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ECOmakala :

Meeting energy needs, fighting poverty
and protecting the forests of the Virunga National Park
in North Kivu (DRC)



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SUMMARY



The North Kivu province in Eastern DR Congo has been disrupted by war and violence for over 20 years. Its capital, Goma, has seen the arrival of many families fleeing the fighting and its consequences in rural areas. Goma's population currently stands at 1 million following a population boom which has led to a steep rise in energy demand. 97% of the population is dependent upon charcoal, known locally as 'makala', the only easily accessible source of energy for the economically impoverished residents. Some 80% of this energy need is met using resources taken from the famous Virunga National Park, home to the mountain gorillas which put the Park on the map. Indeed, supply of wood energy is the main driver of deforestation in the Park.

In addition to the Congolese Nature Conservation Institute (CNCI) which fights illegal deforestation by strengthening the reserve control, WWF launched the 5-year ECOMakala project in 2007 with help of the European Union to reduce deforestation. The project's aim was to make ECOMakala charcoal available to the residents of Goma. ECOMakala charcoal is produced using rapid-growth trees in plantations managed by local, small-scale tree-planters on land surrounding the Virunga National Park. Another goal was to provide a new way for local tree-planters to earn a wage. This was no small feat seen as brand new makala production and marketing chains needed to be set up whilst ensuring that these were managed by the tree-planters themselves.

The results are clear for all to see: thanks to the work of the project team and 67 local associations, a comprehensive network of players, ranging from nurserymen to 'charcoalers', has been established and forms the basis of the ECOMakala production and marketing chains. During the project, almost 5,000 tree-planters were trained and 5,476 hectares of trees were planted to produce ECOMakala, which, after a growth period of 4 to 5 years, was sold at a reasonable price to the residents of Goma.

Some bottlenecks remain: the associations tasked with assessing the tree planting candidates require more assistance than first thought and the project required some changes to be made following incidents involving armed gangs. In addition, there is a lack of knowledge of local trees production methods, land management remains a big concern and eligible land criteria need to be further developed. The fledgling marketing chain and producer cooperatives should be the main focus of future projects.

Furthermore, financial mechanisms to ensure the sustainability of the project are currently being implemented and must be seen through. These include selling back to the associations so that they can provide their services in a sustainable fashion and ascertaining whether production is eligible for carbon credits.

Finally, the equivalent of 20,000 hectares of trees still need to be planted and strategies need to be implemented with the aim of reducing makala consumption levels in Goma in order to fully meet the city's energy needs. New projects are already under way to ensure the planting of 4,000 additional hectares.

*In my mind, each one of our projects can be traced back to one meeting.
For the ECOmakala project, there were several key meetings.*

*One such meeting was with programme director Marc Languy
in the Virunga National Park in Congo. In 2008, he invited me to come
and «have a look at the reforestation project in Goma».*

*I also met the director of a village association
which was producing makala, a vital source of energy,
from reforested trees.*

*«Everyone else who was supposed to come
decided against it for security reasons», he told me.*

*In the heart of the forests of the Virunga National Park,
I met a beautiful, serene female gorilla,
cradling her offspring in her arms.
I was immensely moved by her tender, caring nature.*

*It was these meetings which inspired me to set up the ECOmakala project.
The ECOmakala project is extremely ambitious in seeking to enable locals
to plant trees and produce environmentally friendly makala
whilst protecting the National Park, the gorillas' natural habitat.*

*The project brings together men and women from DR Congo and Belgium
who believe that the forests of the Virunga National Park can be preserved.*

This document recounts the ECOmakala story.

Regards,

A handwritten signature in black ink, appearing to be 'Geert Lejeune', written in a cursive style.

Geert Lejeune
Director of Conservation
WWF Belgium

1. Languy, M. and de Merode, E, «Virunga, Survie du premier parc d'Afrique», Tielt (Belgium), Lannoo, 2006, 352 pp.

INTRODUCTION

In 1925, Africa's very first National Park, the **Virunga National Park**, was established in North Kivu, an Eastern province of what is now the Democratic Republic of Congo (DRC). Located on the Albertine Rift, the park is known for the great diversity of its habitats and its high percentage of endemic species, including mountain gorillas and okapis.

The park is located in the most densely populated region of the DRC, with most of the population living in extreme poverty. However, the region's soils are rich in minerals and this has contributed to the region being much sought after by neighbouring countries. Since the Rwandan genocide in 1994, the local population has been affected by several tragic events which have devastated the area over the last 20 years. This has led to the Park being declared an endangered world heritage site.

The area remains politically unstable and many people have left rural areas and moved to the provincial capital, Goma. The city had a population of 150,000 in 1990 but is now home to 1 million people following a population influx caused by a series of conflicts. As a consequence, the city's food and energy demand has increased proportionately. Energy supply is one of Goma's biggest problems and the only readily available energy sources for residents are wood and charcoal, known locally as "makala". The only resources rich in these materials are the Virunga National Park's trees.

The WWF has been active in the Eastern part of the Democratic Republic of Congo since 1987. Our initial goal was to further protect the Virunga National Park by precisely defining the Park's limits and raising awareness amongst the local population of reforestation as an alternative source of wood energy or makala.

In 2007, with the support of the European Union, the WWF launched a new project dedicated to the issue of deforestation and, in particular, its main driver: the supply of wood energy and charcoal to the population of Goma. A further objective of the project was that of improving living conditions for residents in the areas surrounding the Park and providing them with an accessible alternative source not just of wood but also of income. Thus, the **ECOMakala** project came into being, with charcoal being produced from trees planted by tree-planters residing in North Kivu.

In this document, we seek to share our experiences and enable donors and conservation and cooperation players, both at local and international level, to benefit from what we have achieved. Our aim is to facilitate the setting up of a production chain for sustainable, legally produced makala which will benefit the local population and preserve the forests of Kivu province.

Regards,



Damien Vincent
Director General
WWF Belgium



Marc Languy
"Green Heart of Africa Global Initiative" Manager
WWF Central Africa Regional Program Office

CONTEXT

Energy sources and demand

Makala, charcoal and fire wood account for 97% of energy consumption in North Kivu province. Makala is the most widely used fuel in urban households as neither electricity nor gas are readily available and the situation will not change in the short term. Forests are an essential resource for charcoal production and the only easily accessible source of wood remaining is to be found in the Virunga National Park. In 2007, 80% of the makala sold in Goma came from the National Park². Energy demand for households in North Kivu is significant, with 2013 estimates amounting to almost 8 million m³³. Due to the swelling population size in Goma over recent years, over 1 million m³ of energy needs to be supplied per annum, the equivalent of between 47,000 and 59,000 hectares⁴ of rapid growth trees.

