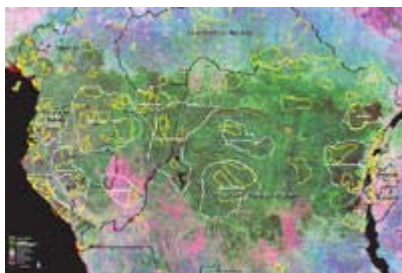
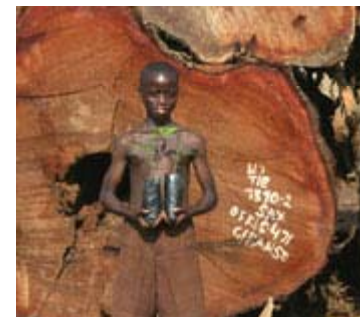


CARPE: mapping Central African forest resources by satellite

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Deirdre Smith explains how the CARPE project is using satellite-derived maps to identify threatened Congo Basin forest areas.



Satellite technology has led to amazing breakthroughs in mapping the most impenetrable areas of the world. In the Democratic Republic of Congo, for example, cartographer Jean-Robert Bwangoy-Bankanza is compiling a new tropical forest zoning map of the Mai-Ndombe region. The map consists of high-resolution satellite images that have been combined with geographic information system (GIS) data sets containing information on the vegetation as well as socio-economic data. In its final version, the map will assist

local policy makers in identifying which forest areas and plant and animal species are under threat from logging, cultivation and other human activities. It may thus prove invaluable in the design of sustainable forest resources management plans.

Bwangoy-Bankanza's project is part of the Central African Regional Program for the Environment (CARPE), a long-term project of USAID and the international Congo Basin Forest Partnership (CBFP) to address the issues of deforestation and biodiversity loss in the Congo Basin, a tropical forest area second in size only to the Amazon Basin. A consortium of government and NGO partners, CARPE aims to ensure that African decision makers have access to, and the capacity to use, information critical to natural resources management (NRM). To a large extent, this information comes in the form of Landsat satellite-derived maps that can be continuously updated using geospatial databases.

Why maps matter

CARPE's maps clearly show the intricate relations between the forest resources of the Congo

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Basin and the local communities that depend on them. As visual representations of ecological and economic threats, the maps are a powerful tool to engage local NGOs, individuals and government agencies in NRM. The maps are fundamental to CARPE's activities because the Congo Basin remains, to a large extent, *terra incognita*. The area hosts the richest ecosystems in tropical Africa; so far, 11,000 higher plant species have been identified, as well as more than 450 mammal and nearly 1000 bird species. However, very little is known about distributions of plant and animal species, and how they have been affected by the area's 20 million human inhabitants, who depend directly on natural resources for their livelihoods. Unsustainable logging, mining, shifting cultivation and other problems related to poverty and political instability are posing increasing threats to this globally significant tropical forest.

Using satellite images, together with data gathered on the ground, CARPE staff are slowly filling in the gaps and, with the help of local communities, gaining a comprehensive picture of the Congo Basin. CARPE has started providing stakeholders, including members of fishing communities and farmers' associations as well as NRM professionals, with training in skills such as the creation and use of geospatial data. Eventually, CARPE's zoning maps will provide information to assist policy makers in establishing a network of national parks and protected areas. Moreover, the maps, when taken together, will support the creation of a regional legal framework for rational NRM and anti-poaching laws. In the future they may also be used to promote sustainable agriculture and ecotourism programmes.

Project highlights

Recent success stories include an elephant telemetry project, which is tracking elephants tagged with Global Positioning System (GPS) collars via satellite. The project combines spatial data, based on remote sensing technology, with statistics on elephant densities and distribution as well as demographic information. Researchers can then generate maps indicating the number and density of elephant herds in relation to their distance from roads and villages, for example. As elephants are indicators of the health of the entire forest ecosystem, this information could be widely useful.

Meanwhile, Mano Ntayingi-Mwamur is working on health issues with both CARPE and Santé Rurale (SANRU), a USAID-funded rural health project. Many forest communities are at serious risk from preventable diseases such as malaria and cholera, which are more likely to occur in areas affected by migration, deforestation, flooding or extreme weather. Thus, Ntayingi-Mwamur recently mapped the administrative boundaries of health services in the DRC. He added epidemiological data to the map and entered them into a geospatial database, together with satellite-derived data on regional forest cover and river networks. This has enabled him to generate 'risk maps' showing where environmental factors may cause epidemics. His findings will

allow public health policy makers to develop policies and programmes that focus their limited resources on areas of the forest where the health threats are greatest.

Sustainable management of the forest resources of the Congo Basin will benefit not only the people and countries of the region, but the entire global community. Through its mapping activities, CARPE hopes that its efforts to conserve the forests will help to slow down global climate change and the loss of species and genetic resources that are of universal value.

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