AFRICA: Atlas of our Changing Environment

As the age-old adages say, "A picture is worth a thousand words" and "Seeing is believing", this stunning 400-page "Africa: Atlas of our Changing Environment" is a unique and powerful publication which brings to light stories of environmental change at more than 100 locations spread across every country in Africa. There are more than 500 satellite images, 300 ground photographs and 150 maps, along with informative graphs and charts that give a vivid visual portrayal of Africa and its changing environment. Using current and historical satellite images, the Atlas provides scientific evidence of the impact that natural and human activities have had on the continent's environment over the past several decades. The observations and measurements of environmental change illustrated in this Atlas help gauge the extent of progress made by African countries towards reaching the United Nation's Millennium Development Goals. More importantly, this book contributes to the knowledge and understanding that are essential for adaptation and remediation. This UNEP publication should be of immense value to all those who want to know more about Africa and who care about the future of this continent.

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ATLAS OF OUR CHANGING ENVIRONMENT

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What policy relevant questions being addressed

- What is the status and trend of the environment in Africa?
- What are the transboundary issues needing international cooperation?
- What are important environmental issues in each Country?
- What progress have countries made towards Environmental Sustainability?
- What is the "scientific evidence" of significant local environmental?
- Can we provide early warning of the places with emerging issues?
- What are some interesting facts and figures about African countries?

A new bride, Ethiopia

Chapter 1

Africa—The Continent

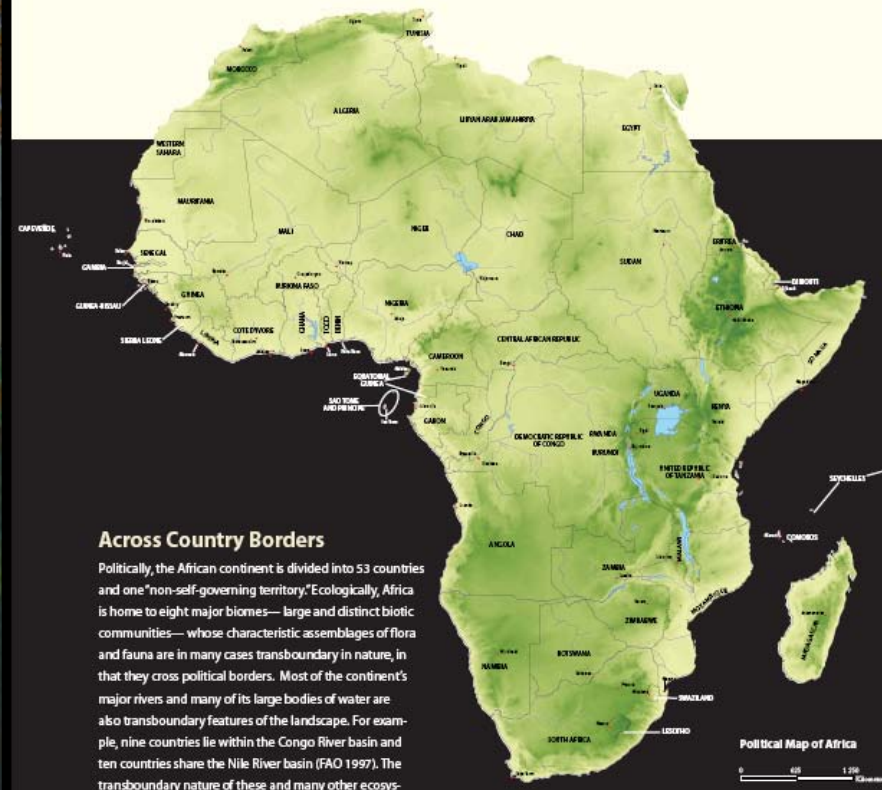
Introducing Africa

A starting point for understanding any region of the world is to gain a sense of its geography. On a continental scale, Africa accounts for one-fifth of Earth's total land area. Widely regarded as the site where the human race originated, Africa currently is home to more than 920 million people. The continent's population has undergone great change over time. That changing population has, in turn, altered African landscapes and ecosystems. While environmental change is not new to Africa, the pace of change has accelerated, as it has in many other parts of the world. Examining specific examples of change in Africa can help shed light on both the causes of change and possible solutions to the problems that change can engender. Earth observations, particularly those made using the tools of satellite remote sensing, are essential to such an endeavour.