Socio-economic context

The incidence of poverty in North Kivu province is almost 78%⁵, an extremely high figure. The arrival of rural populations seeking refuge in Goma over the last 20 conflict-ridden years has made this situation even worse.

The provincial capital, Goma, is currently home to 1 million people⁶ (700,000 in 2008 and a mere 150,000 in 1990). The city is located on the border with Rwanda, on the shores of Lake Kivu, close to the Virunga National Park. The city has experienced a population boom over several decades with growth rates reaching 10% per year between 2001 and 2004⁷. The population density in the areas surrounding the Virunga National Park and in the city of Goma itself has been the highest in the DRC for quite some time, with peaks of 600 inhabitants per km²⁸.

2. Balolebwami, 2008

3. Calculated on the basis of 2005 figures (Languy and E. de Merode, 2006)

4. Op cit.

5. UNPD "North Kivu Economic Profile: 10 years in review, 2000-2009"

6. Goma Municipal Census, 2008

7. Goma Municipal Censuses, 2001-2004

8. Observatory for Central African Forests (OFAC), 2008

9. Languy, M. and E. De Merode, "Virunga, Survie du premier parc d'Afrique", Tielt/Belgium, Lannoo, 2006, 352 pp



The illegal makala market: a lucrative business for armed gangs

Makala produced illegally, i.e. using the Virunga National Park's forests, to meet the energy needs of the population of Goma, is a business estimated to be worth around \$30 million per year.⁹ The lion's share of this market is controlled by armed gangs who operate in the region. The sale of illegally produced makala contributes financially to their operations.



Amani, a ECOMakala tree-planter, in his hillside field © S. BEMELMANS

Even basic social needs such as water, electricity, social protection, schooling, health-care and sanitation are not met in many areas. Healthcare access is minimal and individual and collective sanitation measures are seldom adhered to. Water and electricity supply is rare in the province's three major cities and, in some parts, has never existed.

The population's investment capital levels remain very low as economic resources are allocated by and large to the purchase of basic necessities. Therefore, when investment capital does become available to rural farmers, it is used primarily to acquire land, small shops or livestock.

Ethnic identity issues render the situation even more complex with tribal claims and inter-tribal ill-feeling being a source of tension and violence.

Environmental context

North Kivu has an equatorial climate with annual rainfall ranging from 1000 to 2000 mm per year. The terrain is very rugged with plains, plateaus and mountain ranges in close proximity, accounting for a plethora of different soil and climate conditions and a very rich biodiversity.

The soil texture and composition varies wildly across the province. With the notable exception of land which cannot be used for agriculture due to recent volcanic activity, the soil is generally fertile or very fertile. However, river erosion and inappropriate agricultural practices have led to the widespread degradation of mostly rocky marginal soils, located on hillsides or peaks.

Located along the Albertine Rift, the volcanic Virunga region is home to a huge variety of land-based ecosystems in its high and low altitude mountains, forests, savannahs, lakes and in the vicinity of its active and inactive volcanoes. Its biodiversity is unique and comprises a huge range of species, many of which are endemic.



Mountain Gorilla. A silverback adult male gorilla in the Virunga National Park © B. DAVIDSON - WWF/CANON

Unique biodiversity under threat

The Virunga National Park is home to no less than 627 herbaceous plant species, 126 species of creeper and 107 different species of tree. Of these species, 92 are endemic to the Rift. The Park also boasts 218 different species of mammal, 706 bird species, 109 species of reptile and 78 different amphibian species. It is the only National Park to feature 3 different species of great ape: the Mountain Gorilla, the Eastern Lowland Gorilla and the Chimpanzee. Poaching aside, the biggest threat to the survival of such rich biodiversity is the destruction of its habitat through deforestation and forest degradation.

BOX
2



A young *Cedrele serrulata* plantation, part of the ECOMakala project © M. VAN GEIT / WWF-RDC

Forest-type natural vegetation is now becoming a rare sight on the outskirts of the Virunga National Park. Pressure on wood resources is such that severe forest ecosystem degradation has occurred throughout the area. The main factor in the environmental changes which have occurred is, without doubt, the population boom. Together with the search for more arable land in an area plagued by security fears, this has made a significant contribution to environmental degradation with illegal wood energy being harvested in the Virunga National Park and new arrivals being housed in the areas surrounding the Park in order to cultivate the land.

The area's highest level of tree coverage is to be found on the peaks. These areas are currently being deforested and used as pasture with very low production levels.

Poverty and deforestation

The impact of the ever increasing demand for wood and makala is two-fold: i) Goma's households are becoming progressively poorer as the price of wood and makala rises, ii) The deforestation rate in the Virunga National Park now stands at around 1%. This rate is considered to be very high due to the fact that no deforestation activity should be taking place as such activities are strictly forbidden within the National Park. Also, the rate far exceeds the average annual deforestation rate for the 2000-2010 period, which was 0.13% worldwide and 0.23% for the Congo Basin¹⁰.

10. Food and Agriculture Organization-FAO, 2011



Woman with child, selling charcoal (makala), Saké, DRC © K.HOLT/WWF-UK

Land management

The Congolese legal system is very complex owing to the co-existence of modern and traditional customary laws. The 1973 Land Law, known as “Bakajika”¹¹, states that “*land occupied individually or collectively, in compliance with local traditions and customs*” is deemed to be State-owned property and that “*legal land usage rights are to be conferred by Order of the President of the Republic*”. If no order is issued, traditional customary practices shall prevail. In practice, land is monopolised by powerful land owners and most farmers have little or no land of their own and often have no choice but to hire labourers from the land owners . Land deeds, the only official proof of land rights, do exist, but the price and legal uncertainty linked to the issuing thereof mean that they are quite simply unobtainable for most rural communities.

11. Since 2006, land register regulations have been part of the land tenure code.

12. Bouyier et al., 2013

Developing alternative energy sources to the forests of the Virunga National Park - impediments and opportunities

It is technically possible to plant trees in North Kivu to meet the growing demand for makala as an alternative to exploiting the forests of the Virunga National Park. However, trees were not being planted in rural communities. Before starting the ECOMakala project, we assessed the impediments and opportunities vis-a-vis reforestation.

