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THE CONGO BASIN FOREST MONITORING PROGRAM



DEMOCRATIC REPUBLIC OF THE CONGO – 2010: Forests along the Maringa River in the Maringa-Lopori-Wamba landscape. Photo by Janet Nackoney for USAID



DEMOCRATIC REPUBLIC OF THE CONGO – 2011: OSFAC Remote Sensing Laboratory Manager, Mr. Andre Mazinga, analyzes a Landsat image to map forest cover. Photo by Patrick Lola Amani for USAID

OVERVIEW

Monitoring the vast forests of the Congo Basin presents particular challenges for researchers, policymakers and politicians trying to understand its complex natural systems and its increasing rate of exploitation.

Roughly the size of the United States east of the Mississippi River (or nearly 1.8 million square kilometers), Congo Basin forests range from montane to coastal wetland environments and from woodland savannas to swamp forests. The dense tropical forests also have some of the richest timber reserves and highest carbon stocks in the world.

Many of the forest landscapes lack effective infrastructure and management, and are under increasing threat from growing populations and the demands of international markets for forest-related commercial products.

Recent estimates of forest loss within the Congo Basin show increasing rates across the region with varying causes, from dramatic increases in local population pressures to widespread industrial land use.

Accurately and systematically tracking these changes to the forest is essential for developing effective policies promoting both economic development and sustainable natural resource management.

EMAPS at a Glance

USAID's Environmental Monitoring and Policy Support (EMAPS) project develops Central Africa's national and regional policy and regulatory capabilities, and improves forest monitoring, analysis and information dissemination to help maintain the ecological integrity of the humid forest ecosystem of the Congo Basin.

EMAPS creates policy-making environments for sustainable forest and biodiversity conservation management, and strengthens the capacity to monitor, analyze and disseminate information about forest cover change, forest-based greenhouse gas emissions and carbon sequestration and biodiversity at local, national and regional levels.

The National Aeronautics and Space Administration (NASA), the University of Maryland, and the Central Africa Forest Satellite Observatory (OSFAC) collaborate to produce detailed analyses of forest change across the Congo Basin. To help ensure this information is included in policy-making and regulatory mechanisms, the NASA-led consortium partners with a second EMAPS consortium led by the World Resources Institute, and includes the African Wildlife Foundation, Wildlife Conservation Society, World Wildlife Fund, and the Council for the Defense of the Environment through Legality and Traceability.¹

EMAPS and the Central Africa Forest Ecosystems Conservation (CAFEC) project, which strengthens the management of targeted Congo forest landscapes and the mitigation of threats to biodiversity, are "institutionalizing" the management of the Congo Basin forests through individual, organizational and systems capacity building during the third phase of USAID's Central Africa Regional Program for the Environment (CARPE) program.

The EMAPS and CAFEC projects are complementary. The information collected and shared through the local efforts of CAFEC informs national and regional policy work, while improved policies supported under EMAPS allows for better conservation efforts and land use management at the local landscape level. They both align with and contribute to the Presidential Initiative on Global Climate Change and the National Strategy for Combatting Wildlife Trafficking.

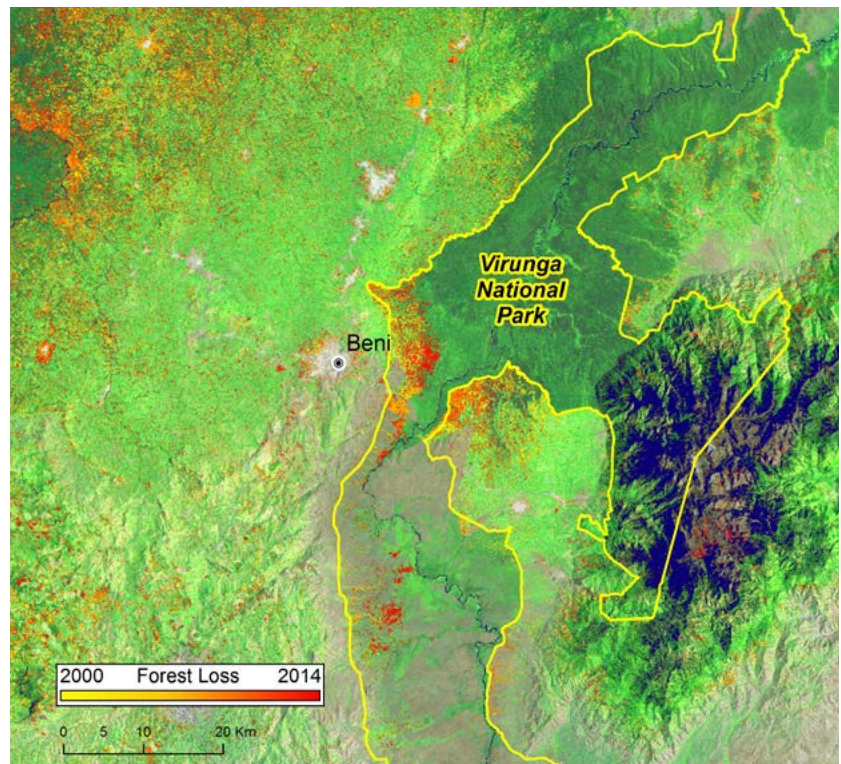
¹ Conseil pour la Défense Environnementale par la Légalité et la Traçabilité (CODELT)

