

DEMOCRATIC REPUBLIC OF CONGO
MINISTRY OF THE ENVIRONMENT,
NATURE CONSERVATION, AND TOURISM

The Democratic Republic of Congo's REDD+ Potential

December 2009

Preface

1. The Democratic Republic of Congo is resolutely committed to the international process of Reduction of Emissions due to Deforestation and Degradation (REDD) of the Forest, with the objectives of contributing to the mitigation of greenhouse gas emissions, reducing poverty, and sustainably managing its forest resources, all the while taking into account the valuation of environmental services.

2. In light of this perspective, it is important to evaluate and analyze the real potential that the country offers in this matter. This is the object of the present exploratory study that has just been completed—under the steering of the Ministry of the Environment, Conservation of Nature, and Tourism—by the National REDD Coordination (CN-REDD) with the analytical support of McKinsey and Company. This report presents preliminary conclusions that will need to be revised and refined in the context of the elaboration of more complete REDD+ strategy that will include the results of scientific research that is currently being conducted on deforestation, the degradation of forests, and the corresponding emissions. This strategy will be defined in a participative manner that associates the entire group of stakeholder parties concerned by the REDD process, in other words:

- i. the national Government, necessitating a strong interministerial coordination in order to achieve the determined objectives,
- ii. provincial Governments, key actors in the implementation on the ground,
- iii. civil society in its entirety as well as local riparian and indigenous communities,
- iv. private operators of the sectors involved,
- v. national and international development partners.

3. The Ministry of the Environment, Nature Conservation, and Tourism would like to thank the people and institutions that contributed to the completion of this exploratory study, which enables the DRC to have a formalized report to present to a broader audience of stakeholders.

Executive Summary

4. The DRC is home to 145 million hectares (ha) of forest, distributed across four ecosystems: humid forest, mountainous forest, sparse forest (of Miombo type) and savannah-forest mosaic. The Congolese forests currently sequester a carbon stock that can be estimated at 40 Gigatonnes (Gt), equivalent to 140 Gt of potential CO₂e emissions. Historic deforestation rates have oscillated between 0.2% and 0.3% in the DRC over the course of the last 20 years¹, which is relatively low when compared to the global historical average of 0.6%² for the same period.

5. The BAU (Business-as-usual) reference scenario for the evolution of degradation and deforestation in the DRC and of the associated emissions was developed based on a « proactive » scenario of the country's demographic and socio-economic development. In this scenario, deforestation would reach between 12 and 13 million ha by 2030, and degradation 21 to 22 million ha. The associated emissions would thus be approximately 390 to 400 Million tons (Mt) of CO₂e in 2030, which represents a year over year growth in emissions between 3 to 4% between 2010 and 2030:

- i. The annual growth of real GDP is estimated to be between 6 and 8% and is based off a combination of IMF and World Bank previsions and the incorporation of « proactive » growth hypotheses for high-potential sectors such as extractive industries (mines and hydrocarbons) and intensive agriculture.
- ii. The average demographic growth is estimated at 3% until 2015, subsequently slowing to attain 2.5% in 2030.
- iii. Taking into account this development scenario, deforestation will affect between 12 and 13 million ha from now until 2030, reducing the DRC's forest capital from today's 145 million Ha to approximately 132-133 million in 2030. The deforestation rate would thus rise from the range of 0.2-0.3% over the last 20 years to 0.3-0.4% over the next 20 years. The three most important deforestation factors are commercial agriculture (~40%), subsistence agriculture (~20%) and fuelwood (~20%).
- iv. Degradation will affect between 21 and 23 million ha, as primarily caused by fuelwood collection (~55%), industrial and artisanal timber harvesting (~15%) and illegal logging (approximately 12-14%).
- v. Net annual emissions resulting from this deforestation and degradation will therefore change from approximately 190 Mt CO₂e in 2007 to 390 to 410 Mt of CO₂e in 2030.

¹ Sources : MECNT, Worldbank, FAO, PNUD, OFAC, UCL Geomatics, South Dakota University

² Source IWG-IFR, Report from October 27, 2009 <http://www.miljo.no/IWG>

6. However, the DRC could pursue another route, compatible both with its social and economic development objectives and its desire to respect the environment. In effect, a collection of the levers linked to the Forest could be actuated to reduced these emissions and sequester more greenhouse gases (GHG). In each of the sectors concerned, it would be ideal to both produce an effort to mitigate emissions as well as conform to sustainable development norms in all realms of activity.

7. By following this path and acting on the all of the ten identified levers, a cumulative emissions reduction of 2.2 to 2.5 Gt CO₂e could be obtained between 2010 and 2030. The portion of emissions that would be omitted from the reach of reductions (in order to permit these sectors to develop) could be compensated for using afforestation and reforestation projects aimed at the sequestration of carbon, up to a cumulative sequestration potential of 1.2 to 1.4 Gt CO₂e between 2010 and 2030.

8. By 2030, the compound effect of potential mitigation and sequestration levers could simultaneously compensate for the estimated emissions total of 390 to 410 Mt CO₂e according to the BAU reference scenario, and even constitute a carbon sink on the order of 20 Mt CO₂e.

9. According to this first round of analysis, approximately 60% of the emissions reduction and sequestration potential can be attained with a cost inferior to € 5 / t CO₂e.

10. The principal REDD mitigation levers and carbon sequestration levers with accessible costs are:

- i. the reduction of demand for fuelwood by the extension of the usage of ameliorated ovens to approximately 5 million urban households, which represents 6% of total abatement potential, at a cost of € 1.7 / t CO₂e, as well as the increase in provision of fuelwood through dedicated reforestation and afforestation projects, which corresponds to 3 to 4% of the abatement potential at an average cost of €2 to 2.5 / t CO₂e.
- ii. afforestation / reforestation projects aimed at creating a carbon sink³, which represents 35% of the total reduction and sequestration potential, could also be created at relatively low costs (between € 1 and 1.6 /t CO₂e for reforestation and € 3 to 4.2 /t CO₂e for afforestation).
- iii. Finally programs aimed at improving the productivity of subsistence agriculture (provision of fertilizers and seeds, training, etc.) and commercial agriculture (provision of fertilizers and seeds, training and aggregation projects organizing production and distribution networks) form

³ These projects are considered in the context of Clean Development Mechanisms (CDM)

an important mitigation potential (4% and 16%, respectively) at below average costs (approximately € 6.5 / t CO₂e and € 48 to 5 / t CO₂e respectively). However, these are programs for which the implementation, follow-up, and result benchmarking must be considered for the long term.

11. In order to achieve these objectives, the DRC has defined the main aspects of its REDD+ strategy. The DRC's ambitions within the framework of this strategy are to simultaneously activate all of the mitigation and sequestration levers possible given acceptable costs. The REDD+ objectives, including afforestation and reforestation, are defined in an ambitious manner all the while remaining realistic relative to the socio-economic development objectives of the country. This strategy will be refined according to a national participative process, involving the entirety of stakeholder groups.

12. These ambitions are concretized into a complete REDD+ Plan, articulated around 4 sections :

Transverse section, focused on the launch of key reforms permitting the coordination, implementation, financing, and control of activities reducing or sequestering emissions. This section ensures the establishment of a solid institutional, strategic, logistical, and technical foundation, enabling the development of REDD strategy.

3 sectoral and territorial sections:

Section I : Management, sustainable exploitation, and increase of the DRC's Forest heritage, under the responsibility of the MECNT. Four programs have been grouped in this section with the objectives of : (1) improving the sustainable management of « permanent production forests » by legal timber harvesting as well as the fight against illegal logging, (2) managing, valuing, and expanding « classified forests », (3) launching afforestation / reforestation projects to create carbon sinks, and (4) defining management rules for « protected forests » and subsequently transitioning this management to local communities.

Section II : Accelerated development of performant agriculture in the rural-forested milieu, through coordination between the MECNT and the Ministry of Agriculture. The 3 programs contained in this section aim to : (1) increase the productivity and decrease the migration of subsistence farmers, (2) grow the yields and value-added of smallholder commercial agriculture, (3) develop intensive agriculture (mainly palm oil cultivation) in a controlled manner.

Section III : Limitation of the impact of urban growth and of industrial sectors on the Forest, achieved through effective interministerial coordination. The 2 programs in this section aim to : (i) reduce fuelwood demand and increase supply through sustainable low-value timber harvesting or through alternative energy

sources, (ii) limit the impacts, on the Forest, of extractive industries, particularly with respect to mining and hydrocarbon production.

13. In order to ensure the achievement of the predetermined objectives within their deadlines, the DRC will finalize a program of priority actions, « REDD+ Urgent Action Plan for 2010-2012 », for which the main components have already been identified. In the context of this « Urgent Action Plan », the DRC anticipates finalizing the content of the overall strategy, accelerating the establishment of transversal programs, and proceeding to launch the pilot projects for each of the priority sectoral programs (Sections I, II, et III).

14. More specifically, pilot projects will need to be launched in order to: (i) reduce fuelwood demand and increase sustainable energy supply, (ii) increase the productivity and added value of smallholder commercial agriculture, (iii) develop afforestation / reforestation projects. The success of this « Urgent Action Plan » is conditional on the DRC's access to adequate financing, notably in the context of the "Informal Working Group on Interim Finance for REDD" (IWG-IFR).

Objectives and Table of Contents

15. The objective of this report is to present the results of the exploratory study of REDD+ potential that the DRC conducted in 2009, the core strategic measures defined today, and the Urgent Action Plan for the next 24 months.