IMPEDIMENTS:

- ▶ **Initial capital not accessible:** starting a plantation requires an initial investment that most farmers simply cannot afford, especially seen as a plantation only starts to bring in any revenue at all after a three year period.
- ▶ **Land uncertainty:** without available land or sufficient guarantees that farmers can still use the land 5 or 6 years later for harvesting, and with land insecurity and armed gangs a real concern, farmers are unwilling to invest in a project with unpredictable levels of medium-term profitability.
- ▶ **Unknown and unproven profit levels:** The costs and revenues of such plantations are unknown. Without these data, it is very difficult to assess the profitability of such a risky investment. Furthermore, there is no quick return on investment as trees need to grow sufficiently before they can be harvested.
- ▶ **Technical know-how and materials not available:** Tree planting, especially with profit in mind, requires technical skills which rural communities do not possess. In addition, farmers have no access to seeds or tree stocks for growing high quality seedlings.
- ▶ **Illegally produced makala distorts the market:** Insufficient checks mean that the forests of the Virunga National Park are easily accessible and can be harvested illegally. Price structures¹³ reflect the ease of access. Illegally produced makala is made using tree species with high calorific content and is therefore a better quality fuel than makala produced from plantations.
- ▶ **Possible competition with agricultural land:** In terms of the allocation of available land, priority is given to activities which seek to meet basic food needs. Agricultural production is also a potential source of short-term income.

OPPORTUNITIES:

- ▶ **Ideal soil conditions for planting:** Thanks to its rugged terrain and its equatorial location, North Kivu has a wide diversity of soil conditions, meaning that the soil and climate facilitate reforestation with a range of different tree species.
- ▶ **Knowledge of plantation techniques:** Techniques need to be adjusted to suit specific areas and knowledge of techniques for some species is more widespread than for others. Technical planting know-how has been acquired.
- ▶ **Interest in plantations, new sources of revenue:** local farmers are interested in reforestation not only because they are aware that the multi-purpose wood market¹⁴ is flourishing but also because it constitutes an “investment” which can be tapped into at a favourable moment. It is also a source of income diversification.
- ▶ **The potentially attractive price of ECOMakala:** our experience and initial estimates showed that in areas within easy reach of Goma, ecomakala can be sold at a price which can compete with that of makala produced from the National Park’s trees. To guarantee increased revenue for farmers, work needed to be done to enhance marketing efficiency, especially in areas which are further away from Goma. The quantity of illegally produced makala on the market will be significantly reduced as a consequence of repressive measures which will be taken by the National Park managers. Thus, the marketing of legally produced makala should not affect the price of makala to the consumer as supply levels will be high.
- ▶ **Enhanced security and physical ease of access for local communities:** Easier and more secure access to plantations makes them more attractive to rural communities and tree-planters, especially women.
- ▶ **Available land:** Subject to further analysis, our initial assessment showed that marginal lands (especially ridges) are available and had large-scale plantation development potential on land which had not or was no longer being used for agricultural production.

13. The price does not include cost of the raw material itself seen as it is harvested in the Park at no cost. However, the price accounts for two cost elements: a “risk premium” owing to the illegal nature of the activity and the transportation of the raw material to the towns and cities.

14. See Box 5. Plantations can also be harvested to produce wooden planks which can be used by humanitarian NGOs in the construction of huts at nearby refugee camps.

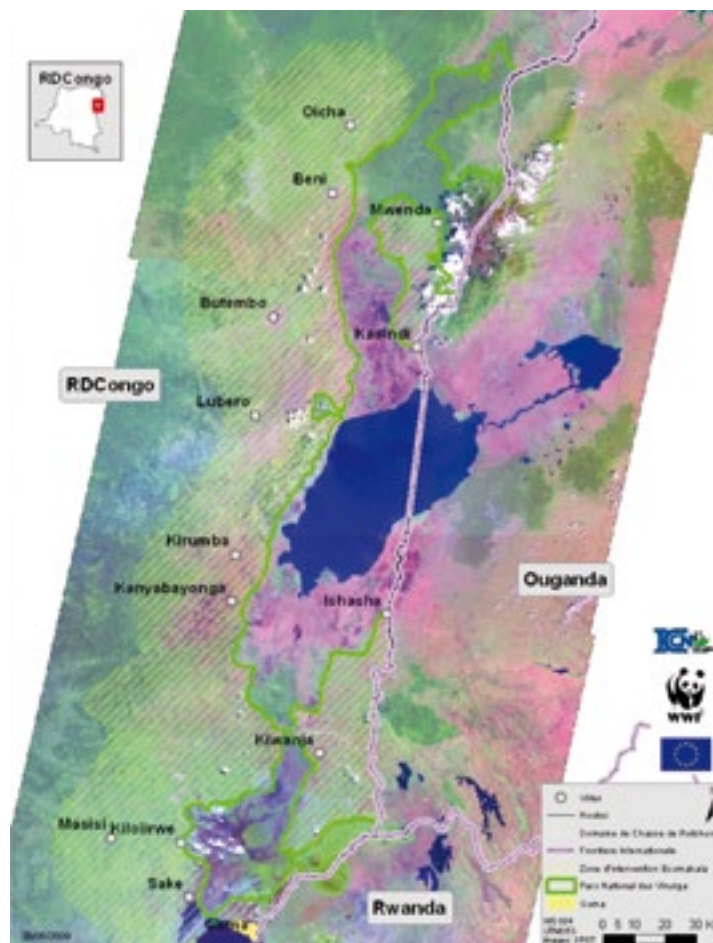
THE ECOMAKALA CONCEPT

Mass reforestation on the periphery of Virunga National Park¹⁵

The ECOMakala project ran from November 2007 until February 2013 with the support of the EU and the Dutch Cooperation (through the IFDC)¹⁶. The project's budget was € 3.8 million and its goal was to plant 4000 ha of trees and provide appropriate assistance.

The project was centred on North Kivu province and, in particular, the buffer zone surrounding the Kirunga National Park (see figure 1). Within this buffer zone, two specific areas were identified for project activities: the Goma supply basin (areas of Masisi, Rutshuru and Nyiragongo) and the areas of Lubero and Beni to the North.

Figure 1: Virunga National Park buffer zone, the area chosen for the ECOMakala project



15. The project, funded by the Dutch Development Cooperation Ministry through the IFDC, also included the planting of 1000 hectares of cocoa plants under shade. This agroforestry scheme was implemented in cooperation with local farmers, just like the EcoMakala project. However, the specific outcomes of this project are not outlined in this document.

