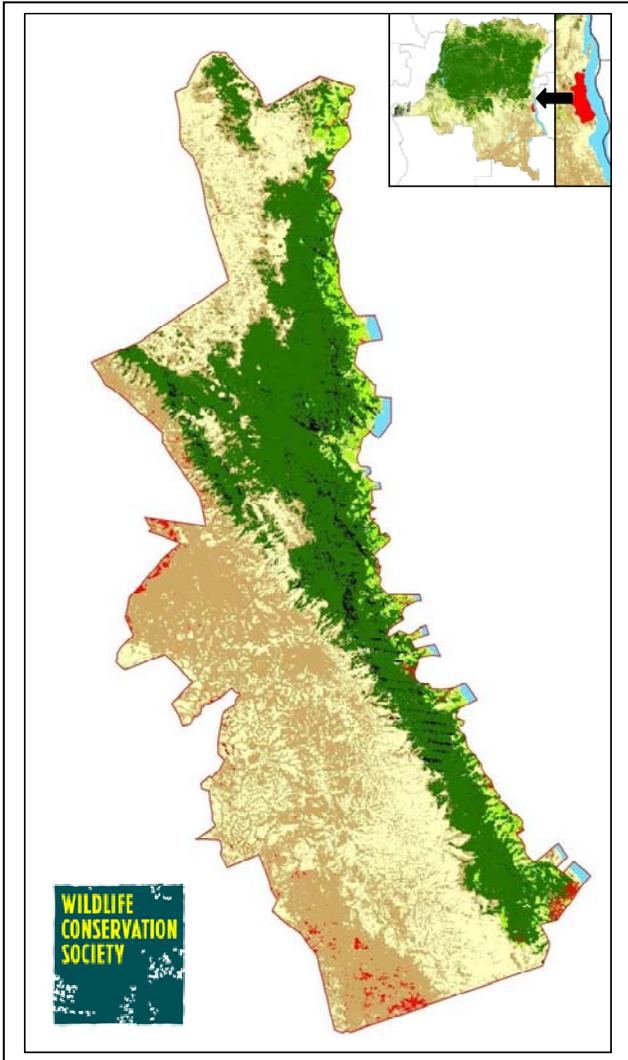


Assessment of the Potential Carbon Financing of A REDD project in the Ngamikka (Kabobo) proposed protected area, Eastern Democratic Republic of Congo



A Reduced Emissions from Degradation and Deforestation (REDD+) project

Through carbon credit sales from avoided deforestation, the Ngamikka Park Project will protect the largest remaining block of rainforest on the coast of Lake Tanganyika, maintain ecosystem functions and services, conserve rare habitat and the unique biodiversity of the proposed park, and create sustainable livelihoods for local communities. The establishment of the Ngamikka Park Project in south eastern DRC is based on an integrated approach to reduce human threats to the region’s forests, while at the same time addressing the needs of the local communities and engaging these communities in the management of the protected area. The project combats the principal cause of deforestation in the area—slash-and-burn agriculture, driven by both subsistence and economic pressures—as well as threats from small-scale gold mining and extraction of timber.

Figure 1: Ngamikka Forest Protected Area, DRC;
legend: green=forest, brown=woodland and grassland, red=forest lost

Project Location: Democratic Republic of Congo (DRC)

The proposed Ngamikka Park lies on the western shore of Lake Tanganyika in eastern DRC in an area that used to be known as Kabobo by the Belgian colonial power and represents the last remaining escarpment forest outside the Congo Basin with a unique diversity in plants and animal species. The forests of Ngamikka are a key, intact biodiversity stronghold with several species known only from this site and many species endemic to the Albertine Rift. WCS surveys in 2007 identified six new vertebrate species for science in a six week survey and it is likely more species will be found that are new.

Project Area: 218,228 ha of which 74,025 ha are forest and 73,233 ha are woodland. The remaining habitat is grassland.