16. This report is organized around 5 chapters :

- I. General context of the REDD+ process and its importance of the DRC
- II. Definition of a reference scenario for deforestation, degradation, and ensuing emissions for the 2030 time horizon (Business-as-usual scenario)
- III. Definition of a possible alternative development scenario considerably reducing the pressure on the DRC Forest as well as GHG emissions
- IV. Presentation of the main components of a REDD+ Plan, in the context of a development strategy with reduced impact on the Forest
- V. Definition of priority measures for the next 24 months, the « REDD+ Urgent Action Plan for 2010-2012 », in order to accelerate the implementation of the REDD+ Plan

Appendix 1 – Methodological approach employed

Appendix 2 – How to read the abatement cost curve

Appendix 3 – Degree of certainty of incorporated hypotheses

Appendix 4 – Bibliography

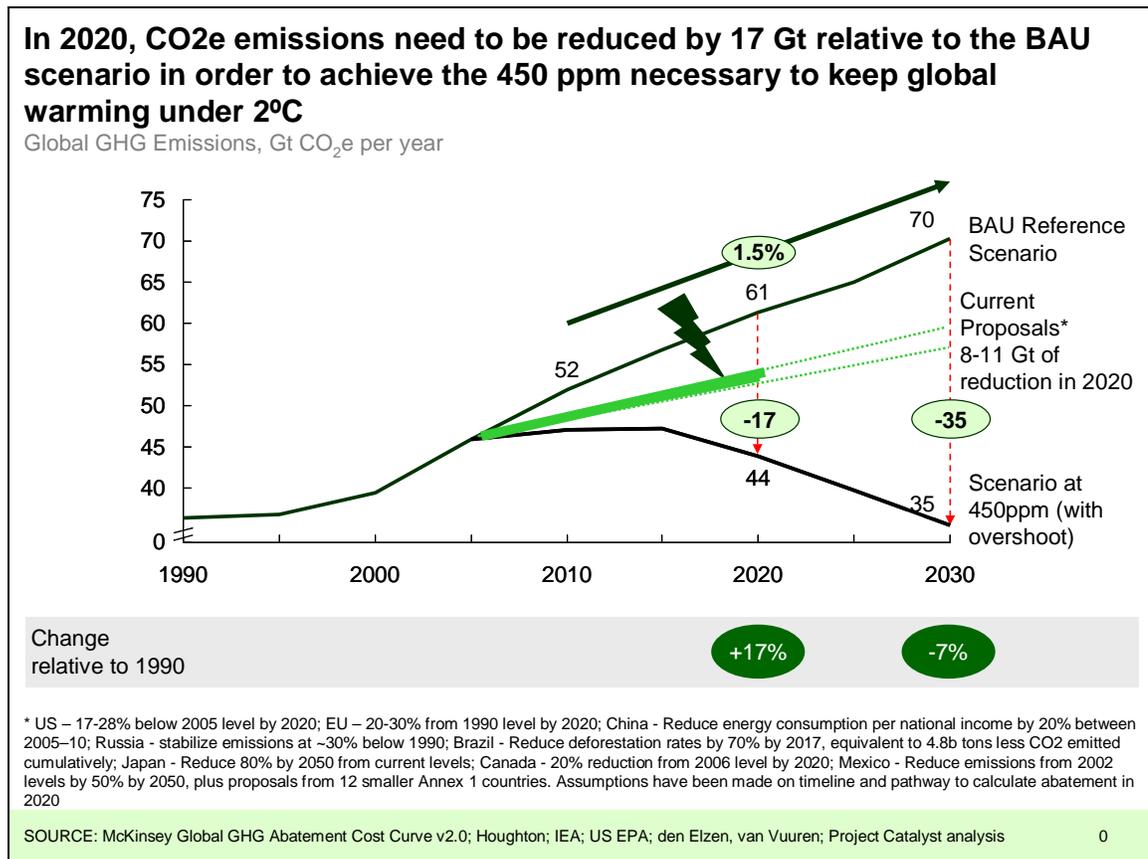
General context on REDD+ and its importance to the DRC

A. Primary importance of REDD+ in the fight against climate change

17. As mentioned in the introduction of the « Catalyst » project report, « Towards the inclusion of forest-based mitigation in a global climate agreement »⁴, the Reduction of Emissions due to Deforestation and Degradation (REDD) is a central tool in the frame of a realistic strategy to curb global warming. In order to arrive at the GHG atmospheric concentration target of 445 parts per million (ppm) of CO₂e, the world would need to reduce its emissions by approximately 17 Gt CO₂e by 2020 compared to the Business-as-usual' (BAU) reference scenario (please refer to Exhibit 1).

⁴ "Pathways to a Low-Carbon Economy : Version 2 of Global Greenhouse Gas Abatement Cost Curve", McKinsey and Company, 2009, integrated in "Towards the inclusion of forest-based mitigation in a global climate agreement" , Project Catalyst, 2009

EXHIBIT1: Global Business-As-Usual Scenario displaying emissions and GHG abatement potential until 2030



18. Out of the potential 17 Gt emissions reduction on the global scale, 6 Gt would be from the Forest in developing countries (please refer to Exhibit 2). This potential incorporates the reduction of emissions due to deforestation and degradation (REDD) with a potential of approximately 4.3 Gt, afforestation / reforestation with a potential of approximately 1.3 Gt, and the sustainable management of forests for the rest of the potential. There is wide agreement among studies that there is no realistic means of achieving the 450 ppm objective without the Forest.

EXHIBIT 2 : The Forest's contribution to the global effort to reduce emissions on the 2030 horizon

Error! Objects cannot be created from editing field codes.

19. The average cost of REDD+ is relatively accessible, with a majority of the considered levers having a cost inferior to EUR 15 / tCO₂e. Therefore REDD+ could constitute up to 30 % of the global abatement potential at a low cost point, through measures curbing deforestation and degradation and promoting afforestation and reforestation.

20. The « Informal Working Group on Interim Finance for REDD » (IWG-IFR)⁵, within which Norway has played the role of secretariat and in which numerous developed and developing countries—including the DRC—and the UN-REDD, and FCPF have participated actively, estimates that an accelerated launch of REDD+ is urgent for 2 reasons, namely that : (1) each year deforestation destroys 13 million Ha of forest—an area equivalent to that of England—releasing 5-7 Gt CO₂e into the atmosphere, and (2) the effective creation of REDD+ programs in developing countries will be a lengthy process.

21. The following paths are being considered to accelerate REDD+ : (i) the IWG-IFR proposes the establishment of an interim financing system and (ii) immediate actions are already being taken by forested developing countries. sont d'ores et déjà menées par les pays forestiers en voie de développement. Thus, according to the introduction of the IWG-IFR report published the 27th of October, 2009 :

« Many developing forest countries want to play their part in international efforts to address climate change and preserve the other benefits forests provide, by protecting their forests and slowing rates of deforestation and degradation. [...]

This document is not based on any particular assumption about when a UNFCCC REDD+ mechanism could be operational. Rather, it explores how and to what extent measurable reductions in deforestation and degradation can be achieved in the short and medium term, within or if appropriate even before the UNFCCC REDD+ mechanism is fully operational. In determining how to do this, the document highlights several case studies – from Brazil, Costa Rica and Guyana – which show that significant progress is possible, as articulated by those countries and many others forest countries. [...]

Based on working group analysis and discussions, and on the consideration of other published work, it is proposed that the world can achieve a 25 per cent reduction in deforestation and forest degradation by 2015. To achieve this objective developed and developing countries must expeditiously establish a deep, collaborative, long-term partnership on REDD+. Such a partnership is essential to strengthen the trust that will allow developing countries to embark on the very serious development choice that REDD+ represents with the assurance that developed countries will support them. It would also assure developed countries of the transparency of REDD+ results and demonstrate environmental, financial, political and social integrity.

The keystone of such a partnership would be an incentive structure that turns around the economic and political logic that currently drives deforestation and forest degradation.» (End of citation)

⁵ IWG-IFR <http://www.miljo.no/IWG>, report from October 27, 2009

22. The DRC therefore wishes to quickly establish itself in the cadre of these efforts and actively participate in the swift execution of REDD+ measures and afforestation / reforestation projects in its territory.

B. Stakes at hand in the protection of the DRC's Forest heritage

The importance of the DRC Forest for the country, for the Congo Basin, and for Humanity

23. The DRC is home to approximately 145 million ha of forests, constituting two-thirds of the Congo Basin's forested area and making it the second-largest tropical forest in the world after that of the Amazon. The DRC Forest can be classified into 4 broad ecosystems : dense humid forest, mountainous forest, sparse forest (of Miombo type), and savannah-forest mosaic. The most prominent ecosystem of these is the dense humid forest, primarily located in the central portion of the DRC basin, which alone covers in the realm of a hundred million hectares, or about 40% of the national territory (please refer to Exhibit 3).

EXHIBIT 3 : Expanse of Forest in the DRC and its segmentation into ecosystems

Error! Objects cannot be created from editing field codes.

24. The Forest currently plays a major socio-economic role in the DRC given that : it constitutes 60% of the country's territory (about 145 of 234 million ha) ; close to 90% of its current population (64 million inhabitants) lives in forest ecosystems from a climate definition⁶ of the word; over 90% of domestic energy resources come from the Forest and a significant part of the country's GDP depends on it.

25. This Forest also constitutes an important environmental resource both for Africa and for Humanity : (i) it sequesters a carbon stock estimated at approximately 40 Gt, equivalent to 140 Gt of potential CO₂ emission, equivalent to roughly three times the planet's current total emissions, which are 52 Gt⁷ ; (ii) it provides priceless « eco-services » both for Africa and the rest of the world ; its presence contributes to the maintenance of important rain cycles that maintain several rivers such as the Congo River, fifth in the world in terms of length and second in terms of flow. It also houses a very large number of endemic species of wildlife and flora, positioning the DRC as an important player in the group of countries with 'mega' biodiversity.