16. Additional financial support was provided by WWF Sweden, with a share of the money being donated by Kelloggs.

A necessarily integrated approach

The goal of the ECOMakala project was to lay down the basis for **the creation and profitable functioning of an ECOMakala production and marketing chain as a means not only to protect the forests of the Virunga National Park but also improve living conditions for local tree-planters, without distorting the price of makala for consumers in Goma.**

The challenge was immense, as are the needs of the city of Goma and the impediments to the growing of plantations in the area (see box 3). This project and the methodology used should be considered as a **pilot project.**

Three quantifiable goals were identified:

- ▶ plant trees outside of the Virunga National Park in order to produce ecomakala, provide financial and technical assistance to local land owners and tree-planters;
- ▶ develop a marketing chain;
- ▶ seek out ways to sustainably finance such a model.

Meeting greater energy needs

Makala is the local name for charcoal produced from wood harvested from trees, which, alongside fuelwood, is the only accessible source of energy for communities in North Kivu. At present, the lion's share of the makala on the market is produced using the Virunga National Park's natural forests. Seen as it is forbidden to harvest wood from these forests, the makala is produced illegally.

Wood energy supply is a complex issue, especially in terms of reducing deforestation in the Virunga National Park without raising the price of makala for households in Goma. The ECOMakala project is based on the objective of **marketing legally produced, sustainable makala, referred to as ecomakala, which is produced from rapid growth trees, planted on the peripheral areas of the Virunga National Park.**

Working with small-scale tree-planters

The main players in the project were the thousand or so **small-scale farmers**¹⁷, land owners possessing less than 5 ha of land and tree-planting candidates for makala production in the area chosen for the project. The advantage of working with small-scale farmers is three-fold: they can truly benefit from the development of new techniques, unlock new sources of income and reduce the risk of destruction, theft or extortion through the high number of plots planted (see box 1). Land ownership is a complex issue for small-scale tree-planters. Under the aegis of the traditional and administrative authorities, the project sought to ensure that all land considered for tree planting was not the subject of a land ownership dispute and that the planting candidate was permitted by the authorities to use the land. Land tenure security, be it real or de facto, should ensure that the tree-planter has the right to exploit the land at least until the plantation is ripe for harvesting.

Another crucial factor in our choice of plots for planting was making sure that the reforestation plots were not located within the Virunga National Park. We also made sure that the plots chosen had not been the site of primary or secondary forest exploitation or of a recently harvested plantation¹⁸.

17. The project's initial goal was to work with three different groups: small-scale farmers, traditional leaders (the Mwami) and large-scale land owners. However, it soon emerged that it would be wise to concentrate our efforts on small-scale farmers and to limit our dealings with the other players at the "pilot" stage.

18. I.e. plantations which had been harvested within approximately the last 5 years.



Ouvrier planteur dans une parcelle destinée à la plantation, Minova, DRC © S. BEMELMANS

BOX
4

Choice of plots and species

The WWF provided the tree-planters with a list of suggested species and priority was given to plantations on marginal land. Upon signing up to the project, tree-planters were asked to state what they wanted to produce: sticks, poles, charcoal or timber. Suggestions as to the different type of species to be planted were made on the basis of intended production and soil conditions. The most popular species chosen were *Eucalyptus saligna*, *Grevillea robusta*, *Eucalyptus maidenii*, *Acacia mearnsii*, *Cedrela serrulata* and *Senna siamea*.

The tree planters then decided, on the basis of the information provided, which species they would plant where. Some farmers chose to combine crop production with tree planting in a single agroforestry system, at least until the canopy was closed for the latter. Others decided to earmark their best land for tree planting in order to obtain the best yield..

Setting up an ECOMakala production chain with local associations

Each impediment to the planting of trees (box 3) was analysed and a specific strategy for the creation of a production chain was developed.

We decided to partner with NGOs and local associations **to facilitate the planting of trees** for the production of ECOMakala. The partners were tasked with selecting the tree planting candidates, setting up the nurseries which would provide the plants and training the planters in forest management, instructing them on soil preparation, planting and maintenance. The associations were also asked to monitor tree planters and the quality of their plantations. Training sessions were conducted to enable tree planters to **acquire all the technical skills** required. From the outset, it was decided that **financial support** should be given to small-scale tree planters so that they could



A nurseryman involved in the ECOMakala project, Minova, DRC © S. BEMELMANS

start, manage and maintain their plantations. They were given \$100 per ha as pre-financing¹⁹ which was to be used as start-up capital and, in part, to pay for labour on the plantation. Seedlings were delivered to them free of charge by the associations. The local associations and NGOs were paid \$150 per ha monitored to enable them to perform their mission activities, including the production of seedlings and assisting the tree planters. Seeds and tree stock for plant production were supplied in addition to the aforementioned financial assistance. Additional support, both technical and administrative in nature, was provided to the associations during the training phase to ensure that they were fully equipped for the tasks they had been assigned. Likewise, training sessions were conducted for the associations' extension agents, those with charcoal production experience and tree planters wishing to master or become more efficient in the art of carbonisation.

Finally, test plots were set up to assess yield rates and as a way of learning more about local tree species. These on-going tests can be used to better align technical advice to the potential of the land chosen for planting.

Species planted on test plots: growth and end-use (Institut Technique Agricole et Vétérinaire, Butembo, DRC)

BOX
5

N°	SPECIES	GROWTH	END-USE OF WOOD			
			Firewood	Sticks and poles	Carpentry	Essential oils
	Cedrela serrulata	2	+		+++	
2	Eucalyptus citriodora	1	++	+		++
3	Eucalyptus maidenii	1	+	+	++	
4	Eucalyptus saligna	1	+++	+	++	
5	Grevillea robusta	3			++	
6	Markhamia lutea	3	+++	+		
7	Nauclea diderrichii	3	++		++	
8	Terminalia superba	2	+	+	+++	

19. This technically qualifies as pre-financing as the tree-planter is asked to sell back 20% of first harvest production. Such a system can be likened to a loan or microcredit.

Setting up an ECOMakala marketing chain

One of the aims of the project was to provide tree-planters with an income through the marketing of makala produced from the new plantations. To this end, ecomakala must be placed on the market at a price which can compete with illegally produced makala. Therefore, the marketing chain needed to be set up in a transparent fashion to enable its benefits to be fairly distributed between the links in the chain and strengthen the role played by the tree-planters in price negotiations. Efforts were made to form tree planting cooperatives or associations, to pinpoint links in the chain and calculate the chain costs with a view to evenly spreading the revenue and costs across all links in the chain. The end goal was to establish marketing contracts for ecomakala produced by the tree-planters participating in the project.

Figure 2: Links in the makala marketing chain and wood product flows between them.



Progressive wood harvesting

BOX
6

Most of the exotic tree species used will regrow after cutting. This means that four cutting cycles (across a twenty-year period) are often possible without replanting being necessary. These species constitute a stock of live wood which tree-planters can harvest at a favourable time. In this project, trees could not be harvested for makala production in the first three years following planting to ensure minimal makala production and the capture of a certain amount of carbon. Only one third of the total area can be harvested each year.



