

## Deforestation Trends in the Congo Basin

*Reconciling Economic Growth  
and Forest Protection*

## ACKNOWLEDGMENTS

*Deforestation Trends in the Congo Basin: Reconciling economic growth and forest protection* is the output of a two-year exercise implemented at the request of the COMIFAC (regional commission in charge of forestry in Central Africa) to strengthen the understanding of deforestation dynamics in the Congo Basin.

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EXECUTIVE SUMMARY

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## Foreword

As global networks of trade, migration, technology, information and finances have grown in strength, speed and density over the last decades, so have our understanding and awareness of the connections that shape the world's physical landscapes and economies. We know that policy decisions in one country can affect the way land is managed thousands of miles away. We know that greenhouse gases emitted in different sectors and in different economies influence the pace of climate change for all. And we know that vicious cycles of poverty, land degradation and food insecurity can be transformed into virtuous cycles of sustainable intensification and shared prosperity with the right interventions and incentives. Development challenges and solutions are all connected, at the local, regional and global level.

Those far-reaching connections come to the fore in a new and timely study that looks at deforestation trends in the Congo Basin across sectors and beyond national borders. The study, led by the World Bank's Africa Region Environment team with the participation of key Congo Basin country stakeholders and support from multiple donors, was informed by economic modeling complemented with sectoral analysis, as well as interactive simulations and workshop discussions. This innovative approach has already deepened our understanding of the multiple drivers of deforestation in the Congo Basin beyond the usual suspects (commercial logging) and opened political space to discuss the role of sectors such as agriculture, energy, transport and mining, in shaping the future of the Basin's forests.

This analysis, combined with recommendations which policy makers can now further refine and flesh out at the country level, could potentially help Congo Basin countries overcome some of the more severe trade-offs between growth and forest protection. If Congo Basin countries are able to minimize forest loss as their economies develop, they could "leapfrog" the steep drop in forest cover that has historically accompanied development in many countries, and make an important global contribution to climate change mitigation by reducing emissions associated with deforestation.

The time is now ripe to move ahead with some of the sound "no-regrets" recommendations made by study participants and experts.



*Jamal Saghir*

*Director*

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*Africa Region*

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## Main Messages

The countries of the Congo Basin face the dual challenge of developing local economies and reducing poverty while limiting the negative impact of growth on the region's natural capital, and forests in particular.

Development needs are great. Despite abundant natural assets, between one-third and two-thirds of the population in different countries of the Basin hover beneath the national poverty line, access to food is significantly inadequate, and undernourishment is highly prevalent. Transportation infrastructure is among the most deteriorated in the world, creating essentially landlocked economies within the region that considerably accrue farmers' vulnerability to poor harvests. Looking ahead, the Congo Basin population is expected to double between 2000 and 2030, leading to a total of 170 million people by 2030—people in need of food, energy, shelter and employment.

At the same time, natural assets have so far been largely preserved, and deforestation rates in the Congo Basin are among the lowest in the tropical rainforest belt and are significantly below rates in most other African regions. The canopy has benefitted to some extent from "passive protection" provided by political instability and the lack of transportation infrastructure.

However, this situation may change. Local and regional development, population increases and global demand for commodities are likely to increase deforestation and forest degradation in the Congo Basin. While subsistence activities

such as small-scale agriculture and fuelwood collection are currently the main causes of deforestation and degradation in the Basin, new threats are expected to emerge.

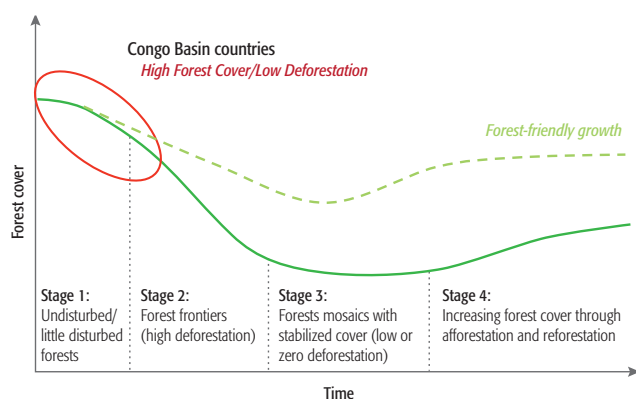
A two-year study was conducted to analyze deforestation dynamics in the Congo Basin and resulting greenhouse gas emissions by 2030. This study combined a modeling exercise with a qualitative analysis of trends in different sectors, as well as a dialogue with experts from the region. Main results suggest that

- Deforestation rates are likely to increase in the future to sustain development and poverty reduction.
- Increasing agricultural productivity is not sufficient to limit pressure on forests.
- Wood extraction for domestic fuelwood or charcoal production will continue to grow for the next few decades and could create a massive threat to forests in densely populated areas.
- The development of much-needed transportation infrastructure could lead to major deforestation by changing economic dynamics in newly accessible areas.
- The pressure from formal logging is limited, but informal chainsaw logging is expected to progressively degrade forests.
- Mining—a largely untapped source of income and growth—could also lead to significant impacts when the sector develops.

Congo Basin countries are now at a crossroad—they are not yet locked into a development path that will necessarily come at high cost to forests. They can define a new path toward “forest-friendly” growth. The question is how to match economic change with smart measures and policy choices so that Congo Basin countries sustain and benefit from their extraordinary natural assets over the long term—in other words how to “leapfrog” the dip in forest cover frequently observed in the forest transition curve (see figure 1).

This study on *Deforestation Trends in the Congo Basin: Reconciling economic growth and forest protection* highlights options to limit deforestation while pursuing inclusive, green growth. Emerging environmental finance mechanisms, such as reducing emissions from deforestation and forest degradation (REDD+) under the climate change negotiations, may provide additional resources to help countries protect

FIGURE 1: Forest transition theory. Where Congo Basin countries stand.



Source: Adapted from Angelsen, 2008. The dotted line illustrates what “forest-friendly” growth could look like.

their forests. But there are already a number of “no-regrets” actions that countries can take to grow along a sustainable development path.

- Participatory land use planning could help clarify trade-offs among different sectors, encourage the development of growth poles and corridors, and direct destructive activities away from forests of great ecological value.
- Unlocking the potential of the Congo Basin for agriculture will not necessarily take a toll on forests: the Congo Basin could almost double its cultivated area without converting any forested areas. Policy makers should seek to target agricultural activities primarily towards degraded and non-forested land.
- In the energy sector, putting the woodfuel supply chain on a more sustainable and formal basis should stand as a priority. More attention should be paid to responding to growing urban needs for both food and energy through intensified multi-use systems (agroforestry).
- Better planning at the regional and national levels could help contain the adverse effects of transportation development, through a multi-modal and more spatially efficient network.
- Expanding sustainable forest management principles to the booming and unregulated informal logging sector would help preserve forest biomass and carbon stocks.
- Setting “high standard” goals for environmental management of the mining sector could help mitigate adverse effects as the sector develops in the Congo Basin.

A lush, green forest landscape with a prominent tall tree in the center. The scene is misty and hazy, with dense foliage covering the hillsides. The colors are vibrant greens, ranging from light to dark, with a soft, ethereal atmosphere. A teal banner is overlaid in the top right corner.

SECTION ONE

*Photo: Boleslaw Kubica*



## Congo Basin Forests at a Glance

The Congo Basin spans six countries: Cameroon, the Central African Republic, the Democratic Republic of Congo (DRC), Equatorial Guinea, Gabon, and the Republic of Congo. It contains about 70 percent of Africa's forest cover: Of the Congo Basin's 530 million hectares (ha) of land, 300 million are covered by forest. More than 99 percent of the forested area is primary or naturally regenerated forest, as opposed to plantations, and 46 percent is lowland dense forest.

Industrial logging represents an extensive land use in the area, with about 44 million ha of forest under concession (8.3 percent of the total land area), and contributes significantly to revenues and employment. Unlike in other tropical regions, where logging activities usually entail a transition to another land use, logging in the Congo Basin is highly selective and extensive, and production forests remain permanently forested.