⁶ Includes the population of cities where the forested ecosystem was dominant prior to urbanization, such as is the case with Kinshasa

⁷ Global emissions in 2010 estimated according to project Catalyst report based on McKinsey Global GHG Abatement curve 2.0

Threats to the Congolese Forest

26. This forest has been relatively preserved from deforestation and degradation during the period of conflict that the DRC was involved in until recently, as a result of its inaccessibility. The historical deforestation rate over the last 20 years is estimated at 0.2 to 0.3% per annum, which is relatively weak compared to the global historic average of 0.6%⁸ for the same period.

27. However, the sustainability of this Congolese forest cover—and therefore its function in stocking and capturing carbon—could be partially jeopardized due to demographic and economic development pressures if the former are not managed sustainably.

C. DRC's willingness to implement an ambitious REDD+ program, integrated into the country's socio-economic development strategy, despite facing current and future challenges

The DRC faces major challenges

28. The DRC is currently experiencing a post-conflict stabilization phase, which notably implies the driving of fundamental reforms on the 3 following major fronts : (i) the reconstruction of the country's institutions and the consolidation of territorial integrity ; (ii) the reconstruction of basic infrastructure and (iii) the fight against poverty and the increase of access of the population to basic social services.

29. The success of these reforms will depend, among other factors, of the control of constraints pertaining to demographic expansion and the sheer size of the country. These challenges also apply to the success of the REDD process.

A strong willingness on the DRC's part to include REDD+ in its prioritized programs for the country's socio-economic development

30. The DRC Government and the partners in its development trajectory are convinced of the major role that the Congolese forest will play for the country and the world as a whole.

⁸ Source : Forest Resource Management 2005, FAO ; UNEP ; Hansen et al., 2008, South Dakota University ; Houghton 2003 ; Duveiller et al., 2008, Université Catholique de Louvain

31. In the context of the Central African Forest Commission (COMIFAC), the governments of the DRC and of other countries located in the greater Congo Basin have committed to synching their forest-related policy through a Convergence Plan, in anticipation of the establishment of a more complete REDD+ program.

32. The DRC Government intends to make REDD+ a major program for the preservation of its forest resources, which will be integrated into its national social and economic development policy. Thus, given its strong interdependence with key sectors such as agriculture, energy production, or timber harvesting, the REDD+ program will need to play a major role in their sustainable development.

33. In order to attain this objective, the Ministry of the Environment, the Conservation of Nature, and of Tourisme (MECNT) has created the « National Coordination for REDD » (CN-REDD), responsible for steering and putting into action the REDD+ process at the national level, which consists in preparing the country for the effective creation of a complete national REDD+ strategy.

34. The DRC has also created a National Forest Conservation Program (PNFoCo), used as reference for the myriad of sectoral programs. The development partners that support the DRC in the reinforcement of its institutional capacities in light of the preparation and setup of its REDD program also refer to this structure.

35. In 2009, the CN-REDD conducted—with the financial concord of its partners and the technical support of McKinsey and Company, an exploratory study of the REDD+ potential of the DRC, for which results are presented hereunder. These results will definitely be refined in 2010 in the context of the completion of a more finalized REDD+ strategy that will incorporate the results of all of the current scientific research on deforestation, degradation, and related emissions.

36. The finalization of this strategy will take place through a participative process on the national scale that will integrate—in structured form—the full array of stakeholder parties concerned with REDD, notably: (i) the central Government, with strong interministerial coordination to achieve the program's predetermined objectives, (ii) the provincial governments and authorities, key actors in the effective implementation on the ground, (iii) civil society in its entirety, as well as local communities, (iv) private operators in the targeted sectors, and (v) national and international development partners.

I. Definition of reference scenario for deforestation, degradation, and ensuing emissions on the 2030 horizon (Business-as-usual scenario)

A. Impact of the country's socio-economic growth on the BAU scenario

37. To this day, the DRC has maintained the deforestation and degradation of its forests and savannahs well below the global mean, averaging between 0.2 and 0.3 % over the last 20 years in contrast to 0.6% globally⁹. This can be explained by a number of factors, namely (i) the geographic characteristics of the country (a vast territory of 234 million ha, 60% covered by forested ecosystems ; the dense humid forest of the central basin alone occupies 40% of the territory), and (ii) moderate demographic pressures. The armed conflicts that occurred over the territory in these past decades have accentuated these factors.

38. However, deforestation and degradation are vulnerable to acceleration over the next few years due to the country's expected demographic growth and socio-economic development, which are already materializing in this post-conflict stabilization period.

39. According to the IMF and World Bank's projections, the country will experience a sustained growth rate in real GDP of 5 to 6%¹⁰ over the next 20 years. These projections consider that the growth of the primary sector will be moderate (principally with respect to mining, petroleum, and intensive agriculture—such as the production of palm oil) due to a number of limiting factors, one of which is the lack of qualified labor.

40. If we consider however that these constraints will be in part rapidly addressed in the context of proactive Government programs, these sectors could instead experience a marked acceleration in the years to come. In this case, real GDP could grow by 6 to 8% per annum, or 42 to 46 billion USD in 2030 (please refer to Exhibit 4).

⁹ Forest Resource Management 2005, FAO ; UNEP ; Hansen et al., 2008, South Dakota University ; Houghton 2003 ; Duveiller et al., 2008, Université Catholique de Louvain

¹⁰ Source : World Bank

EXHIBIT 4 : GDP growth scenario, present day to 2030

Error! Objects cannot be created from editing field codes.

41. Based on this perspective, the growth in different sectors could be broken down in the same way :

Primary sector: +4% of annual growth of real GDP, that would evolve from approximately 5 billion USD today to approximately 13 billion USD in 2030

- i. **Agricultural sector** : annual growth of about 3% to attain approximately 8.5 billion USD. These figures rely on a considerable development of commercial agriculture in zones close to cities, enabled both by an increase in productivity¹¹ as well as increased access to further production zones due to infrastructural development.
- ii. **Extractive sectors (mining and hydrocarbons)**: net intensification (i) of mining activity (10 to 15% of research permits converted into exploitation permits) in the central, southern, and eastern regions; and (ii) exploratory and extractive petroleum activities in the central DRC basin, leading to an annual growth of 10%.

Secondary sector: +10% of annual growth of real GDP, from 1 billion USD to 8 billion USD in 2030

- i. **Construction, public works, and infrastructure**: (i) development of road (rehabilitation of roads through the Ministry of Infrastructure and Public Works' program), river and rail infrastructure; (ii) densification of energy grids such as that of electricity , to achieve an annual growth of 10 to 15% beginning in 2015.
- ii. **Industrial sectors**: significant growth in industries involving transformation of primary agricultural and extractive products, for the local market as well as for export.

Tertiary sector: +8% of GDP growth to attain approximately 20 billion USD in 2030. This sector is considered a determining factor in the growth of other sectors.

- i. **Tourism** : increasing investment in touristic infrastructure, with particular emphasis starting in 2015 (after stabilization of

¹¹ Increase in productivity by 10% in 20 years and doubling of rotations on cultivated land

transportation infrastructure) ; promotion of national and international tourism.

- ii. **Financial sector** : development of country's financial institutions as well as programs integrating financial flows ; decentralization of financial transactions and enlargement of access to financial system over entirety of territory.

B. Impact of demographic growth on BAU scenario

42. Demographic growth will progress consistently at 3% per year until 2015, and then in diminishing increases to arrive at 2.5% per annum in 2030. Therefore, the population will grow from the current 64 million inhabitants to 122 million in 2030 (please refer to Exhibit 5). This scenario takes into account (i) the impact of post-conflict stabilization, (ii) the amelioration of public health conditions (notably impacting infant mortality) and (iii) the improvement in the population's standard of living following the Programs launched by the DRC Government, with particular respect to the Strategy for Growth and Poverty Reduction (SCRIP) and the Millenium Development Goals¹².

¹² Source : Strategy for Growth and Poverty Reduction Document, 2006, and National 2009 Millenium Development Goal Report

EXHIBIT 5 : 2009-2030 demographic growth, split into urban versus rural population evolution

Error! Objects cannot be created from editing field codes.

43. Important population movements are also expected, accentuating the attractiveness of larger cities and provinces experiencing strong economic growth (notably Kinshasa, Bandundu, Katanga), from the rural populations seeking stable employment. This entails that the DRC's population will be 45-50% urban in 2030, up from 33% today.

C. Analysis of main deforestation and degradation factors in the DRC between 2010 and 2030

44. Taking into account the aforementioned demographic and socio-economic growth scenarios ('proactive' BAU scenario), the pressure on the forest will thus be significantly increased by two factors: (i) the demographic pressure that will increase demand for agricultural land and fuelwood for provision of rural and urban populations, and (ii) the growth of economic sectors that will have a (direct or indirect) impact on the forest such as mining or hydrocarbons, for which forest research / extraction are already significant.

45. In this scenario, deforestation will affect between 12 and 13 million ha from now until 2030, decreasing the DRC's forest cover from a total of 145 million ha to approximately 132 million ha (please refer to Exhibit 6). The degradation caused by these activities would affect an additional 21 million ha¹³, the three main factors of deforestation and degradation being commercial agriculture (~40%), subsistence agriculture (20%) and fuelwood collection (~20%). Without immediate action, approximately 10% of the Democratic Republic of Congo's forested territory could disappear between now and 2030, rising to 15 to 20% by 2050.

EXHIBIT 6 : BAU reference scenario for cumulative DRC deforestation by 2030

Error! Objects cannot be created from editing field codes.

46. In this reference scenario, 10 factors of deforestation and degradation, organized into 3 component groups, were considered for the 2010-2030 period.

47. The growth of each of these factors has been analyzed in detail, taking into account different direct and indirect causes and the numbers presented by

¹³ The total degradation expressed herein is indicative and encompasses all types of degradation, from « light » to « severe ». The impact of these different types of degradation on emissions is quantified granularly.

factor are the cumulative contributions to deforestation and degradation from 2007 to 2030 (please refer to Exhibit 7).