© K. HOLT/WWF-UK

BOX
7

Gervais Jade, 48, PAEDE coordinator, Minova

The Endogenous Development Aid Programme for Farmers and Breeders (PAEDE) is an NGO based two hours by road from Goma. It has almost 130 members, all of whom are local small-scale farmers. The association seeks to fight malnutrition, defend the rights of disadvantaged farmers and breeders, protect the environment and ensure access to microcredit. PAEDE is one of the 40 ECOMakala partner organisations.



Gervais, coordinator of non-profit organisation PAEDE © S. BEMELMANS

Why did you want to take part in the ECOMakala project?

In the past, PAEDE set up pilot nurseries and distributed seedlings. However, this was a small-scale operation. Taking part in the ECOMakala project enabled me to reforest on a larger scale. There was great demand for this amongst the local people.

How many hectares have you reforested up to now?

In 2009, we started with a very modest 15 hectares. Up to now, we've been able to reforest 205 ha and we are planting 40 hectares in this planting season.

How do you select tree-planters?

People are informed and invited to apply to be tree-planters via WWF radio broadcasts. We are looking for candidates who can offer sufficient available land, free from ownership disputes, outside of the Virunga National Park and where natural forest has not been harvested in the recent past.

What difference has the project made to people's daily lives?

First and foremost, it has created jobs and extra income through the sale of timber products which can lead to further projects being set up to benefit local people.

Ensuring the sustainability of the project and its financing

International donors and the WWF offered a substantial amount of capital for the reforestation project. To avoid reforestation activity becoming dependent on these funds, we deemed it vital to set up a financial sustainability mechanism for reforestation. With this in mind, efforts were made to set up a rotating capital system.

Rotating capital aims to help organisations create self-financing systems to support tree-planters and enable access to all the resources necessary for the proper functioning of the production chain. Rotating capital is underpinned by two mechanisms.

The first requires all tree-planters who sign a contract with an organisation to sell back 20% of their harvest in years 4, 5 and 6 (on the basis of 1/3 of trees being harvested per ha per year). Payment may be made in kind (wood or makala) and the products must then be sold on by the organisation to finance its activities and provide support for (new) tree-planters.

The second mechanism seeks to register the plantations in the **A/R CDM** initiative (see box 8) as a potential source of future revenue for farmers through the marketing of the plantations' carbon stocks.

Furthermore, the ECOMakala project laid down the basis for access to another financial mechanism, REDD+, which was promoted by another pilot project (see box 10).

BOX
8

Can ECOMakala tree-planters benefit from the carbon market?

From the very beginning of the ECOMakala project, the idea was that the project could tap into carbon funds and that this would act as an incentive to start reforestation activity. As the project enables carbon capture and storage and avoids deforestation in the National Park, it meets all of the eligibility criteria for access to carbon funds. Two different carbon funds are of interest to the project: the Afforestation / Reforestation Clean Development Mechanism (A/R CDM), which promotes increases in forest size, and REDD funding, which aims to reduce deforestation rates.

CDM Assessment

From the outset, a rigorous database monitoring system was implemented, not just to meet the CDM criteria but also to guarantee that planting was proceeding as planned with no cases of fraud i.e. “ghost” plantations. Forestry officials visited the plots several times to collect the necessary data. Socio-economic and environmental studies were also conducted and map-based monitoring methodology was tested as part of the MORECA university project²⁰.

20. The MORECA project (Monitoring of large scale Reforestation projects for Carbon finance mechanisms) is a partnership between the WWF (EcoMakala project), the Université Libre de Bruxelles and the Université Catholique de Louvain and is financed by BELSPO (Belgian Science Policy Office). The project tested ways of identifying and analysing forest zones via satellite, based on UNFCCC definitions. Two methodologies were compared and combined in mapping the eligibility of potential reforestation areas whilst a methodology for monitoring reforested plots using optical and radar satellite pictures was drawn up.

ECOMAKALA OUTCOMES AND FIGURES

1. Meeting greater energy needs through mass reforestation

Almost 6,200 reforestation contracts were signed by local tree-planters and associations for the reforestation of 6,370 ha of land right around the periphery of the Virunga National Park (see figure 5). **5,476 hectares**, almost 40%²¹ more than the initial objective²² of 4,000 ha, were **formally approved** following plot assessments. This is an exceptionally positive result, given the conflict-ridden nature of the area in which our teams and tree-planters were working. In order to fully assess the impact of the project, the areas which have seen autonomous tree-planting by local farmers should also be considered as they have indirectly benefited from the production chain which was set up for the project. However, at this juncture, we are unable to provide quantitative data on independent tree-planting.

2. Working with small-scale tree-planters

4,900 landowners and tree-planters, including 400 women, participated in the reforestation project. 200 of these tree-planters also took part in training sessions and contributed to the setting up of nurseries which led to the growing of over 7 million plants which were used in the project. The average surface area of reforested plots is 1 ha, thus meeting our target of ensuring a good spread of plots to reduce the threat of large-scale extortion or destruction of plantations (see figure 5). Indeed, the planting of trees helps small-scale tree-planters to consolidate their ownership of the land. Worthy of note is the high level of female participation. This is of fundamental importance as it opens up new sources of revenue, but also because women play a key role in the dissemination of improved stoves, which will lead to a decrease in makala consumption rates.

3. Setting up an ECOMakala production chain with local associations

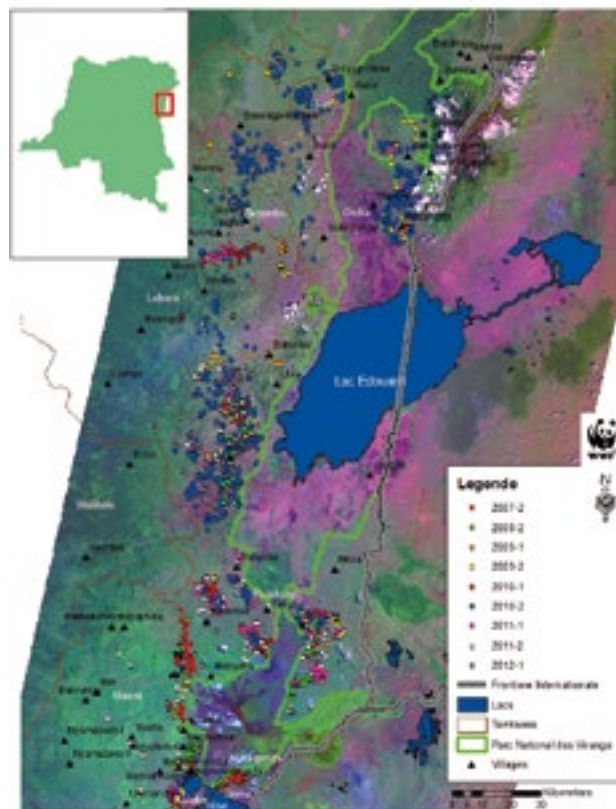
In order to set up an effective production chain, it was necessary to provide training for the tree-planters and those assisting them and to ensure that financial support was made available to the planters and the organisations supporting them. We ensured that the tree-planters were trained and received a small amount of investment capital in order to prepare viable, quality plantation plots²³ for the production of ecomakala, though some tree-planters were of the opinion that the amount of money they received was not sufficient to cover all costs, especially labour.