Chapter 1, an overview of the continent

Chapter 2

Transboundary Environmental Issues



Across Country Borders

Politically, the African continent is divided into 53 countries and one "non-self-governing territory." Ecologically, Africa is home to eight major biomes— large and distinct biotic communities— whose characteristic assemblages of flora and fauna are in many cases transboundary in nature, in that they cross political borders. Most of the continent's major rivers and many of its large bodies of water are also transboundary features of the landscape. For example, nine countries lie within the Congo River basin and ten countries share the Nile River basin (FAO 1997). The transboundary nature of these and many other ecosystems, together with the natural resources they contain, is the source of diverse environmental issues and presents unique management challenges throughout Africa and, in some cases, beyond the continent itself.

Chapter 2, a look at transboundary issues.

Chapter 3

Tracking Progress Towards Environmental Sustainability

United Nations Millennium Development Goals

The Millennium Declaration

In September 2000 147 heads of State and Government, and 189 nations in total, in the United Nations Millennium Declaration committed themselves to making the right to development a reality for everyone and to freeing the entire human race from want. They acknowledged that progress is based on sustainable economic growth, which must focus on the poor, with human rights at the centre. The objective of the Declaration is to promote "a comprehensive approach and a coordinated strategy, tackling many problems simultaneously across a broad front."

The Declaration calls for halving by the year 2015, the number of people who live on less than one dollar a day. This effort also involves finding solutions to hunger, malnutrition and disease, promoting gender equality and the empowerment of women, guaranteeing a basic education for everyone, and supporting the Agenda 21 principles of sustainable development. Direct support from the richer countries, in the form of aid, trade, debt relief and investment is to be provided to help the developing countries.

Millennium Development Goal Seven: Ensure Environmental Sustainability

Chapter 3, Tracking progress towards environmental sustainability

Republic of Ghana

Total Surface Area: 238 553 km²
Estimated Population in 2006: 22 556 000

Ghana is relatively well-endowed with natural resources, including fertile soils, forests, and mineral deposits of gold, diamonds, manganese, and bauxite. The climate is generally tropical and warm, with aridity increasing from south to north. Occupying central Ghana, the Volta River Basin drains nearly half of the country. While the coastal zone represents only 6.5 per cent of the total land area, it supports one-quarter of the population and most of the country's industries (Amlalo 2006).

Important Environmental Issues

- Deforestation
- Land Degradation and Coastal Erosion
- Overfishing and Reduced Water Volume in Lake Volta

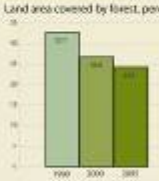
Progress Towards Environmental Sustainability

As defined by the United Nations Millennium Development Goal 7 Indicators

In less than 50 years, Ghana's primary rain forest has been reduced by 90 per cent, and between 1990 and 2005, the country lost 26 per cent of its forest cover. Overgrazing, heavy logging, overcutting of fi rewood, and mining have all taken a toll on forests and woodlands. About one-third of the land area is threatened by desertifi cation, caused mainly by slash-and-burn agriculture and overcultivation of cleared land, resulting in widespread soil erosion and degradation.

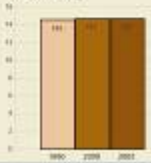
★ Indicates progress

Land area covered by forest, percentage

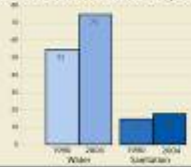


Carbon dioxide (CO_2) emissions, metric tonnes per capita

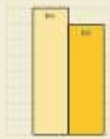
Protected area to total surface area, percentage



Proportion of total population using improved drinking water sources and sanitation facilities, percentage



Slum population as percentage of urban



The closing of Akosombo Dam in the early 1960s flooded four per cent of Ghana's land and created the largest reservoir in the world by surface area, Lake Volta.