The Congo Basin forests are home to about 30 million people and support livelihoods for more than 75 million people from more than 150 ethnic groups who rely on local natural resources for food, nutritional, health, and livelihoods needs. These forests provide crucial protein sources to local people through bushmeat and fisheries. Forest products, whether directly consumed or traded for cash, provide a substantial portion of local peoples' income. Forests also constitute an important safety net in countries where poverty and undernourishment are highly prevalent (see box 1).

### BOX 1: Hunger in a Land of Plenty

Although most Congo Basin countries are richly endowed with natural resources and abundant rainfall, hunger is a serious to extremely alarming concern in all countries except Gabon (IFPRI Global Hunger Index, 2011). Agriculture is still dominated by traditional low-input, low-output subsistence systems and there are tremendous gaps between actual and potential yields. Poor infrastructure isolates farmers from potential markets and growth opportunities, thereby cutting off a significant proportion of the Congo Basin's active population from the broader economy.

	Poverty	Nutrition	Agricultural Land	Employment	Access to Food
Countries	Population at purchasing power parity \$1.25 a day %	Children under age five underweight %	Agricultural land area as % of total land area	Economically active population in agriculture %	Paved roads as % of total roads
Cameroon	9.6	16.6	19.8	46.4	8.4
Central African Republic	62.8	21.8	8.4	62.3	...
Congo, Democratic Republic of	59.2	28.2	9.9	56.7	1.8
Congo, Republic of	54.1	11.8	30.9	31.2	7.1
Equatorial Guinea	...	10.6	10.9	63.8	...
Gabon	4.8	8.8	19.9	25.2	10.2
<b>Sub-Saharan Average</b>	<b>47.5</b>	<b>21.3</b>	<b>52.6</b>	<b>58.2</b>	<b>23.8</b>

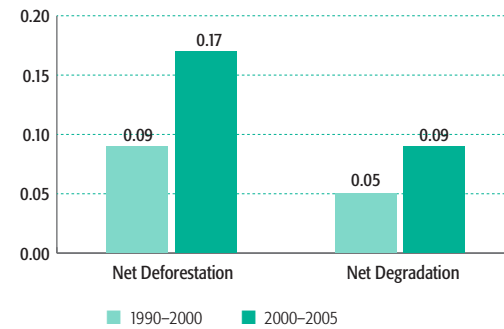
Source: UNDP (2012).



These forests perform valuable ecological services at local, regional, and global levels. Local and regional services include maintenance of the hydrological cycle and important flood control in a high-rainfall region. Other important regional benefits include regional-scale climate regulation and cooling through evapotranspiration and buffering of climate variability. The forests also house an enormous wealth of plant and animal species, including threatened animals such as the lowland gorilla and chimpanzee. Globally, Congo Basin forests represent about 25 percent of the total carbon stored in tropical forests worldwide, mitigating anthropogenic emissions (de Wasseige et al. 2012).

Deforestation and forest degradation have been minimal in the Congo Basin. Africa as a whole is estimated to have contributed only 5.4 percent to the global loss of humid tropical forest over 2000-05, compared to 12.8 percent for Indonesia and 47.8 percent for Brazil alone (Hansen et al. 2008) However deforestation in the Congo Basin has accelerated in recent years (see figure 2). Deforestation and forest degradation have been largely associated with expansion of subsistence activities (agriculture and energy) and concentrated around densely populated areas.

**FIGURE 2: Deforestation rates in the Congo Basin have doubled recently**



*Source: Average annual deforestation and forest degradation rates measured by satellite imagery, as reported in de Wasseige et al. (2012).*

SECTION TWO



*Photo: Jean-François Helliou and  
Nicolas Van Ingen*

## What Will Drive Deforestation in the Congo Basin? A Multi-sectoral Analysis

The Congo Basin forests may be at a turning point, heading toward higher deforestation and forest degradation rates. The Congo Basin forests have been mainly “passively” protected by chronic political instability and conflict, poor infrastructure, and poor governance. Congo Basin countries thus still fit the profile of high forest cover/ low deforestation (HFLD) countries. However, there are signs that Congo Basin forests are under increasing pressure from a variety of sources, including mineral extraction, road development, agribusiness, and biofuels, in addition to subsistence agricultural expansion and charcoal collection.

*The primary goal of the study was to raise awareness and build knowledge of deforestation dynamics.*

Causes and drivers of tropical deforestation are complex and cannot easily be reduced to a few variables. The interplay of several proximate as well as underlying factors drives deforestation in a synergetic way. Expansion of subsistence activities (agriculture and fuelwood collection) is the most commonly cited proximate cause of deforestation in the Congo Basin. This is supported by demographic trends and accelerated urbanization, which form the most important underlying cause of current deforestation. The Congo Basin region has so far not witnessed the expansion of large-scale plantation experienced in other tropical regions; however, larger macroeconomic trends could change this situation.

### **BOX 2: An Interactive Awareness Raising Exercise**

In 2009 the six Congo Basin countries, along with donors and partner organizations, agreed to collaborate to analyze major drivers of deforestation and forest degradation in the region. A modeling approach was chosen because the HFLD profile of the Congo Basin countries justified using a prospective analysis to forecast deforestation; historical trends were considered inadequate to capture the future nature and amplitude of drivers of deforestation. The approach built on an adaptation of the GLOBIOM model set up by the International Institute for Applied Systems Analysis and tailored to the Congo region (CongoBIOM) to investigate drivers of deforestation and resulting greenhouse gas emissions by 2030. It also strongly relied on inputs from three regional multi-stakeholder workshops held in Kinshasa and Douala in 2009–10, as well as in-depth analysis of trends in the agriculture, logging, energy, transport, and mining sectors.

The CongoBIOM was used to assess the impacts of a series of “policy shocks” identified by the Congo Basin country representatives. Various scenarios were developed in order to highlight internal drivers of deforestation—improved transportation infrastructure, improved agricultural technologies, and decreased fuelwood consumption—as well as external drivers—increased international demand for meat and for biofuel.

## AGRICULTURE

Agriculture is a vital yet neglected sector in the Congo Basin. Agriculture remains by far the region's largest employer. In Cameroon, the Democratic Republic of Congo, the Central African Republic, and Equatorial Guinea, more than half of the economically active population is still engaged in agricultural activities. Agriculture is also a significant contributor to GDP, particularly in the Central African Republic, the Democratic Republic of Congo, and Cameroon. Despite its importance, the agriculture sector has so far been neglected and underfunded for much of the past few decades. Most agriculture is small scale and the sector is dominated by traditional subsistence systems with a few large commercial enterprises, focused mainly on palm oil and rubber. Agricultural productivity in the region is very low compared with other tropical countries, with overall very low fertilizer use. As a result, reliance on food imports is substantial and increasing.

*There is great potential to both expand cultivation and increase existing yields.*

The potential for agricultural development in the Congo Basin is significant for many reasons. First, Congo Basin countries are endowed with much suitable and available land: Altogether, Congo Basin countries represent about 40 percent of the non-cultivated non-protected low-population-density land suitable for cultivation in Sub-Saharan Africa and 12 percent of the land available worldwide; if only non-forested suitable areas are included, the Congo Basin still represents

about 20 percent of the land available for agricultural expansion in Sub-Saharan Africa and 9 percent worldwide (Deininger et al. 2011). Second, the region has unconstrained water resources, which gives it an edge over other areas that may face water scarcity as a result of climate change. Third, Congo Basin countries unsurprisingly rank among the countries with the greatest potential in the world for increasing yields. Last, the rapidly urbanizing populations as well as increasing international demands for food and energy could drive a dramatic demand for agricultural products from the Congo Basin. These factors combine to make agriculture a very promising sector (see for example box 3).

Future agricultural developments may, however, be at the expense of forests. Unlocking the agriculture potential in the Congo Basin could increase pressure on forests, particularly if investments in road infrastructure remove a long-lasting bottleneck to market access. The CongoBIOM was used to identify the potential impacts of specific changes, both internal (such as agricultural productivity) and external (international demand for meat or palm oil) on Congo Basin forests. It highlights that an increase in agricultural productivity, often seen as a win-win solution to increase production and reduce pressure on forests, could turn out to drive more deforestation.