Current Green House Gas emissions: 100,847 tons of CO₂e per year from deforestation

Total emission reductions over 20 year project lifetime: 2,016,945 tons of CO₂e by 2031.

Assuming 15% leakage and 90% successful reduction of deforestation this project would generate \$7.7 million USD for the site at a carbon price of \$5 USD/tCO₂e.

Carbon calculations

Future green house gas emissions are determined by the carbon density of the forest and the rate of deforestation. The historic deforestation rate is used to project deforestation over a minimum project life time of 20 years.

The carbon density was determined by measuring all trees with a diameter above 10cm at breast height in 87 circular plots with a 20m radius. The algorithm of Baker *et al.* (2004) was used to calculate biomass of all trees in the plot, which converted to carbon by multiplying it by 0.5 (C) and converted to carbon dioxide by multiplying it by 3.67(CO₂e), divided by 1000 (tCO₂e) to obtain tonnes carbon dioxide and multiplied by 7.96 to convert it to on hectare (tCO₂e/ha) (Table 1.).

The rate of deforestation was determined overlapping in GIS the DRC forest loss map of Hansen *et al.* (2010), and the outline of the site (Figure 1). Inside the proposed park forest lost during the period 2000-2005 and 2006-2010 was calculated and used to calculate the mean annual deforestation rate (ha/yr) over the last 5 year (Table 2). This rate was used to calculate the projected deforestation over the project life time.

The yearly emissions from deforestation were calculated for primary and secondary forest, and woodland separately; inside the proposed park and in a 5km buffer zone (Table 3). Deforestation inside the proposed park was used as a conservative estimate of emissions. Deforestation in the buffer zone was used to calculate a more realistic estimate of emissions. Deforestation of forest in proposed park and in the buffer zone differed little, 75 and 78 ha per year respectively. Deforestation of woodland was much higher in general and higher in the buffer than in the proposed park, 240 and 439 ha per year, respectively.

A conservative estimate based on deforestation inside the proposed park gives a current emission of 100,847 tCO₂e per year, a total emission of 2,016,945 tCO₂e over 20 years, regenerating a gross revenue of \$10,084,723 USD at a carbon price of \$5USD per tCO₂e and a net revenue of \$7.7 M USD. A more realistic estimate based on deforestation in the buffer zone gives a current emission of 132,754 tCO₂e per year, a total emission of 2,655,076 tCO₂e over 20 years, regenerating a gross revenue of \$13,275,382 USD at a carbon price of \$5USD per tCO₂e and a net revenue of \$10.2 M USD (Table 4).

Table 1. Mean carbon density in Ngamikka (tCO₂e/ha) based on 87 plots.

Trees with a	dbh* > 10cm	dbh > 30cm
Primary forest	874	634
Secondary forest	291	211
Woodland	219	159

*dbh=diameter at breast height

	2000-2005	2006-2010	2011	Annual (ha/yr)
Primary forest	-114	-227	65,753	-45
Secondary forest	-276	-148	8,272	-30
Woodland	-377	-1,199	73,233	-240

	Deforestation (ha/yr)		Emissions (tCO ₂ e/yr)	
	inside	buffer	inside	buffer
Primary forest	45	24	39,708	20,955
Secondary forest	30	54	8,632	15,756
Woodland	240	439	52,507	96,043

	conservative	realistic
<u>Emissions</u>		
Annual	100,847	132,754
Project	2,016,945	2,655,076
<u>Revenue</u>		
Gross	10,084,723	13,275,382
Net	7,714,813	10,155,667

The forest dominates the eastern escarpment down to lake Tanganyika but gives way to fire maintained grasslands and miombo woodland in the west.