21. We made a conscious decision to be cautious in setting an objective of 4,000 ha as security concerns meant that we would not be able to freely circulate in all of the project areas. This was indeed the case in practice, but the teams were able to adapt to this challenge and surpass the objective.

22. Around 7% of this area was planted by large-scale landowners.

23. 86% of plots planted were deemed to be viable and of quality.

Figure 3: Locations of plots which have been reforested as part of the ECOMakala project.



The 4,900 tree-planters were supported by 67 local associations and around 100 extension agents who had been trained in providing support training and follow-up assistance to local tree-planters. 528 people received training in carbonisation techniques with 109 of them being officially recognised as “maitre charbonnier”. Wood cut from the first plantations was used in carbonisation tests which made it possible to slightly increase carbonisation yields. However, the technique needs to be developed further²⁴.

In different areas of North Kivu, there is a network of individuals trained²⁵ in ecomakala production who are able to carry out further reforestation work. This network forms the basis upon which all new initiatives and plantations can be based. It is a valuable source of skills and inputs for all future tree-planting candidates. Furthermore, the network should facilitate the dissemination of effective techniques even amongst tree-planters who did not take part in the ECOMakala project.

4. Setting up an ECOMakala marketing chain

Work on structuring the marketing chain began in the penultimate year of the project, with the trees requiring a growth period of almost 4 years before being harvested for the first time. Two large-scale meetings were called and brought together almost 1,500 tree-planters. These led to the setting up of 4 producers groups which are based in Rutshuru, Nyiaragongo, Beni and Lubero. In addition, three tree-planter cooperatives²⁶ were established in Saké, Kitshanga and Minova. The producers groups and cooperatives were tasked with organising ecomakala collection, transport and sales on behalf of their members and the negotiation of contracts and sales prices. These groups are still fledgling in nature and will doubtless require strengthening.

After five years of growth, i.e. the entire duration of the project, only one attempt was made to market ecomakala in 2012. The fledgling tree-planting cooperative established in Saké succeeded in negotiating a contract for the sale of 17 tonnes of ecomakala (850 sacks). The product was sold in Saké, a few kilometres away

24. Yield rates of 15 to 18% are possible. This is double the yield rate of the traditional methods used in the National Park.

25. However, the supply of quality seed to the region remains a serious problem.

26. COCOPROBA in Kitshanga, CACOPROB in Sake and COOPROMA in Minova.



© M. VAN GEIT / WWF-RDC



Small-scale tree-planters meeting, Goma, 2012

© C. ELLIS

from Goma, for \$22 per sack and was then sold on the market in Goma for \$25 including tax. At the time, illegally produced makala was being sold for \$30, with the higher price being linked to the higher calorific content of the product. This initial experience enabled us to verify that the sale price met the producers' expectations²⁷.

5. Ensuring the sustainability of the project and financing

The implementation phase of the first rotating capital mechanism saw tree-planters commit to sell 20% of the product of their first harvest cycle to associations. The formal implementation of this principle has not yet occurred due to the fact that the lion's share of the plantations has yet to reach maturity and, as a result, there have been few sales. However, there appears to be other hindrances to the application of this clause, the main one being that tree-planters fail to see the advantages of financing associations by selling back to them. It seems as though associations suffer from a legitimacy deficit and are, at present, unable to demonstrate their potential for added-value to tree-planters.

The second rotating capital mechanism is centred around placing carbon on the market. Ex-ante measuring of carbon storage levels²⁸ was carried out at ECOMakala plantations and initial results should be verified and backed up by in-depth analysis. It is currently estimated that around 260,000 tonnes of CO₂²⁹ has been absorbed across the 5,476 ha of plantations. The CO₂ market is currently experiencing price volatility, but if one assumes a price of \$4/tonne of CO₂, the carbon stored in ECOMakala plantations is worth the equivalent of around 1/4 of the sum invested by donors.

27. Up to now, it has not been possible to carry out a full evaluation of the real production costs borne by the producer or the sharing out of costs across the production and marketing chain. A study seeking to quantify the real costs is in the pipeline.

28. Estimates calculated on the basis of provisions contained in the IPCC publication "Good Practice Guidance for Land-use, Land-use Change and Forestry".

29. After around 7-8 years of growth and harvesting, a balance between harvesting and growth shall arise which enables absorption levels to stabilise.



Project's Eucalyptus plantations for the ECOMakala production © H. DAUDI / WWF-RDC

DIFFICULTIES ENCOUNTERED AND LESSONS LEARNED

1. Meeting greater energy needs through mass reforestation

If no action were to be taken to reduce makala consumption, the ECOMakala project would produce enough makala to account for 13-14% of total annual makala consumption in the city of Goma. However, we believe that the dissemination of improved stoves will reduce makala consumption rates by around 50%. As a result, the demand for makala would equate to around 20,000 ha of forest, around 3.5 times the plantation area of the ECOMakala project. Therefore, setting up more plantations is a priority. Furthermore, we have noticed that the idea behind the project is being taken up by other tree-planters who were not directly involved in the project but decided to set up plantations using the ECOMakala project model as inspiration. These additional plantation areas should enable even more makala to be placed on the market, although it is currently not possible to quantify these extra amounts. In future projects, it would be propitious to seek to better understand, evaluate and encourage such spin-off activities so that more resources can be deployed to support plantations.

2. Working with small-scale tree-planters

Producing the equivalent of 5,476 ha of plantations whilst working with over 5,000 individuals requires efficient technical, administrative and logistical organisation. Therefore, a professional coordination team, efficient monitoring tools (including GPS and databases) and well-organised associations are a must. In practice, not all associations were particularly well-organised and so our methodology for working with associations needs to be revised so as to better reflect these concerns.