Despite its marginal contribution to global markets, the Congo Basin could be affected by global trends in agricultural commodity trade. The CongoBIOM tested two scenarios dealing with international commodity demand—Scenario 1: increase in global meat demand by 15 percent by 2030, and Scenario 2: doubling of first-generation biofuel production by

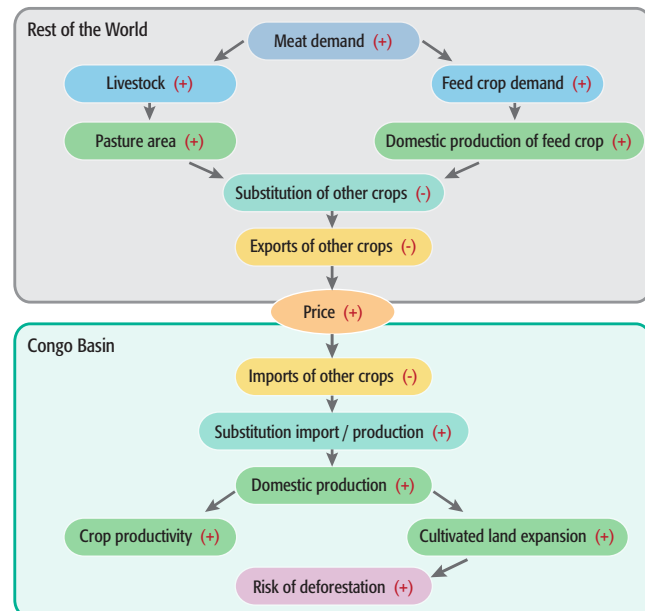
2030. Under both scenarios, the CongoBIOM highlights that the Congo Basin is unlikely to become a large-scale producer of meat or biofuel (in the short/medium term) but that it will be indirectly affected by changes in other parts of the world.

**BOX 3: Palm Oil Potential in Cameroon**

Demand for palm oil, the number one vegetable oil globally, is projected to rise as the world's population looks for affordable sources of food and energy. In 2011, Malaysia and Indonesia dominated the production of palm oil, but strong consumption trends have made it an attractive sector for investors seeking to diversify supply sources across the tropics, including in the Congo Basin. A case in point is Cameroon, where at least six companies are reported to be trying to secure more than 1 million ha of land for the production of palm oil (Hoyle and Levang 2012). In 2010, Cameroon produced 230,000 tons of crude palm oil across an estate of 190,000 ha (independent smallholdings accounted for 100,000 ha; supervised smallholder plantations and agro-industrial plantations accounted for the balance) and was the world's thirteenth largest producer. Compared with other crops in the Congo Basin, where productivity tends to trail far behind other countries' performance, palm oil yields in Cameroon are among the highest in the world (on par with Malaysia's). Because of its potential in terms of growth, employment, and poverty reduction, industrial palm oil production is a national priority, with plans to increase production to 450,000 tons by 2020. Some of the proposed plantation sites pre-identified in emerging land deals could be problematic because they appear to be in high conservation value forests or near biodiversity hotspots.

Although meat production in the Congo Basin is hampered by the prevalence of the tse-tse fly and the absence of a reliable feed industry, it could still be affected by a global increase in meat demand. According to the CongoBIOM, an increase in meat production (associated with increased land areas devoted to pasture and feed crops) in other regions of the world would reduce the production of other crops traditionally imported by the Congo Basin countries (for example maize); this would trigger a substitution of imports by more locally grown products that could potentially lead to increased deforestation in the Congo Basin (see figure 3).

**FIGURE 3: Effects of global meat demand on deforestation in the Congo Basin.**



## ENERGY

It is estimated that more than 90 percent of the total volume of wood harvested in the Congo Basin is for woodfuel and that on average 1 m<sup>3</sup> of woodfuel is required per person per year (Marien 2009). In 2007, Congo Basin countries' total production of fuelwood exceeded 100 million m<sup>3</sup>. The biggest producers were the Democratic Republic of Congo, with 71 percent of total regional fuelwood production, and Cameroon, with 21 percent, reflecting the countries' shares of the regional population.

*Consumption of woodfuel is likely to remain at very high levels for the next few decades.*

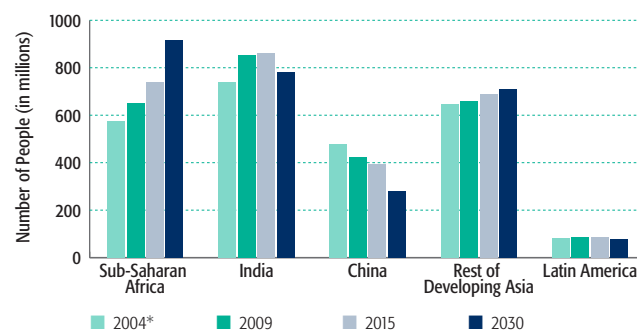
That said, energy profiles vary from one country to another based on wealth, access to electricity and the relative costs of wood and fossil fuel energy. In Gabon, for example, reliance on woodfuel is significantly lower, thanks to an extensive electricity network and subsidized gas for cooking.

The urban lifestyle tends to be more energy intensive because households in urban areas tend to be smaller, leading to less efficient per capita fuel use for cooking. In addition, charcoal is often the primary cooking fuel for many small-scale roadside restaurants and in kitchens of larger public institutions, such as schools and universities, hospitals, and prisons, as well as small-scale industries. With an average urban growth of 3 to 5 percent per year and even more (5 to 8 percent) for already large cities such as Kinshasa, Kisangani, Brazzaville, Pointe Noire, Libreville, Franceville, Port Gentil, Douala, Yaounde, and Bata, Congo Basin countries are

witnessing a shift from fuelwood to charcoal consumption because charcoal is cheaper and easier to transport and store.

Charcoal production in the Congo Basin increased by about 20 percent between 1990 and 2009—from 1,094,000 to 1,301,000 metric tons—according to the UN Energy Statistics Database. In contrast to China, India, and much of the developing world, where the use of wood-based biomass energy has peaked or is expected to peak in the near future, consumption of wood-based biomass energy is likely to remain at very high levels in the Congo Basin and even continue to increase for the next few decades, based on population growth, urbanization, and the relative price change of alternative energy sources for cooking (liquefied petroleum gas or others).

FIGURE 4: Number of people relying on the traditional use of biomass (millions)



Source: IEA World Energy Outlook 2010. (\*=IEA World Energy Outlook 2006).

Note: The projections for 2015 and 2030 are part of the IEA "New Policies Scenario," which assumes that recent government commitments are implemented in a cautious manner, and primary energy demand increases by one-third between 2010 and 2035, with 90 percent of the growth in economies outside the Organization for Economic Cooperation and Development.



In rural areas the impact of woodfuel collection may be offset by natural forest regeneration, but it can become a severe cause of forest degradation and eventual deforestation when demand comes from concentrated markets such as urban households and businesses. Basins that supply a growing urban demand extend over time and can radiate as far as 200 km from the city centers, gradually degrading natural forests. The peri-urban area within a radius of 50 km of Kinshasa, for example, has been largely deforested (see box 4).

Wood biomass energy is supplied by an inefficient sector. Charcoal is mostly produced using traditional techniques, with low transformation efficiencies (earth pit or earth mound kilns). The organization of the charcoal supply chain is also notoriously inefficient, relying on poorly designed regulatory frameworks that eventually lead to massive informality in the sector. The pricing structure of woodfuel sends perverse signals, as it incompletely accounts for the different costs along the value chain. In most cases, the primary resource (wood) is taken as a “free” resource. Inadequate economic signals in the woodfuel supply chain do not allow the producer to apply sustainable forest management techniques.

However, experience in other countries (for example, Rwanda) suggests that the scarcity of wood products increases the economic value of remaining forests, thereby creating incentives for better forest management and the establishment of woodlots and tree plantations. As a result, forest ecosystems begin to recover—albeit with a great loss in biodiversity—and transition to more artificially planned plantations and monocultures.