EXHIBIT 7 : Distribution of deforestation between 10 factors considered for the DRC

Error! Objects cannot be created from editing field codes.

Group I: Forestry and activities linked to the Forest 4 factors, contributing up to 0.7 to 0.8 million ha (6%) to deforestation and 6 to 6.5 million ha (28%) to degradation, amounting to a cumulative contribution to emissions of approximately 500 Mt CO₂e and 940 Mt CO₂e respectively from 2007-2030

- i. **Industrial timber harvesting** : 3 to 3.5 million ha of degradation (15% of total degradation). Industrial timber producers currently extract a volume that is declared to be presently small (between 3 and 5 m³/ha/year on the delineated parcel), that could however rise up to 15 m³/ha/year in 2030, as a result of (i) a growth in regional demand for timber (ii) an expansion of the range of extractable species, (iii) an amelioration of the evacuation network for the product. The resulting increased volume would thus constitute a (light) degradation of harvesting zones.
- ii. **Artisanal timber harvesting**: 120 to 130,000 ha (1%) of degradation. Artisanal producers also extract relatively low volumes today, mainly due to lack of appropriate tools as well as the relatively difficult access to the requisite zones. A rise in volume extracted to approximately 10 to 15 m³ /ha / year by 2030 is foreseeable given the expected increase in the range of species that can be commercialized and the improvement of the transportation networks utilized.
- iii. **Illegal logging**: 150 to 200,000 ha (1%) of deforestation and approximately 3 million ha of degradation (10%)¹⁴. These activities are principally located in the provinces where the pressure on the forest is already high and where timber extraction is forbidden, such as in Bas-Congo, North Kivu, South Kivu, and Orientale. 35% of the extractive activity is assumed to be deforestation, and the rest is considered as degradation. Due to many of the same reasons expressed here above, and also to the increase in wood prices, one

¹⁴ Source : MECNT ; Djiré, A., 2003, CIRAD ; CN-REDD

Democratic Republic of Congo / Ministry of Environment, Nature Conservation and Tourism / DRC REDD+ Potential / december 2009.

can expect an increase in volume extracted per hectare from 10-13 m³/ha/year to about 15 m³/ha/year.

- iv. **Other activities contributing to deforestation and degradation**, linked to customary population activities (e.g., hunting and bush fires of anthropic origin) : 580 to 600,000 ha (5%) of deforestation, primarily linked to fire.

Group II : Agriculture and Livestock in forested milieus (4 factors) contributing to up to 7.5 to 8.5 million ha (64 %) of deforestation and 3.4 to 4 million Ha (16%) of degradation, amounting to cumulative emission contributions of approximately 3,400 Mt CO₂e and 300 Mt CO₂e respectively from 2007-2030.

- i. **Subsistence agriculture**, principally migratory in nature and achieved through slashing and burning¹⁵ : 2.2 to 2.5 million ha (20%) of deforestation. These numbers are based on an increase, in the short terms, of cultivated areas in order to supply a growing population. This growth then becomes negative due to (i) a rotation that is two to three times more rapid on fallow land, (ii) the effects of rural exodus and (iii) the conversion of certain farmers to smallholder commercial farming upon having access to improved infrastructure.
- ii. **Smallholder commercial agriculture**, principally destined to the local market: 3.2 to 3.5 million ha (27%) of deforestation. This type of commercial agriculture will increase by approximately 4% per year on average in terms of surface, in response to increasing demand at the national level. Current farmers will tend to increase their production through an expansion of surface cultivated, despite an expected increase in productivity of 10%. Additionally, a portion of the subsistence farmers will cross over into smallholder commercial agriculture, thanks to an improved infrastructure network permitting them easier access to markets.
- iii. **Large-scale intensive agriculture**, destined for export (principally palm oil) : 1.6 to 2 million ha (15%) of deforestation in primary forest (due to the creation of new plantations) and approximately 1.4 to 1.6 million ha (7%) of degradation due to the rehabilitation of abandoned plantations. From now until 2015, from 1.4 to 1.6 million ha of old

¹⁵ This factor also integrates fuelwood from migratory slash-and-burn agriculture, considered as a by-product of such activity and destined, for the most part, to the consumption of rural populations but also of urban populations (approximately 15% of urban needs).

plantations could be rehabilitated to meet actual demand, generating degradation. Subsequently, new concessions on 1.6 to 2 million ha would be permitted in the dense humid forest, notably in the provinces of Equateur and Orientale, in order to satisfy an annual growth estimated to be 4% of demand for arable land for agriculture between 2015 and 2030.

- iv. **Livestock:** 360 to 400,000 ha (3%) of deforestation due to the establishment of smallholder livestock production, and about 2 to 2.4 million ha (10%) of degradation in shrubby savannahs or savannah-forest mosaics due to the establishment of large ranches containing several thousand heads of cattle (leading to relatively light degradation).

Group III : Impacts of urban growth and of industrial sectors on the Forest : 3 factors contributing up to 3.5 to 3.7 million ha (29%) to deforestation and 12 to 13 million ha (55%) to degradation. This corresponds to cumulative emissions of 1,500 to 2,000 Mt CO₂e and 600 to 650 Mt CO₂e respectively over the 2007-2030 period

- i. **Fuelwood** for urban population consumption¹⁶: 2.4 to 2.5 million ha (19%) of deforestation and 12 to 13 million ha (58%) of degradation, including the previously discussed « light » degradation. Here, deforestation and degradation associated with commercial fuelwood production were considered, destined to the supply of urban populations (principally the large agglomerations of Kinshasa, Lubumbashi, or Kisangani) for an annual current volume of approximately 27 million m³. Demand for fuelwood will increase, as a result of urban population growth, to reach close to 40 million m³ ; it will then be moderated by the increasing electrification of urban zones (for a resulting demand of about 25 million m³ in 2030).
- ii. **Mining and hydrocarbon extraction:** approximately 1.1 to 1.2 million ha (9%) of deforestation from now until 2030. In effect, an estimated 10 to 15% of current research permits¹⁷ on mining areas will translate into extraction permits by 2030, provoking 700 to 800,000 ha of deforestation. Additionally, De plus, the extraction of

¹⁶ In order to avoid double-counting, fuelwood from slash-and-burn agriculture has been considered in that factor (please refer to Group II). Fuelwood from such a source supplies cities approximately 15% of their needs, as well as those of the rural populations. It is therefore considered a by-product of slash-and-burn agriculture.

¹⁷ 3,374 research permits over 700,000 Km² according to the DRC Mining cadastre

hydrocarbon deposits in the dense humid forests of the central basin could lead to up to 400,000 Ha of deforestation¹⁸.

- iii. **Infrastructure and urbanization** : the direct impacts of the growth of urban zones located in climatic forest areas (primarily in the provinces of Bas-Congo, North Kivu, and South Kivu) as well as of the development of infrastructure, are quite limited, with deforestation less than about 90,000 ha (1%). However, these factors have a major indirect impact on deforestation and degradation. This is due to the fact that development of infrastructure permits access to new Forest regions, and thus develops or intensifies activities such as agriculture or timber harvesting. This indirect effect is considered in the hypotheses associated with each of the other factors described above.

D. Quantification of emissions from DRC deforestation and degradation reference scenario

48. The « proactive » reference scenario (BAU), will lead to net emissions¹⁹ of 390 to 400 Mt CO₂e in 2030, which represents an annual growth of 3% relative to 2007. In 2020, total net emissions associated with degradation and deforestation are estimated at 345 to 355 Mt CO₂e (please refer to Exhibit 8). The methodological approach employed in the calculation of equivalent tons of CO₂ emissions (CO₂e) consists in projecting the evolution of deforestation and degradation factors and in quantifying the associated t CO₂e²⁰.

EXHIBIT 8 : Emissions from degradation and deforestation in the DRC in 2007, 2020 and 2030 ²¹

Error! Objects cannot be created from editing field codes.

¹⁸ The potential for hydrocarbon extraction is estimated to be between 3 and 4 billion barrels / year for the next 20 years over approximately 36 petroleum fields, according to Ministry of Hydrocarbons

¹⁹ Net emissions take into account the regeneration of the forest occurring after the activity that had originally caused the deforestation or degradation. The emissions are calculated on the basis of a specific carbon content for each ecosystem (both above and below-ground, which is limited to roots). Please refer to appendix for carbon content hypotheses

²⁰ Please refer to Appendix 1 for the methodology

²¹ Ref. appendix on the level of confidence on the hypothesis..These data will be refined in the next phase.

Democratic Republic of Congo / Ministry of Environment, Nature Conservation and Tourism /
DRC REDD+ Potential / december 2009.

E. Major impact on eco-services provided by DRC Forest and on local communities

49. Deforestation, degradation, and their associated emissions have a non-negligible impact on biodiversity (wildlife, flora, and soils) and rainfall. What's more, they directly harm local communities, who source a significant portion of their revenue from the forest.

50. The sparse scientific data available does not permit the precise identification of critical zones or the objective impact of certain potentially harmful activities on the environment²². However, they « *demonstrate that a significant reduction in the basal surface of a dense humid tropical forest population can provoke a deep-seated change in the forest's dynamic and unduly endanger its regeneration, both in terms of biodiversity and in terms of biomass.* »²³.

51. As one of the wealthiest countries in the African continent from the perspective of biodiversity, degradation and deforestation in the DRC will have a negative effect on this diversity, and thus an impact on local communities that utilize it for nourishment, medicine, and other purposes. For example, deforested zones no longer constitute a suitable habitat for certain animal species, which also contributes to a reduction in hunting perimeters.

52. Finally, deforestation, and the climate change that ensues, alters rain patterns, impacting not only Forest ecosystems (in terms of wildlife and flora) but also agricultural yields and general access to water resources.