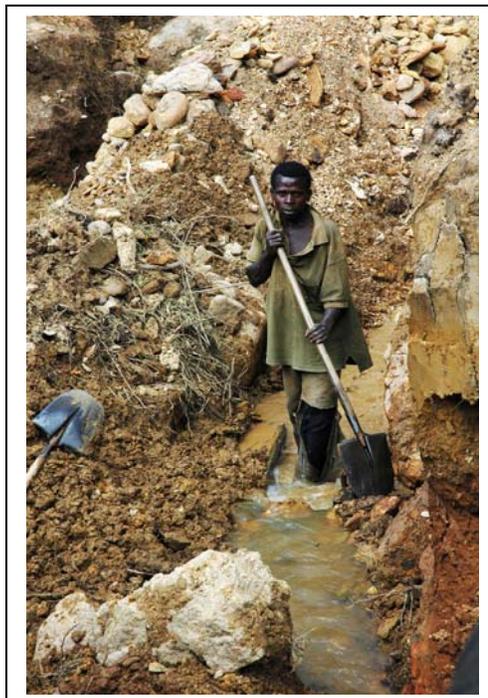
Project Description

In 2008, Wildlife Conservation Society (WCS) started the initiative to create the 218,228 ha Ngamikka Park and to finance it through carbon markets. A socio-economic study identified the main agents and drivers of deforestation and assessed the willingness of the local population to establish a protected area.

Over 85% of households and 90% of villages wanted to create a protected area. Subsequent meetings with traditional chiefs and district leaders has led to the agreement to establish a new national park and buffer reserve which they have elected to call Ngamikka National Park. Successful, establishment will ensure a reduction in green house gas emissions, bring rural sustainable development and reduce the loss of biodiversity.

Deforestation threats

- **Slash and burn agriculture:** The biggest threat to Ngamikka Park is a slash and burn agriculture used principally for subsistence and partially for cash income. Forests or fallow are, cut burned and planted with rain-fed crops. After a few years the fields are usually abandoned and cultivation moves elsewhere. Slash and burn agriculture can be a sustainable in tropical forests and does not require clearing of old growth forest as long as fallow periods are long enough and human population density remains low. However, the forest has become accessible to immigrants as the Kabobo area has become secure again, as a result of which the deforestation rate almost tripled over the last five years.
- **Small scale or illegal mining:** Mining typically occurs in remote, pristine forest areas. Kabobo has some gold deposits which are being extracted by migrants from outside the region. Mining for gold uproots trees and fragments the forest at a number of sites. The ability of local authorities to prevent these activities is limited.
- **Small-scale logging:** logging in the Ngamikka Park forest is not an important driver of deforestation due to difficulty of access and transporting timber out of the forests, but it is increasing in the south of the forest where it is near to Kalemie Town on Lake Tanganyika and it potentially could become more important in future.



Underlying these activities are factors such as open access to forest resources, increasing pressure from immigrants, poverty and insecurity that are driving unsustainable resource use. The planned rehabilitation of the road linking Kalemie to Fizi, north of the forest, will open up the region and encourage commerce which is likely to have adverse consequences for the forest. Introducing cash crops to supply the international market will increase the farmer's economic security, but will require more land for cultivation. The Ngamikka Park Project focuses its interventions at improving farmer welfare and empowerment to address these underlining causes of forest clearance.

Climate benefits

The Ngamikka Park Project will prevent, at a conservative estimate, 2 million tCO₂e of greenhouse gas emissions over the course of 20 years. Without the Ngamikka Park Project, 6,297 ha of forest – 4.3% of the project area – would be deforested based on the business as usual scenario. This analysis is based on plot data for trees with diameter at breast height (dbh) of 10 cm and above and a carbon density of tons 874 CO₂e/ha and a historic deforestation trend of 315 ha per year. The moderate baseline deforestation rate coupled with a high carbon density accounts for the high emission reductions potential.