PROGRAM

Traditional forest inventory methods are often impractical in the Congo Basin due to the forest's size and associated logistical challenges concerning access and measurement. An alternative approach to ground inventories is the use of satellite-based earth observation imagery to provide regular and accurate information on forest extent and change.

Earth observation data provide long-term overviews that can be processed to derive important information on forest changes due to logging, slash and burn agriculture and other drivers of forest loss and degradation. This information is key to generating carbon emissions estimations and understanding long-term trends in forest carbon stocks. It can also be used to directly quantify habitat fragmentation and loss, which is important for biodiversity monitoring and assessment.

The governments of the region and their international partners recognize the need for reliable and updated information on forest cover and forest cover change. A meeting of concerned stakeholders in Libreville, Gabon, in 2000, led to the creation of the Central Africa Forest Satellite Observatory (OSFAC)², a regional non-governmental organization with the mission to create and provide regional data and information products for Congo Basin forests.



DEMOCRATIC REPUBLIC OF THE CONGO – 2010: Sample page from the FACET* Atlas of forest cover extent and loss between 2000-2010. Photo: Courtesy of the University of Maryland

* Forêts d'Afrique Centrale Evaluées par Télédétection – Monitoring the forests of Central Africa using remotely sensed data sets

² Observatoire Satellital des Forêts d'Afrique Centrale

OSFAC, which is primarily supported by the U.S. Agency for International Development's (USAID) Central Africa Regional Program for the Environment (CARPE), is part of a National Aeronautics and Space Administration (NASA)-led consortium that includes the University of Maryland (UMD). The consortium works in partnership with the U.S. Geological Survey and the U.S. Forest Service.

The work of the consortium combines remote sensing, forestry and land use expertise, along with state of the art computer software programming and analysis, to change the way researchers and planners see and understand the Congo Basin forest.

The respective environment ministries of the Congo Basin countries³ are key partners, helping with data collection, providing opportunities for regional capacity building in the use of satellite data and mapping techniques, and producing important and reliable information about forest cover and forest cover change.

As part of the NASA consortium, UMD has developed and implemented a highly automated data processing and characterization system based on imagery from the U.S. Government's pioneering Landsat satellite program. Landsat data are a principal input for forest monitoring,

providing both historic and near real-time information on Congo Basin forests.

OSFAC, in collaboration with consortium partners, generates a group of "FACET"⁴ products, Landsat-derived maps of forest extent and disturbance that capture the small scale forest cover changes characteristic of the Congo Basin. FACET data provide systematic and cost-effective output that directly informs land use policy decisions and their effectiveness at local, national and regional scales. Hard- and soft-copy FACET atlases provide cloud-free image composites and thematic maps of primary forest, secondary forest and woodland extent and loss.

FACET atlases have so far been produced for the Democratic Republic of the Congo, Republic of Congo, and Gabon for 2000-2005 and 2005-2010. In addition to the atlases, the USAID forest monitoring program has now compiled more than 70,000 images that are available for free through OSFAC.

OSFAC and its consortium partners provide training on Geographic Information Systems, satellite image processing and FACET methodology and applications to build capacity for those receiving the data. They also offer courses on a wide range of technical applications in remote sensing through their affiliation with the University of Kinshasa.