²² EURATA, Etude "Profil Environnemental (PEP) de la République Démocratique du Congo", 2005

²³ Dupuy 1998, Zobi 2002, Gourlet-Fleury et al., 2004. Translated from French, original text as follows:

"...démontrent qu'une réduction importante de la surface terrière d'un peuplement forestier dense humide tropical humide peut amener un changement profond dans la dynamique forestière et mettre indument en péril sa régénération tant en terme de biodiversité que de biomasse."

II. Definition of possible alternative development scenario that significantly reduces the pressure on the Congolese forest and GHG emissions

A. Calculation of GHG reduction potential by 2030 and associated costs

53. The analysis of overall REDD+ potential based on the REDD potential of the 10 identified factors, as well as the additional carbon sequestration potential of afforestation and reforestation²⁴ shows that in 2030, the DRC could become a carbon sink of approximately 20 Mt CO₂e for all forest-related activities (please refer to Exhibit 9).

EXHIBIT 9 : Total abatement potential of emissions from deforestation and degradation as well as sequestration in the DRC

Error! Objects cannot be created from editing field codes.

54. The average cost for the entirety of the mitigation and sequestration levers is estimated to be € 6,5/ t CO₂e, with approximately 60% of the potential costing less than € 5 /t CO₂e (please refer to Exhibit 10)

EXHIBIT 10 : Abatement potential and cost curve for emissions from deforestation and degradation²⁵

Error! Objects cannot be created from editing field codes.

55. The emissions abatement potential for each of the 10 deforestation and degradation factors considered in the reference scenario (please refer back to Part II) has been defined in realistic fashion ; the approach differs in function of two categories of factors :

- For 6 of the factors²⁶ affecting sectors with high economic growth potential, both in terms of GDP and in terms of employment, the DRC calibrated its emissions abatement so as to balance abatement and the maintenance of GDP growth. For example, in the case of intensive agriculture, instead of strictly forbidding this activity (and therefore reducing ensuing emissions by 100%, which has the side effect of reducing potential contribution to GDP by 100% as well), the DRC proposes to limit the intensive agriculture

²⁴ Considered in the context of Clean Development Mechanisms (CDM)

²⁵ Please refer to appendix for methodological note on modeling and construction of cost curve

²⁶ (i) Industrial timber harvesting (ii) Artisanal timber harvesting (iii) Illegal logging (iv) Commercial agriculture –both smallholder and intensive, including for export (v) Livestock (vi) Mining and hydrocarbons

that takes place in the forest to the rehabilitation of abandoned plantations, and to place the new plantations in marginal areas, permitting a reduction in emissions all the while maintaining an important influx of GDP contribution. The other factors are analyzed in the same way and choices have been made with respect to programs to launch (in complementary form), ranging from the reduction to elimination of deforestation and degradation in certain areas (up to 100% abatement), to a displacement of the activity towards other non-forested areas, or even an establishment of coaching programs permitting a reduction in emissions (for example, an increase in agricultural productivity).

- For 4 factors²⁷, less sensitive from the perspective of their contribution to economic growth, the abatement potential can reach 100%. This potential is thus uniquely a function of the DRC's capacity to implement programs permitting its achievement, such as the agricultural programs for subsistence agriculture.

56. The sequestration potential for the 2 levers of afforestation and reforestation is also calculated with a concern for realism, as it takes into account a preliminary zoning of the DRC territory, notably by allocating marginal zones (savannahs) to different economic activities and determining the areas suitable for afforestation / reforestation :

- Afforestation aiming to sequester carbon : based on this methodology, a hypothesis of approximately 30% of shrubby savannahs or forest-savannah mosaics has been employed in calculating afforestation from now until 2030, which comes out to about 7 million ha.
- Reforestation : approximately half of the zones deforested in the last 10 years can be considered as non-utilized and / or abandoned and can thus be used for reforestation. Additionally, a fourth of the zones deforested in the next 20 years (after reduction of deforestation thanks to the aforementioned levers) is considered as potentially reforestable, the rest being occupied by a specific activity (for example, timber concessions, mining, petroleum extraction or agricultural fields). These reforestable zones represent about 4 million ha on horizon 2030.

57. The afforestation programs aiming to create sustainable reserves of fuelwood and the reforestation programs to create higher-value timber are included in the mitigation levers for each of these factors.

58. Afforestation and reforestation programs will reach their full potential by 2020 and will be accompanied by assorted means of labor creation (e.g.,

²⁷ (vii) Other forest-related activities, (viii) Subsistence agriculture, including migratory slash-and-burn agriculture (ix) Fuelwood (x) Infrastructure and urbanization

development of capacity, creation of nurseries). These activities could generate 40,000 jobs during the 2010-2030 period.

59. The contribution of the totality of the levers to the reduction of emissions and to the sequestration of GHG, as well as the associated costs, are presented below (please refer to Exhibit 11) :

EXHIBIT 11 : Reduction potential of emissions from deforestation and degradation and sequestration by lever

Error! Objects cannot be created from editing field codes.

Group I : Forestry and activities linked to the Forest : 3 mitigation levers (and afforestation and reforestation) will contribute between 182 and 192 Mt CO₂e (or 44%) to the total potential emission mitigation in 2030.

- i. **Legal industrial and artisanal timber harvesting :** approximately 19 Mt CO₂e (4% of the total mitigation potential in 2030) thanks to the reduction of extraction volumes by ha to levels that are sustainable and cause limited emissions (transition from 15 m³ per ha to 10 m³ per hectare). The unit costs (€ 2 to 2.5 / t CO₂e) thus represent the amount necessary to make this extraction « sustainable ». The final unit cost takes into account the opportunity cost associated with the volume that is no longer extracted, the additional costs of certification necessary for verification that the timber is sustainable (both from the perspective of the extracted volume and the reduction in collateral damage associated with this initial volume²⁸), and the monitoring and initiative management costs.
- ii. **Illegal logging :** potential reduction of approximately 22 to 23 Mt CO₂e (5%). This potential can be disaggregated into several levers with regional particularities. The first regards the eradication of illegal exploitation destined to neighboring countries (Rwanda, Burundi, Uganda) thanks to the reinforcement of border controls by 2030 in the provinces of North and South Kivu as well as in Orientale and Bas-Congo. The second mitigation lever consists in converting illegal logging that is destined to local markets into legal sustainable harvesting (please refer to « Legal timber harvesting »). The third lever is reforestation for the purpose of sustainably providing timber

²⁸Certification takes into account not only extracted volumes but also total damage generated, including collateral damaged caused by the extraction (roads to site, paths within site, harvesting process itself)

of the lowest quality to local markets, primarily urban populations. The costs associated with putting these different levers into action are estimated to be approximately € 8/ t CO₂e for the first, € 6.5 / t CO₂e for the second, and € 1 to 1.2 /t CO₂e for the third (labor-intensive reforestation).

- iii. **Other activities contributing to degradation and deforestation** linked to customary population activities (such as hunting) or to natural catastrophes (such as bushfires) : 1.2 to 1.5 Mt CO₂e (less than 1%), with a cost of approximately €0,2 / t CO₂e.
- iv. **Afforestation** : emissions reduction potential of 61 to 65 Mt CO₂e (15%) on marginal areas (shrubby savannah and savannah-forest mosaics) on the order of 7 million ha. Associated unit costs are calculated for two types of techniques : the first is labor-intensive afforestation, for which the cost is estimated to be approximately € 3 / t CO₂e, with capital expenses between € 155 and 160 / ha, and operating expenses between € 9 and 10 / ha / year. The second is mechanized, or capital-intensive, afforestation, which costs approximately € 4 / t CO₂e, for which capital expenses range between € 270 and 275 / ha and operating expenses between € 10 and 11 / ha / year.
- v. **Reforestation** : emissions reduction potential of 80 to 84 Mt CO₂e (19%) in 4 million Ha of degraded or deforested forest areas. Unit costs for reforestation are also calculated for the same two techniques : labor-intensive reforestation, estimated at approximately € 1 / t CO₂e with capital costs ranging between € 170 and 175 / ha, and operating costs between € 9 and 10 / ha / year, and capital-intensive, or mechanized, reforestation, at approximately € 1.5 / t CO₂e, with capital costs ranging between € 300 and 305 / ha, and operating costs between € 10 and 11 / ha / an. While recourse to mechanized afforestation or reforestation is more expensive, it is also faster and thus allows for a faster realisation of the abatement potential.

Group II : Agriculture and livestock in forested milieus : 4 abatement levers, contributing up to 180 to 187 Mt CO₂e (43%) to the total mitigation potential

- i. **Subsistence agriculture** : mainly migratory slash-and-burn : abatement potential of 15 to 17 Mt CO₂e in 2030 (4% of 2030 total mitigation potential), based on a productivity-enhancement program

that reaches 50% of households. The unit costs, valued at approximately € 6.5 / t CO₂e, incorporate the cost of the social programs described in the strategy (please refer to next chapter) reaching about 3 million households between now and 2030. They incorporate the annual costs of providing fertilizer and seeds to the families (both the material and distribution expenses associated with this provision), as well as the extension and coaching programs necessary to empower farmers in a sustained way.