Project developments have confirmed the effectiveness of a strategy aimed at spreading the expected benefits of plantations across a large number of players and, by so doing, seeing income levels improve and a large number of locals trained in reforestation. In addition, the ECOMakala project has helped to ensure land security for tree-planters as it is a form of land appropriation. Furthermore, the project has reduced the risk of plantation destruction or appropriation by armed gangs in conflict-ridden areas.



A small-scale tree-planter in his new plantation © S. BEMELMANS

BOX
9

Amani Protés, 56, is a tree-planter and member of the PAEDE association. He is a farmer and has recently become a tree-planter.

How did you become an ECOMakala tree-planter?

I became interested when I saw what participating tree-planters and the association were doing.

Did you have any previous reforestation experience?

In 1967, I helped my father reforest hillside areas but all of the wood was harvested and the plantations became depleted.

Why did you want to take part in the ECOMakala project?

I wanted to reforest the hillsides. Access to high-quality seeds, financial support and the profit I could make when the trees reached maturity were other key factors in my decision to take part. I want to produce sticks, makala and planks.

Do you think that reforestation is important?

Yes, there is a need for the products which are made from the plantations' raw materials but we also need to fight soil erosion and increase soil fertility. I also want to ensure that my children have a future. In addition, protecting natural forests is very important.

Is there much work involved in setting up a plantation?

Yes, you need to prepare the soil and then maintain it, which is a significant task. Regular work is needed because you have to constantly monitor the plantation in order to maintain it.

What will you do with the money that you earn from wood harvesting?

The money will pay for my children's schooling and enable me to start breeding goats or poultry.

3. Setting up an ECOmakala production chain with local associations

The associations may well be the main players in disseminating plantation techniques and organising individual tree-planters, but they were seriously lacking structural organisation to an extent which was underestimated in the early stages of the project. Most of them were recently established and thus had low community legitimacy. Furthermore, contractual obligations and their implications were often a new experience for them. There were a number of weaknesses which led the project team to take charge of some tasks which had initially been assigned to the associations. More support and pre-project training would have most definitely enabled them to increase their skill-set and, consequently, their level of autonomy. This would have enhanced their decision-making skills and enabled them to better organise tree-planters on a medium and large-scale.

Some technical difficulties remain, such as pest management, maintenance quality, managing competition with intercrops, carbonisation efficiency etc. Additional skills, technical research and solutions adapted to the local environment need to be developed in order to increase makala production and the efficiency thereof.

Marginal soils were given priority in terms of “full scale” tree planting. In addition, agroforestry systems were set up to improve plantation productivity whilst allowing for a certain level of agricultural production to take place at the same time. These systems still require further optimisation in order for them to be fully effective in possible future carbon market projects.

Land rights remain a thorny issue and resolving the problems underpinning them was not the goal of the project. The system of validation via administrative and traditional authorities did however prevent land conflicts from arising on land used for reforestation purposes.

4. Setting up an ECOmakala marketing chain

Just like the tree-planters’ cooperatives, the marketing chain was set up at a relatively late stage of the project. These chains are still relatively fragile with little marketing experience thus far. Consequently, marketing chains should be prioritised in future projects. In our eyes, the rationale of developing a plethora of small, decentralised production and marketing networks is the key to success, both for logistical reasons such as barriers to market access, i.e. very poor infrastructure, and to ensure security of production, especially with armed gangs posing a constant threat. The role of the associations is of vital importance here.



Men carrying makala bags, on the road to Saké, near Goma, DRC

© K. HOLT/WWF-UK

5. Ensuring the sustainability of the project and financing

Evaluating the project cost, and thus addressing its sustainability, is not an easy task. There are still many unresolved questions in terms of financially supporting tree-planters and associations and assessing how much they value such support. Further questions arise in relation to the organisational work carried out by the project team and the eligibility of plantations for access to the carbon market.

The project saw a \$100 “loan” granted to tree-planters in exchange for the sale of 20 % of production. This amount was certainly not sufficient to cover all production costs incurred by the tree-planters. However, this amount is low in comparison to the capital which shall be made available to tree-planters when the plantations reach maturity.

As previously mentioned, the practice of selling back 20% of production to associations has not yet been established across the board. The associations’ perceived lack of legitimacy and doubts as to the added value which they can provide to their members, in particular to tree-planting candidates, are problems which need to be addressed in future projects. In order to progress from the current practice of offering \$100 as investment capital, the possibility of offering microcredit to tree-planters has been raised. However, at present, microcredit is only a viable option for very short-term loans, i.e. 3-4 months, due to the interest rates offered by micro-finance institutions. It is currently impossible to obtain loans with a repayment schedule beginning 4 or 5 years after they have been granted, i.e. upon initial harvesting. Therefore, the only way of financially supporting tree-planters with no existing investment capital is to provide them with “loans” through the rotating capital mechanism.

It could be argued that the \$150 granted to associations was a little too generous in light of the fact that many of the tasks assigned to them were then carried out by the project team. However, it would be unrealistic to expect just one WWF team to support every single producer taking part in the project. Organising the project was a mammoth task, with the majority of the project team’s work dedicated to analysing plantation quality and conditions, tasks which required constant monitoring throughout the entire growth cycle. In-depth analysis of several different aspects, such as surface area, plantation location and production levels, was carried out by the project team in order to ensure that the plantations met the criteria laid down for access to carbon credits.

Was all the hard work worth it in the end? Well, checks had to be put in place to ensure a certain level of project efficiency and, in terms of carbon credits, the more information that can be gleaned, the better. However, we do not know whether the extra information requested by the carbon credit authority³⁰ will bear fruit financially. What is clear is that if the price of CO₂ credits falls below a certain threshold, perhaps \$1, then the extra cost of monitoring and adhering to the scheme's criteria will no longer be covered by the income from the sale of carbon credits.

Extremely difficult working conditions

The project was carried out in extremely difficult circumstances owing to armed conflicts, land ownership disputes and mass population movements. In spite of this, the project team were able to handle very difficult situations by being extremely flexible in delocalising some activities as armed conflicts developed to ensure that work could continue.



Women in their field © M. VAN GEIT / WWF-RDC

³⁰. Separating the additional costs of monitoring linked to the carbon credits scheme and those owing to project management alone is not an easy task.

PERSPECTIVES

One of the main reasons for degradation in and around the Virunga National Park is the demand for wood energy and charcoal, known locally as makala. Environmental degradation is one of the most significant threats to the Park's biodiversity and natural habitats.