DEMOCRATIC REPUBLIC OF THE CONGO – 2013: Ms. Marcelline Ngomba of OSFAC instructs forestry students from the University of Kinshasa in air photo interpretation. Photo by Patrick Lola Amani for USAID

³ The Congo Basin forest region includes: Cameroon, Central African Republic, Democratic Republic of the Congo, Equatorial Guinea, Gabon and Republic of Congo

⁴ Forêts d'Afrique Centrale Evaluées par Télédétection – Monitoring the forests of Central Africa using remotely sensed data sets

INCREASING CAPACITY AND REACH

Although OSFAC's technical capacity is well established, the NASA consortium is developing similar capabilities in national forest ministries throughout the Congo Basin in order for governments to successfully manage their forest resources and participate in REDD+⁵ programs.

Working with other CARPE partners, the consortium is providing data, hardware, software and training to national institutions so they can combine their forestry and land use expertise with the FACET methodology to create their own maps, while by-passing the onerous pre-processing of data. The consortium also continues to focus on developing cutting edge remote monitoring products for Central Africa, incorporating fresh and archived material to create new products to support USAID's development objectives in the region.

The NASA consortium will continue to provide steering and coordinating assistance, working with USAID to build a regional monitoring framework as part of the State of the Forest process. UMD will generate annual global updates on forest disturbance, including new national and regional applications specifically for Central Africa as part of the new Global Forest Watch 2.0 initiative.

The consortium will work with Internews' Earth Journalism Network to build a "geo-journalism" environmental news and data portal for Central Africa – InfoCongo – enabling researchers, journalists and policy experts to share information about forest management, climate change and other critical subjects related to sustainable development. This resource will also support increased engagement of civil society by making scientific data easier to understand and access.

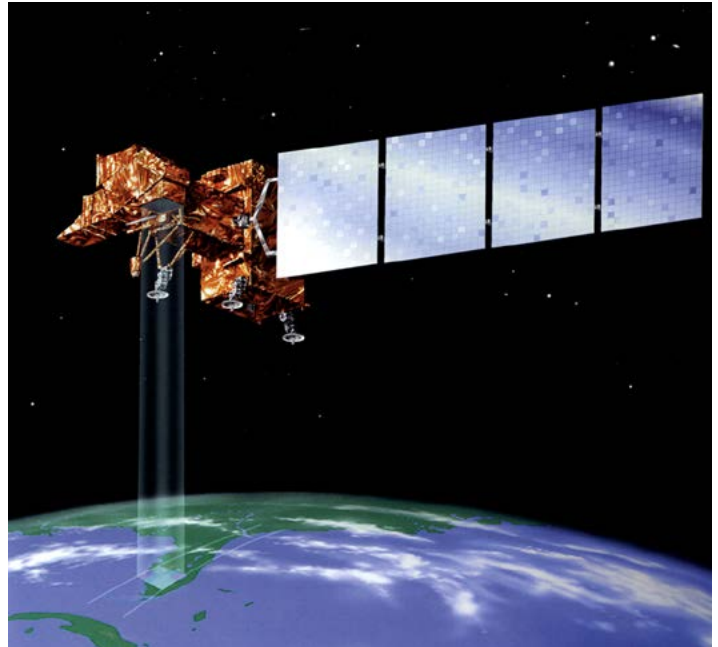
Finally, the NASA consortium will continue to archive and disseminate satellite data to USAID's implementing partners, universities and collaborating national agencies, ensuring that forest cover monitoring products, as well as original satellite data, are available for all forest management and land use planning activities throughout the Congo Basin.

For more information:

www.carpe.umd.edu

CARPEManagement@usaid.gov

⁵ Reducing Emissions from Deforestation and Forest Degradation, plus conservation, sustainable management of forests and enhancement of forest carbon stocks



Artist rendering of Landsat 7 remote sensing capabilities.
Courtesy of U.S. Geological Survey



DEMOCRATIC REPUBLIC OF THE CONGO – 2010: A village leader locates features on a hand-drawn community map as part of a participatory zoning and mapping exercise led by USAID's field partner in the Maringa-Lopori-Wamba landscape. Photo by Janet Nackoney for USAID