- ii. **Smallholder commercial agriculture**, primarily destined to local markets : abatement potential of about 65 to 70 Mt CO₂e (16%), derived from the creation of two programs leading to increases in productivity and targeting approximately 75% of households (please refer to following chapter). The first program, involving extension and provision of inputs, reaches approximately 25% of farmers over the 20 year period. The second program aims to establish aggregation projects reaching 50% of the households. The unit cost for smallholder commercial agriculture abatement is € 4.8 to 5 / t CO₂e.
- iii. **Intensive commercial agriculture**, for the chief purpose of exporting goods (mainly palm oil) : abatement potential of approximately 80 Mt CO₂e (19%). This mitigation is achieved through relocation of new plantations (that would have otherwise been established in primary forest, causing deforestation of 1.6 to 3 million ha according to the BAU reference scenario elaborated in Part II) to shrubby savannahs or savannah-forest mosaics. Plantations rehabilitated on abandoned sites (approximately 1.6 million ha) are not considered in this emissions abatement potential. The unit costs for the placement of new plantations in the shrubby savannah or forest-savannah mosaic are approximately € 13 / t CO₂e, or the equivalent of the reduction in plantation owners' margins due to the decrease in yields and increase in production costs associated with producing in a new, more arid and less fertile ecosystem.
- iv. **Livestock** : abatement potential of approximately 20 Mt CO₂e (5%). The cost associated with this lever, estimated at about € 0,5 / t CO₂e, takes into account the implementation of a program improving productivity that would reach 100% of smallholder livestock producers (please refer to strategy section for further detail).

Group III : Impact of urban growth and industrial sectors on the Forest : 3 mitigation levers contributing up to 47 to 57 Mt CO₂e (12%) to the total abatement potential :

- i. **Reduction in demand for fuelwood**, primarily destined to the consumption of the urban population : approximately 45 to 55 Mt CO₂e (12%). Three programs targeting urban and peri-urban households have been strategically developed : the first is based on a reduction in demand through provision of approximately 5 million households with higher efficiency ovens (reducing fuelwood consumption by a minimum of 50%), which costs from € 1.5 to 2 / t CO₂e. In the second program, the government subsidizes the provision of electricity for 5 million households located primarily in the southern provinces, at a cost of € 25 to 26 / t CO₂e (this cost includes the one-time cost of connecting a new household to the existing grid, estimated to be approximately € 880). The third program involves foresting marginal zones around cities with the goal of ensuring sustainable production of fuelwood, therefore reducing degradation and deforestation. The aforementioned cost associated with labor-intensive afforestation is estimated to be € 3 / t CO₂e and that of capital-intensive afforestation approximately € 4 / t CO₂e.
- ii. **Mining and hydrocarbon extraction** : emission mitigation potential by 2030 of 2.2 to 2.6 Mt CO₂e (1%). The opportunity costs associated with the extraction hydrocarbons greatly exceed 60 € / t CO₂e and are therefore omitted from the cost curve. With regards to mining, we estimate that the incremental cost of adopting measures conforming to « green » mining practices will exceed € 100/ t CO₂e.
- iii. **Infrastructure and urbanization** : the mitigation of direct impacts is estimated to be quasi nonexistent and thus is not considered in our quantitative analysis.

III. Presentation of governing foundation of REDD+ Plan, in the context of a development strategy with decreased impact on the forest

A. Our ambitions

60. The DRC Government displays strong ambition in its REDD+ strategy until the year 2030, and does so at three levels :

- i. The DRC constituting a carbon sink by 2030 for the activities implicating the forest : REDD and afforestation / reforestation
- ii. The objectives for REDD+ and afforestation and reforestation are defined in ambitious manner all the while remaining realistic relative to the country's objectives for socio-economic development
- iii. This strategy will be refined according to a national participative process that will involve the stakeholder parties all together and grant an important place to civil society, local communities in particular

61. These ambitions materialize around a complete REDD+ plan, structured in four components :

A transverse section that aims to put into place key reforms permitting the coordination, the enablement, the financing, and the control of activities that reduce or sequester emissions :

1. Reinforcement of the National Coordination and the mechanisms for executive steering ;
2. Refinement of REDD+ strategy, and launch of legal and institutional reforms, as well as the national participative process ;
3. Establishment of a national MRV (measure, report, verification) system that is transparent ;
4. Definition of a national mechanism for the sharing of revenues and establishment of efficient payment systems in the entirety of the territory

3 sectoral and territorial sections :

Section I : Management, sustainable extraction and increase in forest heritage, under the responsibility of the MECNT;

Section II : Accelerated development of performant agriculture in the rural-forested milieu, as a coordinated effort between the MECNT and Ministry of Agriculture ;

Section III : Limitation of the impact of urban growth and of industrial sectors on the forest, achievable through strong interministerial coordination.

B. A strategy composed of 14 key programs

62. Today, the DRC has preliminarily structured its REDD+ Plan around 4 sections containing 14 distinct programs (please refer to Exhibit 12). These programs will be refined and structured further in the framework of the work to be addressed in the beginning of 2010 and will be done through a national participative process.

EXHIBIT 12 : DRC REDD+ Strategy

Error! Objects cannot be created from editing field codes.

63. The governing aspects of these 14 programs are presented, in preliminary fashion, in the ensuing paragraphs :

Transverse section :

64. The reinforcement of the DRC's capabilities with respect to forest management is the focus of an action supported by both the Government and international partners—in particular the World Bank- FCPF and UN-REDD, that is inscribed in the National Program for the Forest and Conservation of Nature (PNFoCo).

65. In this context, the DRC created the CN-REDD and launched a centralized and regional reform of its institutions ; it allocated itself a legal framework governing the group of activities linked to the forest.

66. The programs developed inside this component aim to accelerate, reinforce, and complete actions that have already been launched, conform to the REDD+ strategy.

- **Program 1 : Reinforcement of the National REDD Coordination and of its executive steering mechanisms**

67. As previously mentioned, the DRC has already created a National REDD Coordination (CN-REDD) that coordinates all REDD+ activities for the involved stakeholders.

68. The present program's objective is to reinforce the CN-REDD by allocating it the human and financial means to achieve its mission within the set deadlines. This should allow it to effectively play the role of 'Program management office (PMO)' for the REDD+ Plan at the national level.

69. The reinforcement of CN-REDD and its missions will be specified in the context of the institutional reform to be launched immediately as support for the overall strategy's success (please refer to program 2 – module 2.2).

70. Thus, the CN-REDD would be able to :

- i. Report regularly on the state of advancement of the REDD+ plan to the entire group of concerned stakeholders
- ii. Organize and moderate consultation and coordination sessions between the totality of stakeholders, civil society in particular
- iii. Coordinate the activities of different national institutions and international and national partners around the REDD process
- iv. Communicate regularly with the wider public and the media, in coordination with the relevant entities in the MECNT.

▪ **Program 2 : Refinement of REDD+ strategy and launch of legal and institutional reforms and of national participative process**

71. This program is the amalgamation of three complementary sub-programs that have already been launched by the DRC and that will be reinforced in the beginning of 2010.

Module 2.1 : Development and update of REDD+ strategy and definition of a national territory utilization (zoning) policy

72. The DRC commits to finalizing the definition of its REDD+ strategy by refining and further specifying the results obtained preliminarily in the context of this exploratory study on the potential for reduction and sequestration of emissions as well as the costs of programs implementing sustainable solutions.

73. More specifically, a wider consultative process and complementary analyses will allow to :

- i. Finalize the analysis of deforestation and degradation as well as the ensuing emissions by 2030 through a scientific process including satellite imagery. This will notably require the completion and specification of (i) certain data including that which reflects fuelwood and illegal logging and (ii) the specificities of the 4 ecosystems and 11 provinces considered, in terms of deforestation and degradation.
- ii. Refine the analysis of the potential for mitigation and sequestration, along with the associated costs, in close concert with the entire group of stakeholder parties. In particular, the needs of the sectors which

have direct impacts on the forest will be discussed in detail with the concerned Ministries, such as those in charge of agriculture, of energy (for fuelwood), for mining, and for hydrocarbons.

- iii. Finalize the DRC's REDD+ Plan by specifying the content of the 14 key programs to launch. Each of these programs will be broken down into concrete actions to be executed.
- iv. Define Provincial REDD+ Plans for the country's 11 provinces, ensuring the successful implementation of a national REDD+ program on the ground. These plans will need to take into account the specific potential as well as specific constraints of each province.
- v. Achieve national territory 'zoning', aiming for a clear allocation of the areas included in the 4 ecosystems to the totality of activity sectors. This zoning will need to be based on the three categories of forest that are already defined in the Forestry Code (namely classified forests, permanent production forests, and protected forests), as well as on the administrative maps and the needs of other sectors such as areas that are the subject of research for mining.
- vi. Elaborate an overall deployment calendar for the REDD+ Plan, clearly defining the actions to be performed, those responsible for their completion, and the deadlines for such.
- vii. Define an « urgent action calendar » detailing the prioritized actions to be performed in the first two years (please refer to chapter 5 of the report).
- viii. Establish a plan for the financing of REDD+ strategy and identify the sources of financing and the potential partners for the establishment of the different programs, both for the overall deployment calendar and the urgent action calendar for the next 24 months.

74. All of these documents will be refined and updated regularly. A first refresh of the strategy can be done starting in 2012-2013 in order to integrate the impact of the first achievements, in particular the results of pilot projects as well as the request from different stakeholder parties.

Module 2.2 : Pursuit and reinforcement of legal and institutional reform, in accordance with the objectives of REDD+ strategy

75. The success of this program is deemed critical to the success of the DRC's overall REDD+ Plan, especially given the challenge that the institutional reconstruction of the country in this post-conflict period represents.

76. In effect, the DRC has already started a reform aiming to reinforce its whole institutional and legal base. The MECNT has thus already launched initiatives pertaining to :

- i. the definition and application of a Forestry Code
- ii. the reinforcement of the MECNT and of the institutions under its guardianship.

77. The present program therefore aims to pursue the efforts that have already been initiated in the following directions :

- i. the reinforcement of the legal framework within which the strategies pertaining to territorial « zoning » belong
- ii. the finalization of the institutional reforms, with aim to:
 - o define organigrams and job descriptions at every level
 - o reinforce the capabilities of institutions at every level
 - o intensify the synergies between the MECNT and the ministries in charge of sectors impacting the forest
- iii. the launch of national land reforms based on the experiments currently taking place and integrating the aforementioned 'zoning' project

Module 2.3 : Establishment and stimulation of national participative process

78. The creation of CN-REDD as well as all of the work launched in the context of the REDD+ process have been—until the present—conducted in participative fashion. This participation will be reinforced in the months to come with an eye to successfully mobilizing the nation around a REDD+ Plan.