Deforestation

Ghana is the world's second-largest producer of cocoa beans (FAO 2007), and large tracts of tropical forest have been cleared to support increasing cocoa cultivation. When world cocoa prices are low, Ghana's foreign exchange earnings are signifi cantly affected; this is often compensated for by increasing timber and mineral exports. Thus, cocoa farming is both a direct and indirect driver of deforestation.

Ghana has one of the highest deforestation rates in Africa at—two per cent annually (UN 2007). Timber harvesting and slash-and-burn agriculture are the greatest threats, but wildfi res, mining, and rising demand for fuelwood are also important contributors.

Cocoa Production, Area Harvested

Land Degradation and Coastal Erosion

Despite relatively fl at topography, nearly three-quarters of Ghana suffers from sheet and gully erosion (FAO 2005), and one-third of its land is affected by desertifi cation (UNCCD 2002). Lowered water tables, siltation of rivers, and increased flooding are evidence of increasing aridity. Rapid deforestation and poor cultivation practices are largely responsible, although occasional droughts and wildfires intensify the problem. Furthermore, mining is a signifi cant source of localised land degradation; the use of cyanide and other poisonous chemicals has contaminated surface and groundwater resources and rendered much land unusable for agriculture or forestry. Although most mining is controlled by international corporations, small-scale, illegal mining is pervasive.

On the coast, land degradation is a consequence of the heavy concentration of people and industries. Overexploitation of mangroves and rapid development are driving coastal erosion at an average rate of two to three metres per year (ACOPS n.d.).

Overfishing and Reduced Water Volume in Lake Volta

In the mid-1960s, the Akosombo Dam was constructed on the Volta River creating Lake Volta, one of the largest artifi cial water bodies in the world. With roughly 140 identifi ed fish species, Lake Volta is the site of the most important inland fi shery in Ghana. However, the maximum sustainable yield has been exceeded annually since 1995, causing fi sh catch to stagnate (FAO 2000-2007). Furthermore, the lake's water volume recently dropped to record low levels, affecting the dam's electricity-generating capacity. This is likely both a consequence of natural factors such as climate variability as well has human-induced problems such as soil erosion.

Freshwater Fisheries Production

Republic of Ghana

Forest Reserves Under Pressure in Ghana

In the 1973 image the vegetation inside and outside the protected areas appear green and robust

Mines (yellow arrow) pose a serious threat to Ghana's remaining forests

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Republic of Ghana

Gold Mining in Wassa West District

The mines in Wassa West have been kept out of the forest reserves, which can be seen as dark green areas with clear straight boundaries

The 2002 image shows that the footprints of mining operations in the district have grown dramatically since 1986

