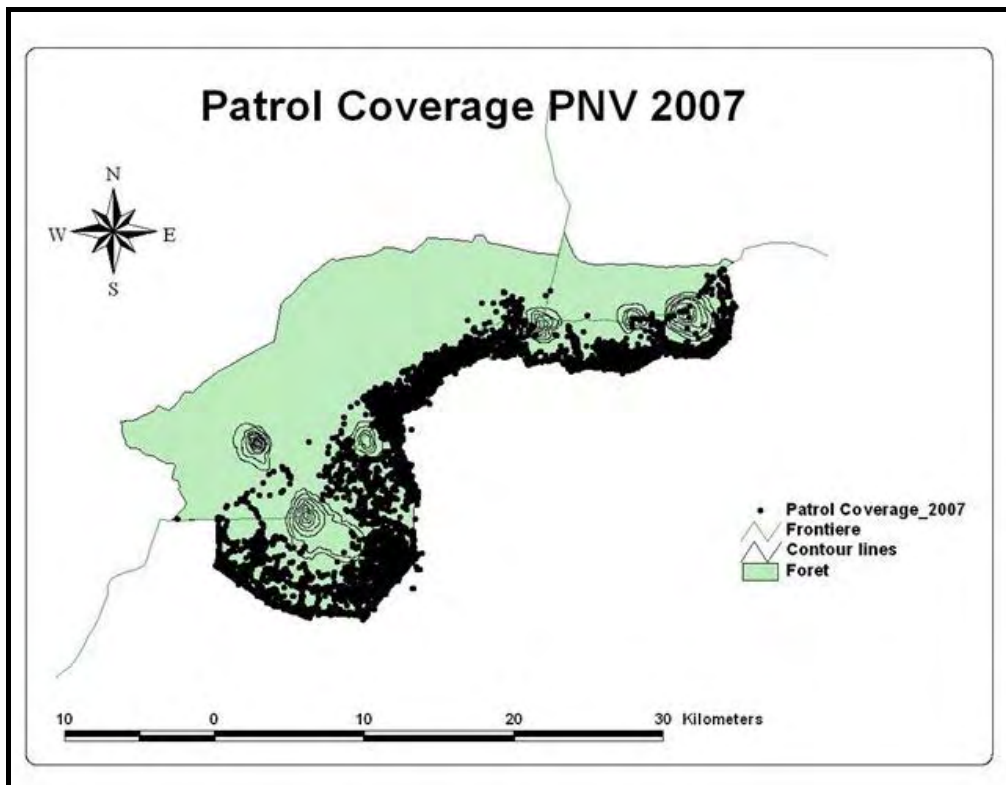
Source: ORTPN, 2008.

Map I-27 Illegal activities in PNV relative to gorilla group ranges, 2007.



Source: ORTPN, 2008.

Map I-28 ORTPN patrol coverage in PNV, 2007.



Source: ORTPN, 2008.