#### **BOX 4: Feeding Cities: Mixing Charcoal and Cassava near Kinshasa**

Kinshasa, a megacity of 8 to 10 million inhabitants, is located in a forest-savannah mosaic environment on the Batéké Plateau in the Democratic Republic of Congo. The city's wood energy supply of about 5 million m<sup>3</sup> per year is mostly informally harvested from degraded forest galleries within a radius of 200 km of Kinshasa. With gallery forests most affected by degradation from wood harvesting, even forests beyond the 200 km radius are experiencing gradual degradation, while the peri-urban area within a radius of 50 km of Kinshasa has suffered total deforestation.

However, there have been several attempts to develop plantations around the mega-city to help provide wood energy on a more sustainable basis. About 8,000 ha of plantations were established in the late 1980s and early 1990s in Mampu, in the degraded savannah grasslands 140 km from Kinshasa to meet the city's charcoal needs. Today the plantation is managed in 25 ha plots by 300 households in a crop rotation that takes advantage of Acacia trees' nitrogen-fixing properties and the residue from charcoal production to increase crop yields. The plantations produce about 10,000 tons of charcoal per year, or 1.6 percent of Kinshasa's estimated charcoal demand (Peltier et al. 2010).

Another scheme, run by a Congolese private company called Novacel, intercropped cassava with Acacia trees in order to generate food and sustainable charcoal, as well as carbon credits. To date, about 1,500 ha out of a projected 4,200 have been planted. The trees are not yet mature enough to produce charcoal, but cassava has been harvested, processed, and sold for several years. The company has also received some initial carbon payments. The project has been producing about 45 tons of cassava tubers per week and generates 30 full-time jobs, plus 200 seasonal jobs. Novacel reinvests part of its revenue from carbon credits into local social services, including the maintenance of an elementary school and health clinic.

## TRANSPORTATION

Transportation infrastructure in the Congo Basin is woefully inadequate to support development and poverty reduction. Road networks are sparse and poorly maintained, often as a result of recent civil conflicts. The paved road density in the Congo Basin is among the lowest in the world with only 25 km of paved road for each 1000 km<sup>2</sup> of arable land, compared with an average of 100 km in the rest of Sub-Saharan Africa. A legacy of the colonial era, the railways system was designed to facilitate the extraction of natural resources rather than to support the movement of people and goods. Railways are poorly maintained, with more than a third of the total network not fully operational. The river transportation networks of the Congo Basin hold great potential (25,000 km of navigable waterways) but remain marginal because of outdated infrastructure, lack of investment, and poor regulatory frameworks.

*Improved transportation could unlock the development potential of the Congo Basin but threaten its forest cover.*

Lack of transportation infrastructure has hampered economic growth in the Congo Basin by creating barriers to trade not only with international markets but also internally in domestic markets. For example, domestic transport costs, at about \$3,500 to \$4,500 per container, account for more than 65 percent of the total cost of importing goods to the Central African Republic (Domínguez-Torres and Foster 2011). This has created multiple landlocked economies within a single country, with limited to no exchanges among them. Deficient

infrastructure holds back extractive sectors (such as logging and mining) and sectors that rely on mobility of people and goods. The agriculture sector is particularly affected, with a severe connection gap between producers from rural areas and consumers in growing urban centers.

Lack of connectivity prevents the modernization of local farming practices, with farmers unable to rely on markets for either inputs or outputs and forced to rely on self-subsistence. In the Democratic Republic of Congo, it is estimated that only 33 percent (7.6 million out of 22.5 million ha) of all non-forested suitable arable land is less than six hours from a major market; that proportion is as low as 16 percent in the Central African Republic (Deininger et al. 2011). (By contrast, 75 percent of the non-forested suitable land in Latin America is within 6 hours of a market town.) As a result, growing domestic markets are mostly fed by food commodity imports which deteriorate the national agriculture trade balance. Together with poor governance and high political risks, this lack of infrastructure helps explain why the Congo Basin has not seen the type of large-scale land acquisitions witnessed in other parts of the developing world.

The isolation created by poor infrastructure also represents a significant risk in terms of people's vulnerability to climatic shocks: Even a modestly unsatisfactory growing season can jeopardize food security, because people have no way to benefit from surpluses in other parts of the country.

The infrastructure gap in the Congo Basin is widely acknowledged. Most Congo Basin countries have set ambitious infrastructure goals to drive economic growth and development. In Republic of Congo, where the transportation system is by far the most deteriorated, public financing to

the transport sector increased by a third between 2006 and 2010 (African Development Bank, 2011). Significant progress has also been made to mobilize external funding to support the reconstruction of the road network. The Democratic Republic of Congo for instance has secured major financial commitments from multilateral and bilateral sources, including China. At the regional level, various entities are drafting plans and strategies to fill the infrastructure gap, including the Program of Infrastructure Development in Africa from the African Union/New Partnership for Africa's Development, the Consensual Road Network from Economic Community of Central African States, and the River Transportation plan from CICOS (Commission Internationale du Bassin Congo-Oubangui-Sangha).

Transport infrastructure is one of the most robust predictors of tropical deforestation. Of all the different scenarios tested by the CongoBIOM, a scenario modeling improved transportation infrastructure is by far the most damaging to forest cover. Most of the impacts do not result from the but from indirect impacts associated with higher connectivity (see box 5).

The Congo Basin's inadequate transportation infrastructure has by and large protected its forests. The challenge now is to strike the appropriate balance between forest protection and the development of a rural road network that would unlock the Congo Basin's economic potential (particularly in agriculture).

#### **BOX 5: Simulating Changes Resulting from Improved Infrastructure**

The CongoBIOM was used to compute the likely impact of all the road and railways projects for which financing has already been secured. It simulated changes in average travel time to the closest city along with changes in internal transportation costs, and took into account population density and urbanization trends. While the direct impact of road construction in rainforests is often limited, indirect and induced impacts could represent a major threat by significantly changing economic dynamics—particularly in the agriculture sector—in newly accessible areas.

A reduction in transport costs can lead to significant changes in the equilibrium of rural areas along the following causal chain:

**Improved infrastructure → Increased agriculture production  
→ Increased pressure on forests**

The model showed that when agricultural products reach urban markets at a lower price because of lower transportation costs, consumers tend to buy more domestically grown products through import substitution. This in turn encourages producers to increase their production. Additionally the price of inputs such as fertilizers tends to go down, increasing agricultural productivity. A new equilibrium is reached with a larger volume of regionally grown agricultural products and lower prices compared with the initial situation—a change that presumably improves food security and human wellbeing but creates incentives for clearing forest land for agriculture. The reduction of domestic transportation costs also improves the international competitiveness of agricultural and forestry products—including products derived from uncontrolled logging along the newly opened roads.

## LOGGING

Industrial logging represents an extensive land use in the Congo Basin, with about 44 million ha of forest under concession—a fourth of the total dense lowland forest area (see figure 5). The formal logging sector produces an average of 8 million m<sup>3</sup> of timber annually, with Gabon as the largest producer. Logging also contributes about 6 percent of the GDP in Cameroon, the Central African Republic and Republic of Congo, and is an important source of employment in rural areas. The formal sector accounts for about 50,000 full-time jobs and much more indirect employment in the six countries.