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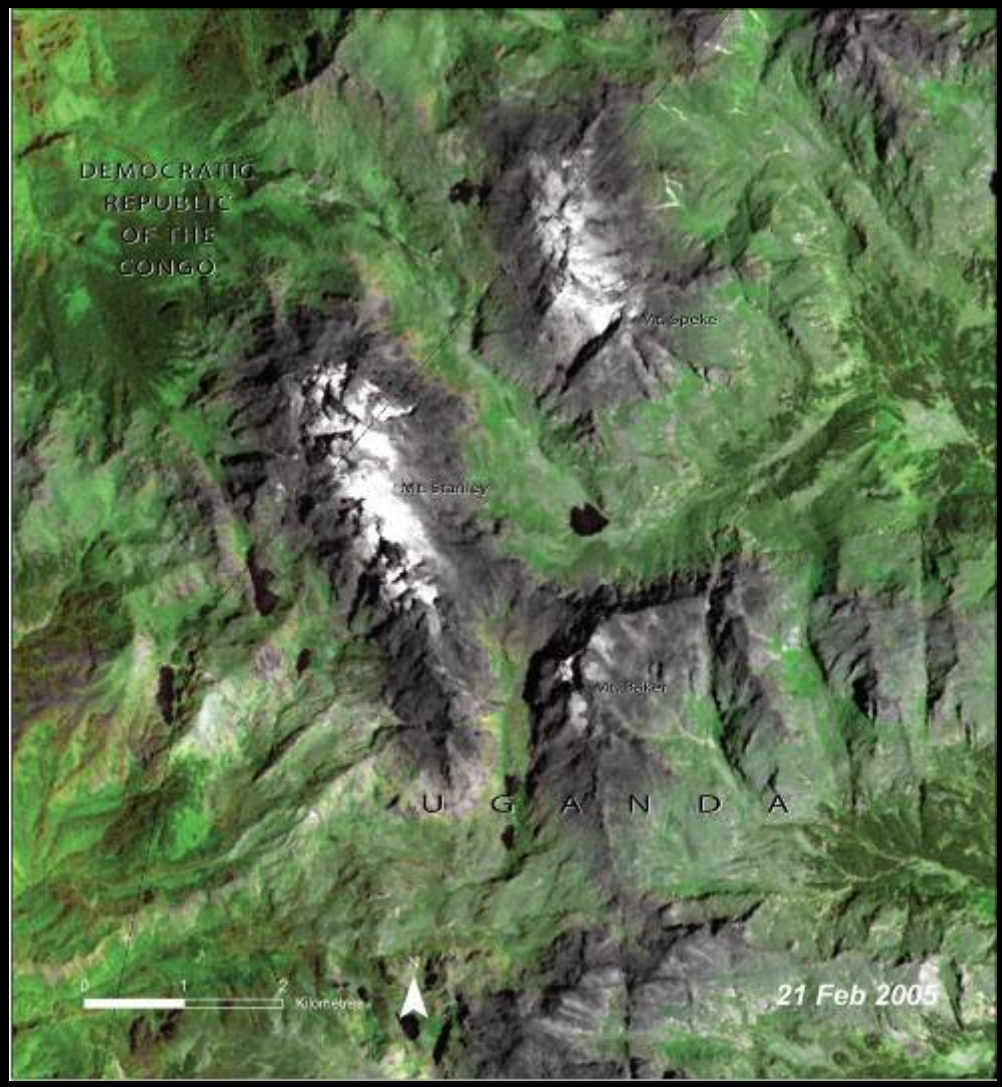
Republic of Uganda

Glacial Recession: Rwenzori Mountains



A comparison of satellite images from 1987 and 2005 shows a decrease in the extent of glaciers on Speke, Stanley, and Baker peaks

The glaciers declined by 50 per cent between 1987 and 2003

A century ago the glaciers of the Rwenzori Mountains covered nearly 6.5 km^2

If the glaciers continue to recede as they have since 1906 - researchers estimate they will be gone in the next 20 years

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Islamic Republic of Mauritania

Wetlands around Diawling National Park

Drought had already begun to impact the wetlands before construction of the dams in the 1980s (1979 image)

The construction of the Diama Dam in 1986 disrupted the cycle of flooding and evaporation in the Senegal River delta wetlands