79. A large part of this program will be dedicated to the increased awareness of the REDD+ Plan by civil society.

- **Program 3 : Establishment of transparent national MRV (measure, report, verification) system**

80. In coherence with the recommendations of the IWG-IFR, this program, essential for the proper functioning of the REDD+ Plan, aims to create an inventory of the DRC's carbon stocks, and to measure the annual rates of deforestation and degradation as well as the related emissions. In order to achieve this, the program aims to :

- i. Clarify the roles of the institutions in charge of MRV and reinforce their coordination.
 - ii. Provide these institutions with the human and financial means necessary
 - iii. Ensure a permanent coordination between these institutions and the national and international organizations concerned (e.g., universities, spatial agencies) in order to combine different sources of information to measure, on a yearly basis, the rate of deforestation and eventually, the emissions caused by deforestation and degradation. It is also important to ensure the transparency of said results.
 - iv. Create a public platform for the diffusion of results, specifically through the creation of a website.
- **Program 4 : Definition of a national mechanism for the transparent repartition of revenues and establishment of payment systems throughout the territory**

81. In order to ensure successful implementation in the field as well as to minimize transaction costs, it is important to define and put into place a transparent mechanism for the repartition of revenues between (i) the different economic sectors (ii) the public institutions at the central level, provincial and local, private actors and local communities. Therefore, this program aims to :

- i. Establish transparent rules for the sharing of REDD+ revenue among different beneficiaries ;
- ii. Create a national REDD+ fund that can be managed by a multiparty Commission ;
- iii. Establish effective systems for the transfer of payments to beneficiaries
- iv. Install an independent verification process.

Section I : Management, sustainable extraction and increase in forest cover, under the responsibility of the MECNT

82. This component, placed under the tutelage of the MECNT, aims to organize all of the activities linked to forestry. Four complementary programs have been developed, permitting the coverage of different forest « perimeters » defined according to the Forestry Code by specifically tailored actions.

83. For reference, the Forestry Code defines three categories of forest, namely :

- i. Permanent production forests, dedicated to legal extraction : 10 million ha currently conceded, with an objective to achieve 20 million ha at term ;
- ii. Classified forests, integrating all of the protected areas (such as national parks or natural reserves) as well as other classified perimeters. This category currently covers 10% of the national territory and will achieve 15% at term ;
- iii. Protected forests, that could host other economic activities such as agriculture or mineral exploitation. This category regroups the rest of the country's current forested capital under a moratorium that freezes the granting of any new concession.

▪ **Program 5 : Management of activities in the « Permanent production forests » around sustainable industrial and artisanal extraction, and fight against illegal logging**

84. The objective of this program is to reinforce the actions of the management of concessions and forest extraction permits (industrial and artisanal) and to fight illegal logging in the whole territory.

85. In effect, concrete actions have already begun on four fronts :

- i. The conversion of old industrial extraction titles into new titles, based on budget forecasts and development plans for the management of sustainable production. These converted titles affect 10 of the 24 million ha that were previously being produced upon.
- ii. The granting of artisanal permits in certain perimeters that are under less pressure.
- iii. The increased control of illegal logging in perimeters where the pressure on the Forest is extremely strong, such as in Bas Congo and the provinces of North and South Kivu.
- iv. The establishment of a tracking system for the wood as well as for control in the markets.

86. This program thus aims to reinforce these measures, notably through :

- i. The granting of new exploitation permits (10 million ha more than the 10 recently confirmed) at the end of the moratorium, in the areas identified upon issue of zones. The beneficiaries of said permits will need to negotiate their budget forecasts with local communities and

elaborate development plans that guarantee a sustainable management of the forest's resources.

- ii. The establishment of programs providing otherwise illegal producers with incentives to become legal.
- iii. The reinforcement of the fight against illegal logging over the entirety of the national territory.

- **Program 6 : Management, recovery, and extension of « classified forests », and preservation of their biodiversity through the development of public private partnerships (PPP)**

87. As previously mentioned, the DRC has already classified 10% of its territory in order to preserve biodiversity within well defined borders. The objective for the years to come is to do so for a total of 15% of the national territory.

88. This program thus targets :

- i. The definition of complementary areas to classify, in coordination different stakeholder parties, in the context of territorial « zoning ».
- ii. The establishment of efficient systems to manage these areas, enabling the structuring and / or control of activities taking place within them and the valorization of the resources therein.

89. The management of these areas could follow several different models depending on the potential and specificities of each area : La gestion de ces aires pourra se faire selon plusieurs modes dépendant des potentialités et spécificités de chacune : maintenance under state management, notably by the ICCN ; delegation of management to private entities or international organizations in the context of PPPs ; co-management with local communities ; etc.

- **Program 7 : Afforestation and reforestation**

90. In order to attain the sequestration potential estimated in this first approach at 30 Gt by 2030, the DRC will need to put an ambitious afforestation / reforestation program into place over 13 million ha, within which : one part will be afforestation in marginal areas (savannahs) and the other will be reforestation in degraded areas. This objective will be further specified in the months to come along with the national territory zoning that will take place.

91. These afforestation / reforestation programs will be executed employing either mecanized or labor-intensive (HMO) means.

92. The technical choices will be made in function of the location and specificities of the areas in question. On a case-by-case basis, these projects will be executed by either the State, private operators, or communities.

93. The country will capitalize on lessons learned from projects—such as those of Mampu or Ibi—that are already moving forward (please refer to Exhibit 13 below).

EXHIBIT13: Case study – ‘Ibi Batéké’ afforestation / reforestation project

| Afforestation and reforestation | |  |  |
|---|---|---|---|
| Case Study – Ibi Batéké Project for Agroforestry and the creation of a carbon sink in the DRC | | | |
| Context | Strategy adopted | | |
| <ul style="list-style-type: none"> • The Batéké plateau is composed of : <ul style="list-style-type: none"> – 90% savannah, a large part of which is burned to serve the population’s direct needs (agriculture, livestock...) – 10% forest, which is being progressively deforested and degraded for subsistence agriculture and the production of coal • Population density is still low (1 person / ha), but is growing rapidly • The collection of fuelwood and the incidence of bush fires currently threaten the regeneration of ecosystems | <ul style="list-style-type: none"> • 900 ha will be reforested annually over 5 years : <ul style="list-style-type: none"> – 800 ha for agroforestry, combining cassava plants and trees in the same fields – 100 ha planted in the forest • A proportion of wood production will be utilized for fuelwood, and another will be sold in local markets as timber for construction • The afforestation of the savannah to create new forests and productive farmland allows for the: <ul style="list-style-type: none"> – Sequestration of atmospheric carbonic gases as the trees grow – Reduction in bush fires, which emit carbonic gases (CH4) into the atmosphere. | | |
| |  | | |
| | Results | | |
| | <ul style="list-style-type: none"> • Direct impacts : First ‘Clean Development Mechanism’ project in the DRC <ul style="list-style-type: none"> – 1 million tons of CO2e sequestered between now and 2017, with a potential of 2.5 million tons over 30 years – 200 jobs created • Indirect impacts / benefits to population : <ul style="list-style-type: none"> – Creation of a clinic and of a school (with 160 students) – Establishment of a coaching program for the farmers in the villages | | |
| Source: www.ibi-village.cd ; World Bank; CDM project document | | | |
| 2 | | | |

▪ **Program 8 : Identification of “Protected Forests” and progressive transfer of their management to local communities**

94. The DRC would like to progressively put in place communal management of « Protected Forests » in order to implicate and responsabilize local communities to manage their forest heritage.

95. This program therefore aims to :

- i. Target and define potential areas, in the context of the territorial « zoning » that is to take place
- ii. Support local communities in their creation of organizations adapted to the management of these areas
- iii. Reinforce the management capacity of these organizations in order to enable them to manager and value from their areas, including through creation of activities generating revenue such as the

sustainable extraction of timber, eco-tourism, and the gathering of non-wood forest products.

96. This program will be executed within the framework of a participative process involving civil society, local authorities, and communities.

Section II : Accelerated development of a more performant agriculture in the rural-forested milieu, through coordination between the MECNT and Ministry of Agriculture

97. The programs included in this component group are essential to the success of REDD+ due to the sizeable magnitude of deforestation and degradation (actual and future) induced by agricultural activities (more than 40% of the potential by 2030). Thus, programs defined within the REDD+ Plan could be the precursors to a complete national agricultural strategy, aiming to increase productivity, sectoral GDP, and farmer revenue.

▪ **Program 9 : Increase in productivity and sedentarization of subsistence farmers around a range of social agriculture programs**

98. The objective of this program is to increase productivity and sedentarize subsistence farmers, who currently use slash-and-burn techniques and tend to be located in remote zones limiting their potential evolution into smallholder commercial farmers.

99. This program aims to reach 50% of such farmers by 2030 with a range of social agriculture projects. It is meant to strongly improve yields (up to 100 to 200% in certain cases) and to sustain cultivation through adequate preparation and work on the soil in order to promote sedentary farming within the populations on land that has already been cultivated.

100. The deployment steps for this program, already tested in countries such as Ethiopia, India, or Morocco, are the following :

- i. Programmatic conception in function of the population needs and geographic accessibility of different cultivation zones. The programs will be focused on increasing cultivation productivity, particularly that of cassava, which represents 70% of agricultural production. However, they will be adaptable to specific local characteristics and prioritize zones exacting particularly strong agricultural pressure on the forest.
- ii. Management based on the support of creation and development of communal structures to be in charge of the proper support for farmers as well as for the diffusion of cultivation best practices.