The energy challenges facing the region are immense and, in the short-term, the majority of the population has no accessible alternative to makala. Investment in hydro-electric power has been announced but this is not a solution to the short-term needs of the lion's share of local communities. It is very unlikely that this new source of energy shall be made available, at least in the short-term, to households below a certain socio-economic threshold or located outside of a certain radius of production sites or distribution networks.

Protecting the National Park does not only involve preserving its biodiversity but also highlighting its significant potential for tourism, the growth of which would be of benefit to the country and its inhabitants. Located in the Congo River basin, second only to the Amazon in terms of total forest area, the Virunga National Park's forests and the plantations in the North Kivu region are vital for climate preservation not just in the region, but also the country and the entire continent.

Therefore it is vital that **ecomakala** is made available to the regional population, especially those residing in Goma, as a short-term alternative energy source to the makala illegally harvested from the Virunga National Park, whilst simultaneously ensuring that living conditions improve for communities and both makala producers and consumers. **This is a very significant challenge in the fight against deforestation.**

Against this backdrop, there are four areas in which we must succeed:

1. Mass reforestation of the areas surrounding the Virunga National Park in order to make ecomakala available at a fair price and reduce makala consumption

There are three key actions which we believe are of paramount importance to ensure short-term supply of a significant amount of legally produced makala, corresponding to between 10,000 and 15,000ha of plantations, to the Goma market as a replacement for illegally produced makala.

1. Develop plantations on the basis of the ECOMakala model, ensuring support for tree-planters and associations.
2. Make available improved stoves, which use almost 50% less makala, to all consumers in Goma.
3. Implement technical and marketing strategies to enable an ever-growing number of locals to set up large-scale plantations by setting up appropriate monitoring and more support systems.

2. Combatting illegal logging and subsequent illegal production of makala in the Virunga National Park

Reducing accessibility to illegal accessibility to illegality produced makala is a key goal which should be pursued alongside the setting up of plantations. This has to be made in accordance with the CNCI which is in charge of the control of the park. This will enable the legally produced makala to obtain a larger share of the local charcoal market. Strengthening on-site and monitoring teams addressing logging within the National Park is a priority.

3. Increasing income levels for rural communities by strengthening and improving the structure of decentralised ecomakala production and marketing chains

At the end of the 5-year project, the foundations have been laid upon which to build and reinforce ecomakala production and marketing chains. The chains must ensure fair remuneration for tree-planters and a fair price for the consumer. To this end, we feel that the fledgling tree-planters' cooperatives can play a leading role in setting up fair ecomakala production and marketing chains and can make their presence felt politically and economically on the problematic issue of sustainable wood energy supply. In order for associations to play an efficient role in the setting up of the production and marketing chains, they need to be strengthened and receive more recognition from their members.

Beyond improving its technical performance, it is essential to increase the profitability of ECO makala vis-a-vis its illegal competitor by introducing a form of positive discrimination. In this respect, two strategies can clearly be envisaged:



Women producing “improved stoves”, North Kivu © WWF BE

stepping up the inspections carried out by the *Institut Congolais de Conservation de la Nature au sein du Parc* in order to combat illegal exploitation on the one hand, and lobbying the political authorities in order to lower taxes in favour of ECOmakala on the other.

4. Broaden partnerships

With the return of peace to the area, we hope that it will be easier to ensure sustainable levels of tree planting. The time is nigh to broaden existing partnerships and enable State agencies and political and administrative authorities to become more systematically involved seen as they can play a significant role in building on the project's success.

New plantations are already in the pipeline. The WWF has already started two projects which seek to plant an additional 4000 ha³¹ (see box 10) in the same area as the ECOmakala project. One of the goals of these projects is to encourage the use of improved stoves.

The WWF is ready and willing to work with NGOs and donors who are active in the area, with whom we share our experiences and best practice examples arising from the ECOmakala project. We hope that we can join forces to further develop plantations which will benefit local populations, both rural and urban, and help to preserve the biodiversity of the Virunga National Park whilst contributing to reduce the impact of climate change.

ECOMakala +, a new project under the REDD+ mechanism

BOX
10

REDD is a carbon financing mechanism which seeks to Reduce Emissions resulting from Deforestation and Degradation. Upon request of the government of DRC, the ECOmakala project has now evolved into a REDD+ pilot scheme. ECOmakala + is one of the seven geographically integrated pilot schemes which are being financed by the Congo Basin Forestry Fund (CBFF).

The project started in July 2013 and shall run for two and a half years. The objective is to reduce deforestation and forest degradation in the southern part of the Virunga National Park. The project was set up to further address the region's problems by not only sustainably increasing charcoal supply through the planting of a further 1,000 ha on the basis of the ECOmakala project model, but also by reducing demand through the promotion of improved stoves. Another aim is to further improve planting conditions by supporting a more formal approach to land rights and stepping up checks in the Virunga National Park.

Efforts are being made to develop REDD+ methodology at a provincial level in order to make project activities more effective, including those of NGO partners in the REDD mechanism, and with a view to partnering with the Congolese government.

31. Aside from the REDD+ project, the WWF is also a partner in the "Congo Forests and Climate Change" (CFCC) project which is financed by the European Union via CIFOR. The project seeking to plant an additional 3,000 ha began in May 2013.



Tree selection before felling, Kirumba, RDC © H. DAUDI

Acronyms

- A/R CDM:** Afforestation / Reforestation Clean Development Mechanism
- BELSPO:** Belgian Science Policy Office
- CBFF:** Congo Basin Forest Fund
- CDM:** Clean Development Mechanism (Kyoto protocol)
- CIFOR:** Center for International Forestry Research
- CNCI:** Conservation National Congolese Institute
- DGIS:** Directorate General for International Cooperation, Netherlands
- DRC:** Democratic Republic of Congo
- EU:** European Union
- IFDC:** International Fertilizer Development Center
- NGO:** Non-governmental organisation
- REDD+:** The Mechanism of Reducing Emissions from Deforestation and Forest Degradation
- UNDP:** United Nations Development Programme
- UNFCCC:** United Nations Framework Convention on Climate Change

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Chimpanzee female carrying her twins infants © NATUREPL.COM/ANUP SHAH / WWF-CANON

WWF in figures

100%
RECYCLED



97 %

of households in North Kivu province are dependent on energy produced from makala, charcoal or firewood. In Goma, 80% of these energy sources are produced from wood harvested from the forests of the Virunga National Park.

5.476

hectares of forest were planted in the ECOMakala project.



20.000

hectares of forest are necessary to meet the makala needs of Goma's households provided that they all are equipped with improved stoves which use 50% less makala.

4.900

tree-planters took part in the project.



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