The 2006 image shows the restored wetlands in and around Diawling National Park

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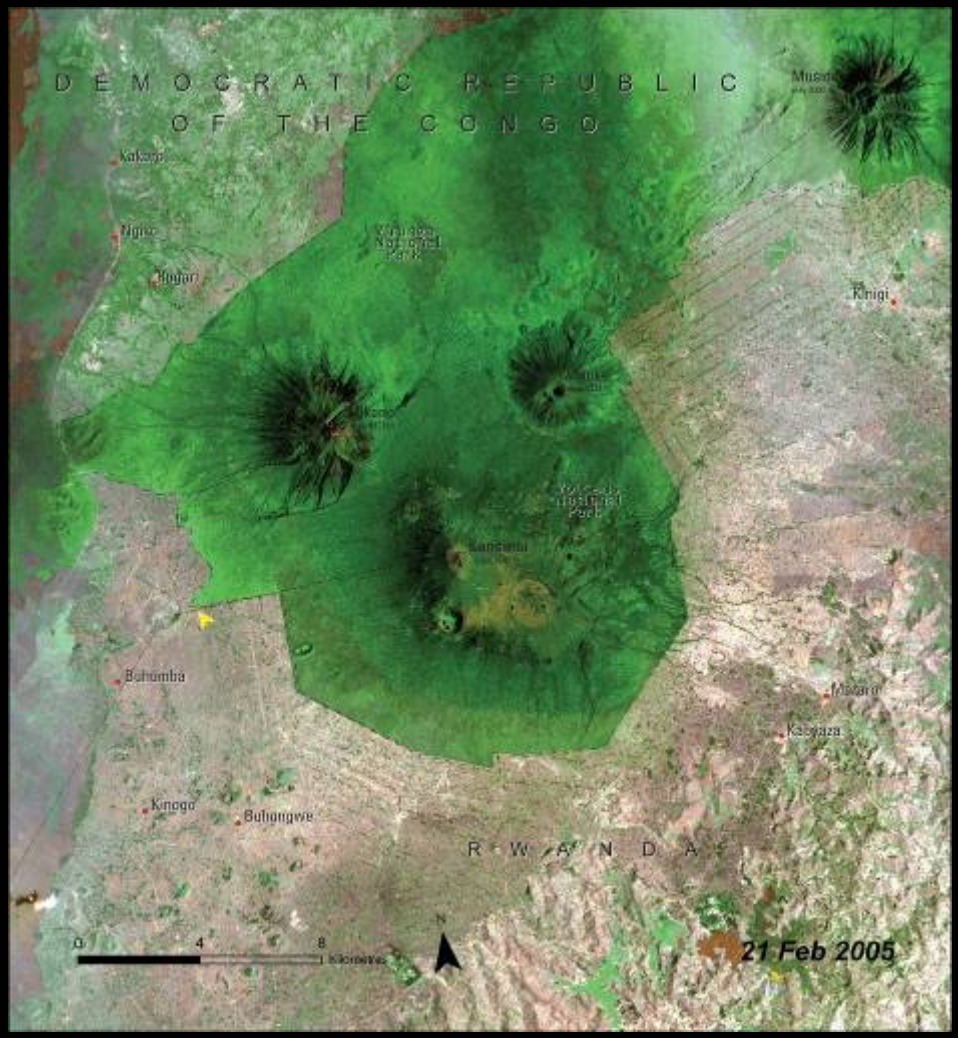
Democratic Republic of the Congo

The Gorillas of Virunga National Park



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The Virunga Park area is home to over half of the world's 700 surviving mountain gorillas (*Gorilla beringei beringei*)

In the 1978 image, a line between the protected areas and the populated agricultural areas surrounding the parks is already apparent

While the boundary of the parks has remained largely intact since the mid-1970s, during the 1990s and early 2000s, large numbers of people moved into the area surrounding the parks