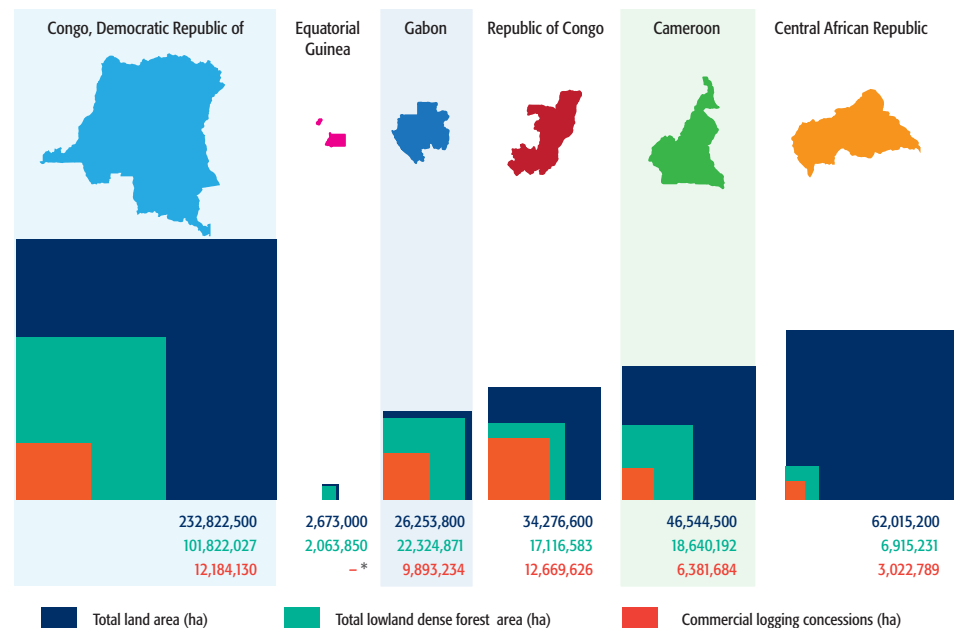
Employment created by private sector operators in the formal forestry sector is particularly important in Gabon and the Central African Republic where timber is the largest source of jobs after the public sector.

Contrary to the popular impression, logging is not uniformly a cause of deforestation and forest degradation: Ecosystem services and other land uses coexist with logging concessions. Unlike in other tropical regions, logging in the Congo Basin usually does not result in conversion to other land uses, such as cattle ranching or plantations. Industrial logging's

impacts are further limited by the adoption of Sustainable Forest Management (SFM) principles as well as the high selectivity of logged species. The trend toward SFM has been momentous: As of 2010, 25.6 million ha were managed under state-approved plans. Wood extraction rates are very low: on average less than 0.5 m<sup>3</sup> per ha. Of the more than 100 species generally available, fewer than 13 are usually harvested.

Although the footprint of formal logging operations is considered low, the informal artisanal sector presents a different story.

FIGURE 5: Land, dense forest and logging areas in the Congo Basin



\* In Equatorial Guinea, all logging concessions were cancelled in 2008.

Source: Prepared from data in: Wasseige et al. (2012).

The artisanal sector, while long overlooked, is now recognized as a major segment of the logging sector. There are few reliable data about informal logging which is mostly oriented to domestic markets, but experts believe that it is at least as large as the formal sector and has more serious impacts on forest loss by progressively degrading forests close to highly populated areas.

In Cameroon and the Democratic Republic of Congo, informal timber production already surpasses formal timber production, and in the Republic of Congo, domestic timber production represents more than 30 percent of total timber production (Lescuyer et al. 2012).

### *A booming informal logging sector may lead to increased forest degradation.*

The informal sector supplies markets that are less selective than export markets; chainsaw operators are less efficient in their use of trees to produce timber; and informal activities tend to over-log the most accessible areas, surpassing regeneration rates. On the plus side, the informal sector is a larger source of direct and indirect local employment than the formal sector, with benefits more equally redistributed at the local level.

Domestic demand for construction timber is booming and is currently quasi-exclusively supplied by the unregulated, under-

performing and unsustainable informal sector. This trend is unlikely to wane as most Congo Basin countries experience a strong urbanization process. In addition, demand for informal timber emanates from other African countries (such as Niger, Chad, Sudan, Egypt, Libya, and Algeria), where demographic growth and urbanization are booming.

Left unregulated, this segment of the forest sector may severely undermine forest biomass and erode carbon stocks.

There are also opportunities to improve the competitiveness of the formal logging sector so that it becomes a greater source of employment and growth. Despite the high value of their timber and gains in sustainable forest management, Congo Basin countries remain relatively small players in terms of timber production at the international level: Timber from Central Africa represents less than 3 percent of the global production of tropical roundwood, far behind the other two major tropical forest regions (OFAC 2011). Their contribution to the trade of processed timber is even smaller. Processing capacities are essentially limited to primary processing (sawnwood, peeling, and slicing for the production of plywood and veneer). Investing in modernized processing capacities along the secondary and tertiary stages could generate more added value and employment from existing forest resources and tap regional demand for higher-end furniture.

## MINING

The Congo Basin is home to mineral resources worth billions of dollars on world markets, but that wealth has been largely untapped. Among these resources are valuable metals (copper, cobalt, tin, uranium, iron, titanium, coltan, niobium, and manganese) and non-metals (precious stones, phosphates, and coal). With the exception of the Democratic Republic of Congo, the mineral wealth of the Congo Basin has been underexploited in part because of civil unrest and conflict over the past two decades, lack of infrastructure, a poor business climate, and heavy reliance on oil for some countries in the region. Armed groups have often used mineral wealth to fund their activities, perpetuating a cycle of instability that discourages investment.

### *Positive prospects for the development of the mining sector carry both growth promises and environmental risks.*

World demand for mineral resources increased significantly after 2000, driven by global economic development and particularly China's strong growth. While the world recession of 2008 affected the mining sector, economic recovery in some emerging countries led to a rapid revival of demand for raw materials in 2009. Growth in the technology, transportation, and construction sectors will likely continue fueling greater demand for aluminum, cobalt, copper, iron ore, lead, manganese, platinum metals, and titanium in the future.

In the context of rising demand and high prices, mineral reserves that used to be considered financially unviable are now receiving much attention. Heightened interest from investors is directly reflected in increased exploration activities in the Congo Basin, including in densely forested areas. Historically, the majority of mining operations in the Congo Basin has occurred in non-forested areas, but that is projected to change.

The past few years have also seen the emergence of new types of deals in which investors have offered to build associated infrastructure (including roads, railways, power plants, ports, etc.) in exchange for security of supply. The burden of the infrastructure investments is thus taken off the countries' shoulders, which theoretically alleviates one of the major constraints to mining development. At the same time, the decline of oil reserves is pushing countries like Gabon and Cameroon to develop other extractive industries to offset the revenue gap from declining oil wealth.

The mining sector could become an engine of growth in the Congo Basin. At its height in the mid-1980s, the mining sector contributed 8 to 12 percent of the Democratic Republic of Congo's GDP. Given the Democratic Republic of Congo's extensive copper, cobalt, gold, diamond, cassiterite, and coltan reserves, mining could contribute to significant revenue increases and sustain growth in the economy as a whole, including through employment.

Compared with other economic activities, mining has a fairly limited *direct* impact on forest cover. *Indirect* impacts can

be more important and are tied to the larger infrastructure developments that tend to occur in a mining region, such as building power plants (including dams) and more roads. *Induced* impacts may include impacts associated with a large influx of workers, such as subsistence agriculture, logging, poaching, and other activities. Finally, *cumulative* impacts relate more to artisanal mining, where many small individual mining sites add up to significant impacts (see box 6).