Biodiversity benefits

Ngamikka forests harbor a high and unique animal and plant diversity. The park is home to more than 1000 plant species – one of only five sites in the Albertine Rift with this number of species – and six new vertebrate species await formal taxonomical description as well as four possible plant species. These species were found in only 6 weeks of research and it is likely more species of conservation concern occur. The park contains the only population of the Kabobo Apalis and the Prgogine's Colobus monkey as well as an estimated 1,500 chimpanzees. By stemming deforestation, the Ngamikka Park Project will

not only reduce the loss of critical habitat, habitat degradation and fragmentation, but also have a net positive impact by preserving ecosystem service integrity.



Ecosystem Service benefits

In addition to biodiversity benefits, the Ngamikka Park forests serve as a zone of watershed protection and catchment, which are important for agriculture and for providing clean water. Keeping the forest on the escarpment also helps to mitigate climate change as the cooling effect of the forest will reduce the temperature increase predicted for the region as rains in this part of the Albertine Rift become increasingly monsoonal.

Community Benefits

In 2008 a rural population of about 4000 households, inhabited the area around Ngamikka Park. These households depend largely on natural resources for subsistence, and they are the main agents of deforestation. Therefore, these communities are the main beneficiaries of the Ngamikka Park Project and will receive much of the revenues from the sale of carbon, based on the benefit sharing agreement to be developed with the Government of DRC. Revenues will be managed through a previewed Ngamikka Park Project Fund which will be used to improve community welfare. In addition to these future benefits, the Ngamikka Park Project interventions aim to have a net positive impact on communities, which include improvements in infrastructure, education and health services, greater access to new employment opportunities, and training and technical assistance for sustainable agriculture and alternative livelihoods. Most importantly, the Ngamikka Park Project strives to empower local communities and strengthen their institutions through improved land tenure security and resource rights, greater decision-making over forest resources, and participation in park management.

Management Approach

The Ngamikka Park Project will adopt an integrated approach to reduce human threats to the region's forest, while at the same time addressing the needs of the local communities by improving household welfare, strengthening governance and land use, and engaging these communities in the management of the protected area.

The Ngamikka Park Project will include the following activities to reduce deforestation:

1. **Creation of the Park and Community Managed Areas in a Participatory Manner.** A three-part zoning system is proposed which comprises a core with a National park status, surrounded by a natural reserve forming a buffer zone of community managed land around it and an agricultural zone where farming will occur. To delimit the zones, WCS has been conducting a consultation process, engaging villagers and authorities from every village around the proposed park. The three main zones are as follows:
 - ❖ *Zone of Strict Protection:* designated as the core area with national park status and in which no commercial or subsistence harvests will be allowed.

- ❖ *Natural Reserve*: designated around the core protected area in consultation with local populations and which allows sustainable harvesting of forest products for subsistence only, and where immigration is strictly prohibited.
 - ❖ *Agricultural/village expansion zones*: an area where the village and its associated agriculture exists and can expand into with time.
2. **Building capacity for local sustainable resource management**: WCS will be working alongside communities to strengthen institutions and build capacity to manage their natural resources sustainably and stabilize land use, by improving their field productivity while securing formal natural use rights.
 3. **Rural Development and alternative revenue creation**: The Ngamikka Park Project includes a significant number of interventions to enhance the welfare of local communities and their management of resources. Activities will be based on consultations and socio-economic studies and pay particular attention to improving access and quality of health services and education, addressing needs for improved agricultural techniques and creating links to new markets and livelihoods.
 4. **Co-management of Ngamikka Park Area**: A co-management structure for Ngamikka Park Protected Area will be developed based on consultations. This will allow local communities to engage more fully with ICCN in the management of the park and reserve and will ensure that any employment of rangers comes from the local villages. The structure aims to strengthen local organizations, develop a transparent process for selecting representatives, and give communities a voice in park management decisions.
 5. **Creation of equitable benefit sharing mechanisms**: In the event of a REDD project and a carbon sale, the Government of DRC and Ngamikka Park communities will develop an agreement outlining the carbon revenue sharing and management mechanism for the Ngamikka Park Project. A foundation or similar entity designated by the parties will be in charge of the management and disbursement of funds made available under the agreement.