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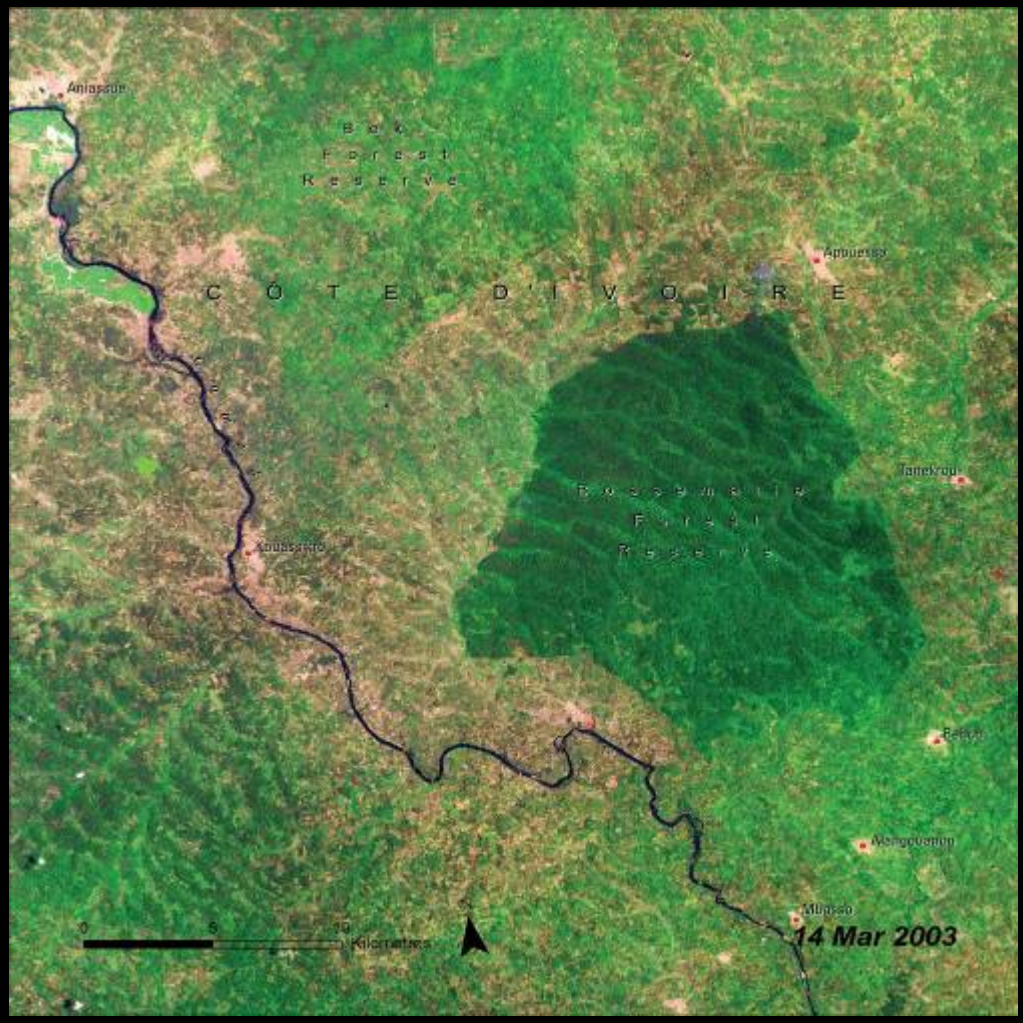
Republic of the Côte d'Ivoire

The Loss of Beki Forest Reserve



Beki Forest Reserve was one of 230 forest reserves established in the country in 1965

By 1986 its forested area had decreased by about one-fifth to 12 816 hectares