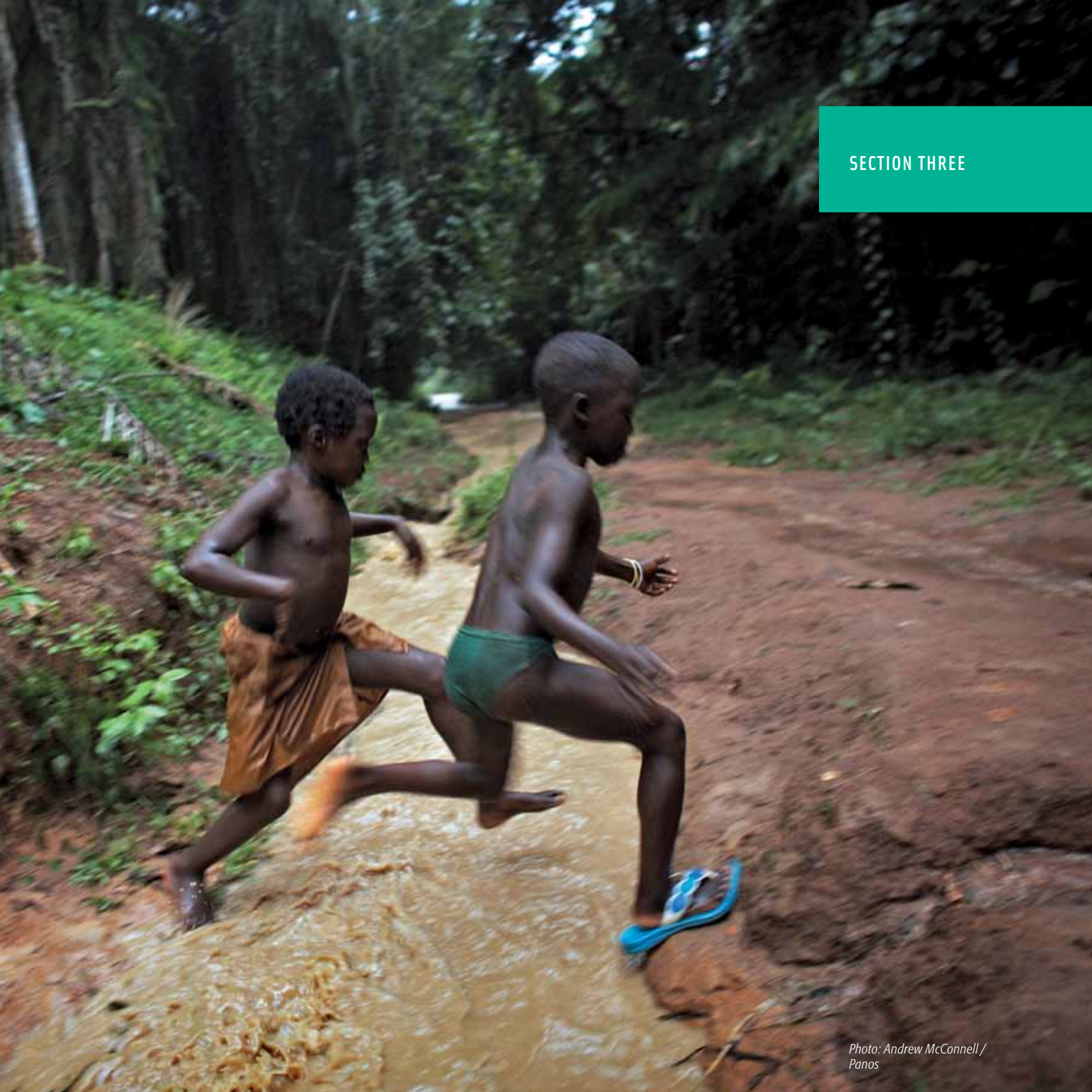
Poor land use management can potentially amplify the adverse impacts of mining operations (both exploration and exploitation). Numerous conflicts have been noted between and among conservation priorities, mining and logging concessions, and the livelihoods of local populations. For example, in the Sangha Tri-National Park (shared by Cameroon, the Central African Republic, and Republic of Congo), projected logging and mining concessions overlap with the region's protected areas and agro-forestry zones (Chupezi, Ingram and Schure 2009).

#### **BOX 6: In Search of Green Gold**

Both artisanal miners (who operate with little mechanized aid) and small-scale miners (who use more organized and more productive methods but produce less than a certain tonnage of minerals per year) have responded to international demand for minerals by increasing activity in the Congo Basin in recent years. Some of the environmental concerns associated with artisanal and small-scale mining stem from practices that can include primary forest clearance, dam construction, the digging of deep pits without backfilling, and resulting impacts on water levels and watercourses. Forest degradation is also associated with the arrival of large numbers of migrant diggers spread out over a large area of forest. In Gabon, for example, artisanal miners suffer from a fragile legal status that gives them little incentive to pursue environmentally responsible mining (WWF 2012).

Strategies to respond to these issues include the setting up of socially responsive and environmentally sustainable supply chains, and measures to professionalize and formalize artisanal and small-scale mining activities so that risks are managed and minimum standards introduced. These initiatives are partially inspired by the success of a third-party certification scheme called "Green Gold—Oro Verde," born in 1999 in Colombia to stop the social and environmental devastation caused by poor mining practices in the lush Chocó Bioregion, and to supply select jewelers with traceable, sustainable metals.

SECTION THREE



*Photo: Andrew McConnell /  
Panos*



## How to Reconcile Growth and Forest Protection Policy Options and Recommendations

The countries of the Congo Basin face the dual challenge of urgently developing their economies to reduce poverty while limiting the negative impact on the region's natural resources. Growing international recognition of the importance of forests to stem climate change provides new opportunities for Congo Basin countries to reconcile these objectives, by leveraging climate finance and creating momentum for policy change.

*Congo Basin countries have the opportunity to embark on development pathways that “leapfrog” severe deforestation.*

Since 2007, parties to the UN Framework Convention on Climate Change (UNFCCC) have deliberated on a framework that would create incentives for reducing emissions from deforestation and forest degradation (REDD+) by rewarding tropical countries that preserve and/or enhance the carbon locked in forests. International, regional, and national discussions on the future REDD+ mechanism have given rise to a better understanding of the multiple drivers of deforestation and a more holistic view of low-carbon development in which different sectors play a role. While many elements of REDD+ remain unknown (see box 7), countries can focus on “no-regrets” measures that should yield benefits regardless of the shape of a future mechanism under the UNFCCC.

### BOX 7: A Fair Baseline

International negotiations on forests and climate change have been positive for Congo Basin countries. The Congo Basin contains an estimated 25 percent of the total carbon stored in tropical forests worldwide and has received wide attention as a result. Congo Basin countries have received support from a variety of bilateral and multilateral funds including the Forest Carbon Partnership Facility, UN-REDD, Global Environment Facility and the Forest Investment Program. For now, financing resources fall under Phase 1 of the REDD+ mechanism, which deals with the “readiness” process (including capacity building and planning). The core provision of finance is expected to come later on, in a phase that rewards measured, reported and verified results. This could be particularly tricky in the Congo Basin context.

One of the most important challenges for Congo Basin countries relates to the development of “reference levels,” or the baselines against which their success in reducing emissions will be measured. For HFLD countries, using historic baselines may not capture the effort and economic sacrifice required to combat future deforestation risks.

In December 2008, countries agreed that REDD+ reference levels should “take into account historic data, and adjust for national circumstances.” This appears to suggest that countries, such as those in the Congo Basin, with low historic rates of deforestation—but potentially high future rates—could consider factoring this into a proposed reference level. But credible data that would justify adjustments to historical trends could be difficult to come by. Although the modeling approach used in this study was an attempt to use existing, limited data to offer an initial description of future deforestation trends, it was not designed to provide robust quantitative information for setting reference levels in a financing mechanism such as REDD+.

This study highlights options to limit deforestation while pursuing economic growth in an inclusive and sustainable way. It outlines both cross-cutting and sector-specific recommendations. These recommendations are intended as general guidelines that should spur more detailed policy discussions at the country level.

## CROSS-CUTTING RECOMMENDATIONS

### **Invest in participatory land use planning**

Participatory land use planning should be used to maximize economic and environmental objectives and reduce problems resulting from overlapping usage titles and potentially conflicting land uses. Trade-offs among different sectors and within sectors need to be clearly understood by the stakeholders so that they can define development strategies at the national level. This requires robust socio-economic analysis as well as strong coordination among ministries and some form of high level arbitrage. Once completed, this land plan would determine the forest areas that need to be preserved, the areas that can coexist with other land uses, and those which could potentially be converted to other uses.

While planning for economic development, particular attention should be given to protecting high-value forests in terms of biodiversity, watershed, and cultural values. Optimally, mining, agriculture, and other activities should be directed away from forests of great ecological value. In particular, agriculture development should primarily target degraded lands. The Global Partnership on Forest Landscape

Restoration estimates more than 400 million ha of degraded land in Sub-Saharan Africa offer opportunities for restoring or enhancing the functionality of “mosaic” landscapes that mix forest, agriculture, and other land uses.