In the images, decimation of Beki Forest Reserve is apparent between 1986 and 2003, in contrast to the Bossematie Forest Reserve to the southeast

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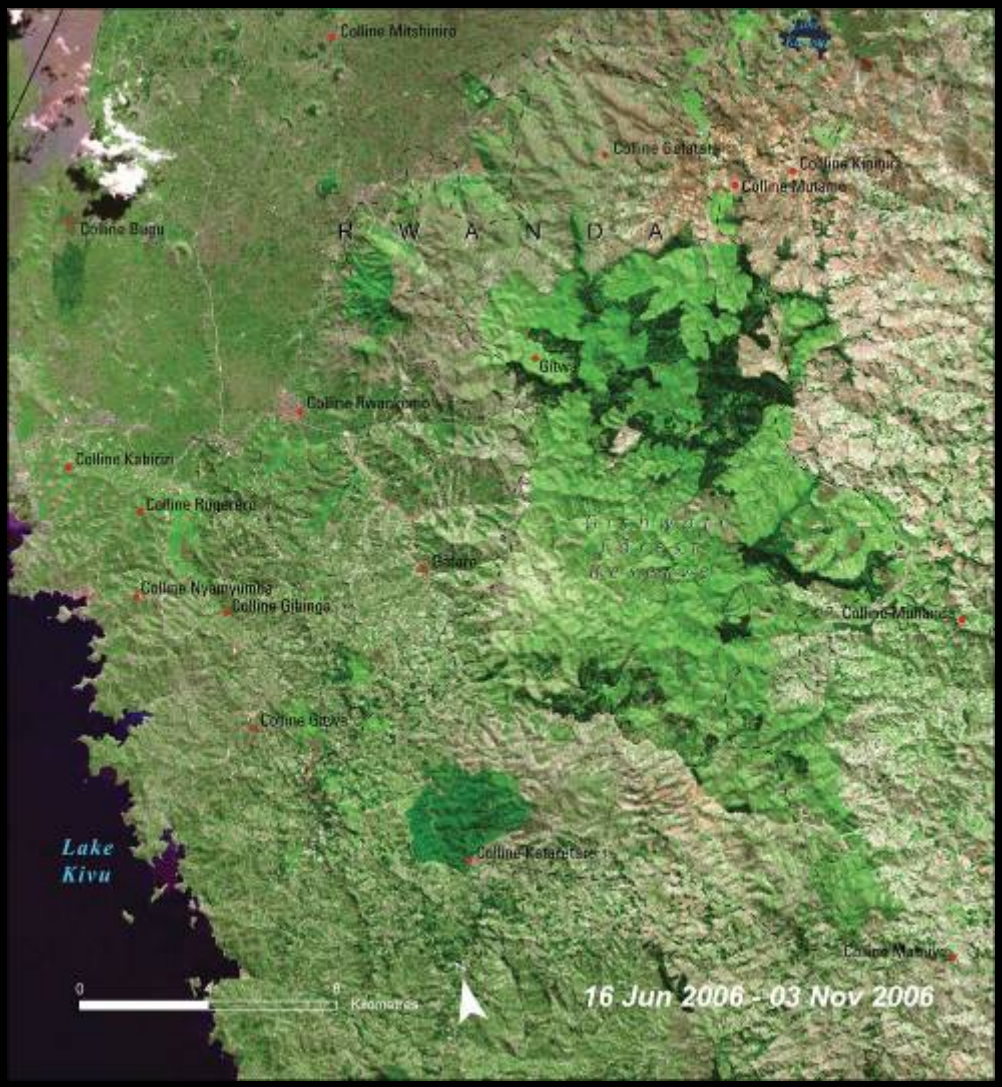
Republic of Rwanda