One output of land use planning could be the identification of growth poles and major development corridors that could be developed in a coordinated manner, with the involvement of all government entities along with the private sector and civil society. In the Congo Basin, this approach would likely be driven by natural resources and provide upstream and downstream linkages around extractive industries. While a land use planning exercise definitely needs to be conducted at the country level (and even at the provincial level), the corridor approach has also been adopted by the Economic Community of Central African States at the regional level to foster synergies and economies of scale among member states.

### **Improve land tenure schemes**

Effective systems of land use, access rights, and property rights are essential to improve the management of natural resources. Improving these systems is a priority for providing farmers, especially women, with the incentives needed to make long-term investments in agricultural transformation. Likewise, there is strong evidence that community-based forest management approaches can expand the supply of fuelwood and relieve natural forests from unsustainable withdrawals, provided communities are given enough visibility on land/tree tenure issues to invest in the long-term sustainability of forests, woodlots, and agroforestry systems.

Current land tenure schemes are not conducive to grassroots sustainable forest management in Congo Basin countries. Outside of commercial logging concessions, forests are considered “free access” areas under state ownership and are not tagged with property rights. Moreover, tenure laws in most Congo Basin countries directly link forest clearing (*mise en valeur*) with land property recognition and thus create an incentive to convert forested lands into farmland. Current land tenure laws should be adjusted to separate land property recognition from forest clearing.

### Strengthen institutions

Without strong institutions able to enforce rules and build alliances within a complex political economy, neither land use planning nor tenure reform will yield real change. Administrations face expectations—in terms of planning, monitoring and controlling forest resources—that they cannot adequately meet when they are weak. Properly staffed and equipped institutions are necessary to fight illegal activities but also to undertake the difficult tasks of formalizing artisanal logging, the woodfuel/charcoal value chain, and artisanal mining in critical ecosystems. New technologies (based on geographic and information technology systems) should be more widely available to administrations to improve their performance.

Monitoring efforts are ideally performed by regulatory agencies. In practice, strategic partnerships can be set up to improve monitoring activities: Local communities can be trained and engaged in helping regulators monitor activities on the ground; nongovernmental organizations can provide additional monitoring via field projects, for example near mining sites.

### BOX 8: An emerging cross-sectoral agenda

By looking at opportunities to mitigate greenhouse gas emissions at the landscape level, REDD+ could emerge as a development planning approach to coordinate forests and other land uses. National REDD+ readiness committees have been set up in most Congo Basin countries and are typically composed of representatives from different ministries. Although cross-sectoral coordination is still weak, the REDD+ agenda has benefitted from political support that transcends divisions between sectors. That support was evident in October 2011, for example, when a high-level Forum on Forests and Climate Change for the Sustainable Development of the Democratic Republic of Congo drew speakers from the Ministry of Environment, Conservation and Tourism; the Ministry of Planning; the Ministry of Energy; and the Ministry of Agriculture.

Finally, for strategic planning purposes, synergies should be built with existing processes such as the Comprehensive Africa Agriculture Development Plan (CAADP) and the Forest Law Enforcement Governance and Trade (FLEG-T) initiatives. CAADP provides an excellent and timely opportunity to thoroughly analyze agricultural potential, develop or update national and regional agricultural investment plans aimed at increasing agricultural productivity on a sustainable basis, and strengthen agricultural policies. For the forest sector, the FLEG-T approach, backed by the European Union in all Congo Basin countries except Equatorial Guinea, provides an effective vehicle for improving forest governance, including in the domestic arena.

## AGRICULTURE

### Increase productivity and prioritize non-forested lands

- **Prioritize agricultural expansion on non-forested areas.** There is an estimated 40 million ha of suitable non-cropped, non-forested, non-protected land in the Congo Basin. This corresponds to more than 1.6 times the area currently under cultivation. Utilizing these available areas, along with an increase in land productivity, could dramatically transform agriculture in the Congo Basin without taking a toll on forests. Decision-makers must prioritize expanding agriculture on non-forested lands.
- **Empower smallholder farmers.** With about half the population active in agriculture in most countries of the Congo Basin, there is a need to foster sustained agricultural growth based on smallholder involvement. Experience in other tropical regions shows this is possible. Thailand, for example, considerably expanded its rice production area and became a major exporter of other commodities by engaging its smallholders through a massive land titling program and government support for research, extension, credit, producer organizations, and rail and road infrastructure development.
- **Reinvigorate research and development (R&D) toward sustainable productivity increase.** R&D capacities in the Congo Basin, with the exception of Cameroon, have been dismantled over the past decades. Research has largely neglected the most common staple food crops such as yams, plantains, and cassava, usually referred to as “neglected crops.” The potential to increase productivity of these crops and improve their resistance to disease and tolerance to climatic events has also been untapped. Partnerships need to be established with international research centers (for example among members of the Consultative Group on International Agricultural Research) to stimulate agricultural research in the Congo Basin and progressively strengthen national capacities.
- **Promote a sustainable large-scale agribusiness industry.** Large agribusiness operations, especially rubber, oil palm, and sugarcane plantations, have the potential to sustain economic growth and generate considerable employment for rural populations. Given weak land governance, there is a risk that investors will acquire land almost for free, interfere with local rights and neglect their social and environmental responsibilities. Governments should establish stronger policies on future large land investments, including requiring land applications to be oriented toward abandoned plantations and suitable non-forested land. Efforts to put palm oil production on a more sustainable footing, such as the Roundtable on Sustainable Palm Oil founded in 2004, may help mitigate some of these environmental issues by setting standards that aim to prevent further loss to primary forests or high conservation value areas and reduce impacts on biodiversity.
- **Foster win-win partnerships between large-scale operators and smallholders.** Such partnerships could become an engine for transforming the agricultural sector. While this has not yet materialized in the Congo Basin, there are many examples in the world where meaningful partnerships between smallholders and large-scale operators have yielded successful results and promoted a well-balanced development of agriculture.

## ENERGY

### Organize the informal value chain

- **Put woodfuel energy higher on the political agenda.** Despite its undisputed importance as a major source of energy, woodfuel is still getting very little attention in the policy dialogue and therefore is poorly featured in the official energy policies and strategies. There is a need to change the policy makers' perception of wood energy as "traditional" and "old-fashioned." Lessons could be drawn from Europe and North Africa where wood energy is emerging as a cutting-edge renewable energy source. Congo Basin countries should seize technical breakthroughs and climate finance opportunities to put this energy resource on a more modern and efficient footing.
- **Optimize the fuelwood/charcoal value chain.** Formalizing the sector would break the oligopolistic structure of the value chain and create a more transparent marketplace. The economic value of the resources would thus be better reflected in the pricing structure and appropriate incentives could be established. Such formalization should be supported by the revision and modernization of the regulatory framework. To do so, the Congo Basin countries would have to understand the political economy of the fuelwood/charcoal value chain. A multi-stakeholder dialogue would be critical to help overcome difficult trade-offs between sustaining rural livelihoods based on informal activities and enforcing production standards and trade restrictions that would come with the formalization of the sector.
- **Diversify supplies.** The charcoal value chain in the Congo Basin currently relies exclusively on natural forests. Although natural forests are expected to continue supplying much of the raw material for charcoal production, they will be unable to meet growing demand in a sustainable manner. Policy-makers should consider diversifying the sources of wood, by increasing sustainable wood supply through tree plantations and agroforestry, and maximizing the potential supply from natural forests, with special attention to timber waste management.
- **Foster community involvement through devolution of rights and capacity building.** Community-based woodfuel production schemes in Niger, Senegal, Rwanda and Madagascar have shown promising results when long-term rights to forest land and devolution of management have motivated communities to participate in woodfuel production. Pilots have been launched in the Congo Basin (Batéké plantations) and could be replicated.
- **Respond to growing urban needs in terms of both food and energy.** Deforestation and forest degradation mostly occur around urban centers in the Congo Basin countries, as a result of ad hoc agricultural expansion to respond to rising demand for food and energy. An integrated, multi-use approach to meeting urban needs would address the various driving forces of forest degradation. If well organized, it could not only secure the food and energy needs for a growing urban population, but could also provide sustainable solutions to unemployment and waste management.