Dramatic Deforestation: Gishwati Forest



The 1978 satellite image shows the Gishwati Forest Reserve as a dark-green carpet of dense forest nearly covering the entire protected area

The 2006 image shows that most of the forest has been cleared

Only a fraction of the forest that was intact in 1978 remains (in degraded condition)

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Republic of Mali

The Drying Up of Lake Faguibine

Water levels have fluctuated widely in Lake Faguibine since the beginning of the 20th century

In the late 1980s, an extended period of reduced precipitation led to a complete drying up of the lake in the 1990s

As global warming intensifies, there may be more change in store for the people who depend on water resources such as Lake Faguibine for their livelihoods

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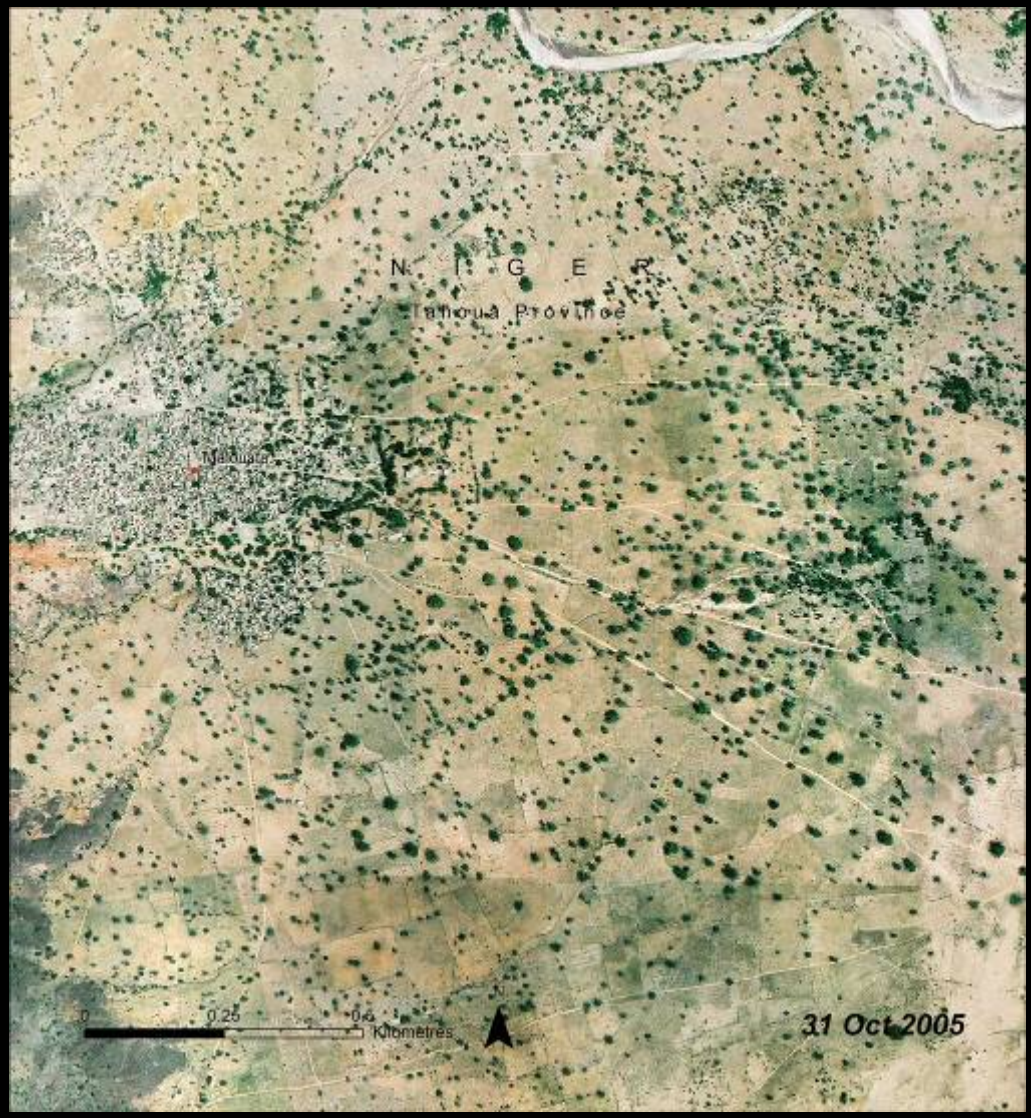
Republic of Niger

Revitalised Land: Tahoua Province



In recent decades, Niger's climate and its demographic problems have negatively impacted its agricultural land by forcing agriculture onto land that had been historically used for livestock

Intense pressure on fragile lands led to acute environmental degradation (1975 image)

A recent study revealed 10 to 20 times the number of trees across three of Niger's southern provinces than there were in the 1970s (2005 image)

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Some findings – climate change

Indicators of climate change

Disappearing glaciers in Uganda's Rwenzori mountains and Mount Kilimanjaro; drying up of Lake Faguibine in Mali, dropping water levels in lake Victoria.

Potential for reducing emissions from deforestation

Deforestation in many countries including in Northern DRC, disappearance of a large portion of Madagascar's South Malagasy spiny forest, the loss of trees and shrubs in the Jebel Marra footills in Western Sudan.

Ecosystem Management/LULUCF

Land revitalization / growth of tree clusters in images of Niger, expansion of wetlands resulting from a restoration project to control flooding in Mauritania.

Releases

- Paper Copy of the Atlas in English and French, released on 10 June 2008 at AMCEN in Johannesburg and at the South African Embassy in London

- Digital version on web: *http://www.na.unep.net/AfricaAtlas/*

- Digital version on Google Earth scheduled for August 2008: *http://www.na.unep.net/digital_atlas2/google.php*

- CDs, DVDs, Posters, Screen savers, high and low resolution images and PowerPoint presentation slides can be downloaded from the website: *http://www.na.unep.net/AfricaAtlas/*

Emmanuel Tachie-Obeng – Ghana

Erick Khamala – Kenya

Blessing Siwela – Zimbabwe / Botswana

Bernard Adusei - Ghana

Eugene Apindi Ochieng – Kenya

Henok Alemu – Ethiopia

Mahamadou Keita – Mali

Sami Eria – Uganda

Meron Abrham – Ethiopia

Scientists from African countries have worked on the "Africa Atlas" in the UNEP Sioux Falls office

René Siwe – Cameroon

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