## TRANSPORTATION

### Better plan to minimize adverse impacts

- **Improve transportation planning at local, national and regional levels.**

*Locally:* Areas that are directly served by improved transportation facilities will become more competitive for various economic activities—such as agricultural expansion including palm oil plantations. Local participation in transportation planning will help ensure that economic opportunities are maximized. Mitigation measures at the local level may include clarifying land tenure or integrating the transportation projects into a broader local development plan. Such plans may include the protection of forest banks along roads, rivers, or railways to avoid unplanned deforestation. Defined up front and in a participatory manner, these restrictions would get more backing from the different stakeholders.

*Nationally and regionally:* The corridor approach shows that improving transportation services (for example freight management in harbors) or infrastructure (facilitating river or rail transportation) may have a wider macro-economic impact at the regional level. Planning at the national and regional levels, through a corridor approach could help identify adequate mitigation measures, such as zoning reforms (establishing permanent forest areas), law enforcement (ensuring the respect of zoning decisions), land tenure clarification, and controlling the expansion of agriculture.

- **Foster multi-modal transport networks.** As countries plan for transport development, it is important that they consider the pros and cons of roads and alternative transport modes such as navigable waterways and railroads, in terms not only of economic returns but also of environmental impacts. For instance, with more than 25,000 kilometers of navigable network, the Congo Basin could benefit from a potentially highly competitive waterway system.
- **Properly assess the impacts of transportation investments before they occur.** Transportation development (be it new infrastructure or rehabilitation of existing assets) will re-shape the economic profile of the areas served by transportation and increase pressure on forest resources. Currently, most environmental impact studies or safeguard reviews fail to fully capture the long-term indirect effects on deforestation. New assessment methods, based on economic prospective analysis, could help prioritize infrastructure investments with low foreseen impacts on forests.

## LOGGING

### Expand sustainable forest management to the informal sector

- **Pursue progress on sustainable forest management in commercial logging concessions.** Although the Congo Basin already has vast concession areas under management plans, further progress can be made through ensuring adequate implementation; adjusting SFM standards and criteria to reflect climate change and advances in reduced-impact logging techniques; moving away from single-use, timber-oriented management models; encouraging certification schemes; and supporting the FLEG-T process.
- **Formalize the informal timber sector.** To ensure a sustainable supply of timber for domestic markets and spread SFM principles to the domestic timber market, numerous small and medium forest enterprises will need to be supported by appropriate regulations. For the fuelwood/charcoal value chain, such a formalization would rely on an in-depth understanding of the political economy of the sector and would require an open dialogue with various stakeholders. In addition, domestic and regional timber markets will have to be better understood to help decision makers respond to market opportunities without jeopardizing natural forest assets.
- **Modernize processing capacities to set up an efficient timber value chain in the Congo Basin with less wastage and more domestic value added.** The development of the secondary and tertiary processing industry would allow Congo Basin countries to use secondary tree species to respond to domestic growing needs.
- **Foster the involvement of communities in forest management.** Although the concept of community forestry has been embraced by most Congo Basin countries and entered their legal framework, shortfalls such as time-bound management contracts continue to constrain effective community forest management of state-owned forests. Revisiting the concept and clarifying community rights over forests could provide a window of opportunity to revitalize the implementation of community forestry on the ground.

## MINING

### Set “high standard” goals for environmental management

- **Properly assess and monitor impacts of mining activities.** Proper environmental impact assessments and social impact assessments have to be prepared for all stages of mining operations (from exploration to mine closure); management plans also need to be of good quality and their implementation regularly monitored to mitigate the associated risks.
- **Learn from international best practices and foster risk mitigation.** If mining is to result in minimal negative impacts on the forests of the Congo Basin, companies will need to follow best international practices and standards designed to meet the mitigation hierarchy (Avoid—Minimize—Restore—Compensate). International standards for responsible mining have been developed by various organizations, including the International Council on Mining and Metals, the Responsible Jewelry Council, the International Finance Corporation, and the Initiative for Responsible Mining Assurance. Lessons can be learned from these innovative approaches as governments adjust their national regulations on mining activities and their environmental monitoring and management.
- **Upgrade the artisanal and small-scale mining sector.** Efforts should focus on putting small-scale miners on a more secure footing and adjusting regulatory frameworks so that they can better respond to the specific needs of this segment of the mining sector. Governments should facilitate the use of environmentally-friendly technologies and encourage the development of a sustainable supply chain. The Alliance for Responsible Mining has developed a certification system for small-scale mining cooperatives that includes consideration of both environmental and social concerns. The Green Gold approach (discussed in box 6) is another example.
- **Promote innovative mechanisms to offset negative impacts of mining operations.** Conservation groups have advocated for biodiversity offsets for extractive projects for at least a decade. Financial instruments, such as financial guarantees, could also be options to mitigate adverse impacts, particularly to ensure mine reclamation and restoration at the closure of mining sites.



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## SUMMARY OF RECOMMENDED “NO-REGRETS” ACTIONS

Sector	Recommendations
Cross-cutting Issues	<ul style="list-style-type: none"> <li><input type="checkbox"/> Invest in participatory land use planning</li> <li><input type="checkbox"/> Improve land tenure schemes</li> <li><input type="checkbox"/> Strengthen institutions</li> </ul>
Agriculture	<ul style="list-style-type: none"> <li><input type="checkbox"/> Prioritize agricultural expansion on non-forested areas</li> <li><input type="checkbox"/> Empower smallholder farmers</li> <li><input type="checkbox"/> Reinvigorate R&amp;D towards sustainable productivity increase</li> <li><input type="checkbox"/> Promote a sustainable large-scale agribusiness industry</li> <li><input type="checkbox"/> Foster win-win partnerships between large-scale operators and smallholders</li> </ul>
Wood-Based Biomass Energy	<ul style="list-style-type: none"> <li><input type="checkbox"/> Put woodfuel energy higher on the political agenda</li> <li><input type="checkbox"/> Optimize the fuelwood/charcoal value chain</li> <li><input type="checkbox"/> Diversify supplies</li> <li><input type="checkbox"/> Foster community involvement through devolution of rights and capacity building</li> <li><input type="checkbox"/> Respond to growing urban needs in terms of both food and energy</li> </ul>
Transportation	<ul style="list-style-type: none"> <li><input type="checkbox"/> Improve transportation planning at local, national, and regional levels</li> <li><input type="checkbox"/> Foster multi-modal transport networks</li> <li><input type="checkbox"/> Properly assess the impacts of transportation investments before they occur</li> </ul>
Logging	<ul style="list-style-type: none"> <li><input type="checkbox"/> Pursue progress on sustainable forest management</li> <li><input type="checkbox"/> Formalize the informal timber sector</li> <li><input type="checkbox"/> Modernize processing capacities</li> <li><input type="checkbox"/> Foster the involvement of communities in forest management</li> </ul>
Mining	<ul style="list-style-type: none"> <li><input type="checkbox"/> Properly assess and monitor impacts of mining activities</li> <li><input type="checkbox"/> Learn from international best practices and foster risk mitigation</li> <li><input type="checkbox"/> Upgrade the artisanal and small-scale mining sector</li> <li><input type="checkbox"/> Promote innovative mechanisms to offset negative impacts of mining operations</li> </ul>



Deforestation rates in the Congo Basin are among the lowest in the tropical rainforest belt and are significantly below rates in most other African regions. However, this situation is projected to change. Local and regional development, population increases and global demand for commodities are likely to increase deforestation and forest degradation in the Congo Basin.

The countries of the Congo Basin face the dual challenge of developing local economies and reducing poverty while limiting the negative impact of growth on the region's natural capital, and forests in particular.

*Deforestation Trends in the Congo Basin: Reconciling economic growth and forest protection* analyzes the current and future pressures exerted by different sectors of the economy on Congo Basin forests, and highlights policy options to limit deforestation while pursuing inclusive green growth.

*"This study shows that a transition to a low and degraded forest cover is possible, but not a fatality. We have tools at our disposal to act in a targeted, forest-friendly way, by reconciling economic growth and forest preservation. Now is the time to make a strong stand in favor of sustainable development." –*  
Mr. Raymond Mbitikon, Executive Secretary, COMIFAC



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