- iii. Continual support to these communal structures through provision of inputs (seeds and fertilizers), via an agro-dealer distribution system.

101. The establishment and management of these social agricultural programs can be assigned to public institutions, technical partners, and / or international financiers, such as with the the project that the WWF is leading in the Luki Reserve (please refer to Exhibit 14 below).

EXHIBIT 14: Case study – WWF agriculture project in Luki

| Increase in productivity and decrease in migration of subsistence farmers through major social programs Case Study – Luki project for Sustainable Management support and forest ecosystem conservation in the DRC | |
|--|---|
| <p>Context</p> <ul style="list-style-type: none"> • The Luki Biosphere Reserve covers an area of 32,800 ha • The Reserve is undergoing strong demographic pressure: <ul style="list-style-type: none"> – About 7,100 people live on the Reserve – 64,200 live in neighboring zones • These populations threaten the Reserve by pursuing the following subsistence activities: <ul style="list-style-type: none"> – Cutting down trees for fuel coal and for construction timber – Slashing and burning for migratory agriculture – Poaching  | <p>Strategy adopted</p> <ul style="list-style-type: none"> • WWF Program targeting degradation in Luki Reserve: <ul style="list-style-type: none"> – Support for agriculture and sustainable production – Reforestation – Population awareness – Control of Reserve • The agricultural program is characterized by: <ul style="list-style-type: none"> – Diversification of subsistence culture in rotation e.g., beans, cassava, maize, nuts, but also beekeeping, livestock production, and fruit production – Acacia plantations to meet fuelwood needs and to increase soil fertility • 20 'model' farmers have benefitted from training, input provision (biological material as well as tools) and regular follow-up <p>Results</p> <p>After three years of support :</p> <ul style="list-style-type: none"> • The restitution of soil fertility, in combination with the diversification of cultures, has permitted farmers to become sedentary and cease slash-and-burn agriculture • Doubling of cassava, maize, nut, and bean yields • Doubling of farmers' revenues |
| <p>Source: WWF 2008, Diagnostic Report, Luki project for Sustainable Management support and forest ecosystem conservation in the DRC.</p> | |

- **Program 10 : Increase in yields and increase in value added for smallholder commercial agriculture, based on aggregation and methods with low impact on the forest, including agroforestry**

102. In the areas adapted for the development of smallholder commercial agriculture aiming to provide for urban communities, this program will seek to increase yields and the added value of small commercial farms not only for agriculture but also for livestock (e.g., cows, sheep, and goats).

103. The objective is to reach approximately 75% of these farmers by 2030, through two types of programs aiming to increase agriculture revenue : one

through intensification of cultivation (significant augmentation of yields, particularly for cassava) and/or the reconversion towards cultures with higher value added (for example, la reconversion vers des cultures à plus forte valeur ajoutée (par exemple, orchards or agroforestry vs. starches alone). This program will be articulated as follows :

- i. Development of **aggregation projects** reaching approximately 50% of these farmers, aiming the connection of smallholder farmers with structured aggregators with access to the market (e.g., agro-industrials, large agricultural developments, food distribution chains). Through contract farming, the aggregators can either supply themselves through the smallholders (offtake method) or coproduce with these producers by providing them with inputs and the necessary technical framework. The State's role will thus be to select the aggregators, provide them with favorable incentives, and establish the legal framework necessary to the development of aggregation.
- ii. Establishment of agricultural **extension programs** aiming to provide support to local communities during a set time period (2-3 ans) with the intention of (1) structuring them around efficient organizations, that are put in charge of their les structurer autour d'organisations efficientes, in charge of coaching them and helping to develop their agricultural activities (2) financially supporting them in the acquisition of equipment and inputs of better quality during the launch phase (3) providing them with technical support in the enhancement of cultural and commercial practices

104. Additionally, after a certain period, these agricultural organizations should become independent from an agricultural (through purchase of their own inputs) and commercial perspective.

- **Program 11: Controlled development of intensive agriculture (including export-oriented production), through the rehabilitation of abandoned plantations and creation of new plantations / ranches in the savannah**

105. The program developed in the context of the REDD+ Plan will seek to value the development potential of intensive agriculture in the DRC, notably in palm oil plantations and potentially in livestock ranches.

106. In order to reduce the potential impact of intensive agriculture on the forest, three major actions can be performed :

- i. Orientation of investors towards abandoned plantations located in the forest in order to rehabilitate them (between 1.4 and 1.6 million Ha)
- ii. Identification of marginal zones suited to the creation of plantations and ranches (within context of territorial « zoning ») ;
- iii. Definition of budgetary forecasts for the sustainable management of agricultural production by their managers, specifying employment clauses for local populations, and eventually the aggregation of small exploitations through equitable contracts (please refer to program 10).

Section III : Limitation of the impact of urban growth and industrial sectors on the Forest, achievable through strong interministerial coordination

- **Program 12 : Reduction in demand for fuelwood and increase in supply through sustainable afforestation / reforestation, within the context of a coherent national energy strategy**

107. The reduction in demand for fuelwood will be mainly due the the provision of electricity over the territory : the government anticipates to meet up to 60% of needs by 2030 (the costs of such ramp-up are not included in the REDD+ Plan).

108. The REDD+ plan includes complementary programs with 2 objectives : first to reduce the demand by :

- i. furnishing of high efficiency ovens to urban households in order to reduced their consumption of fuelwood ;

109. Second, to increase the supply with sustainable reforestation and afforestation projects – such as the Goma project detailed below (please refer to Exhibit 15)—but also with alternative sources of energy :

- ii. afforestation and reforestation projets aiming at sustainably providing fuelwood to urban populations
- iii. promotion of alternative sources of energy such as biomass bricks (which include agricultural residue, leaves, sawdust, etc.) ;
- iv. extension of the coverage of the electric grid to peripheral neighborhoods in large cities, and et subsidization of electricity consumption

EXHIBIT 15: Case study – Substitution and sustainable supply of fuelwood in the Goma region

| Reduction in demand for fuelwood and increase in its supply through sustainable means   | |
|--|---|
| Case Study – Fuelwood substitution in Virunga Park (Goma) in the DRC | |
| Context | Strategy adopted |
| <ul style="list-style-type: none"> Virunga National Park covers an area of 790,000 ha and is home to the population of gorillas, which are severely endangered species. 92% of the wood-based coal used in the city of Goma comes from Virunga National Park. The coal produced annually in the park is estimated at 70,000 tons, representing the loss of approximately 15,000 ha of forest. The estimated value of illegal coal trafficking in North Kivu is US\$ 30 million | <p>1- Substitution of fuelwood:</p> <ul style="list-style-type: none"> Objectives : substituting wood-based coal by biomass briquettes : <ul style="list-style-type: none"> Biomass briquettes made of grasses, leaves, agricultural residue, sawdust, and recycled paper, allow for a complete substitution of fuelwood The cost of these briquettes is much lower than that of coal The program : 2-day training, distribution of material, and follow-up, allowing populations to support their needs in under 10 days. Ambition : creation of 5,000 factories and 30,000 jobs by 2012. A proportion of the profits is reinvested in the management of Virunga National Park. <p>2- Increase in the sustainable supply through reforestation</p> <ul style="list-style-type: none"> In parallel, the Eco-Makala project, launched by the WWF, aims to reforest 4,500 ha by 2012 in order to provide the population of Goma with fuelwood |
|  | Results <ul style="list-style-type: none"> Creation of 1,284 jobs Reduction in the deforestation of park, increase in reforestation Monthly profit of 72\$ per factory (100% of briquettes are sold) Initiative recommended by a panel of experts for the promotion of stability in the East of the DRC |
| <small>Source: ICCN, Village Briquettes Factories: Energy & Employment for Eastern Congo - A Business Plan, WWF</small> | |
| 4 | |

▪ Program 13 : Limitation of direct and indirect impact of extractive and industrial sectors on the forest

110. The opportunity costs associated with the reduction of mining activities and hydrocarbon extraction, superior to € 60 /t CO₂e, a priori restrain the accessibility of this lever.

111. The following measures limiting the impact of the activities in this sector can nonetheless be anticipated :

- i. Definition of zoning that establishes clear priorities for the location of future extractive mining and hydrocarbon activities
- ii. Integration (in research and extraction contracts) of sustainable development clauses limiting the migration of populations living in forested milieus and imposing reforestation post- utilization of the land.

▪ **Program 14: Rural and urban integrated socio-economic development creating alternative sources of revenue**

112. The DRC Government has already defined and set into motion an integrated national socio-economic development strategy. The program inscribed within REDD+ is meant to fit within this framework and serve as a catalyst to more complete sectoral programs in the future.

113. This program will therefore focus on the establishment, over the entirety of the territory, of pilot projects, destined to create activities generating alternative sources of revenue for local communities. This will effectively reduce their dependence on the forest and, *ceteris paribus*, the pressure that they exert upon it.

114. Several pilot projects could be tested within this context, such as the development of eco-tourism in certain protected areas or that of industries transforming forest and agricultural products with high added value.

C. Prioritization of programs in function of their impact and feasibility

115. Given that program implementation is a primordial concern, a preliminary evaluation of the sectoral programs of Components I, II, and III has been conducted. This evaluation clarifies which programs will have an important short-term impact and which other programs will necessitate a longer launch process (please refer to Exhibit 16).

116. Two simple criteria have been considered: (i) impact on the reduction of emissions or of sequestration, based on the cost curve, and (ii) feasibility given the number of stakeholders involved in the execution (one ministry vs. Several ministries, a few private sector representatives vs. several million farmers), and / or in function of the level of dispersion of activities over the national territory.

EXHIBIT 16 : Priority and feasibility of sectoral programs

Error! Objects cannot be created from editing field codes.

117. Three programs emerge as having both high potential impact and being relatively easy to implement: (1) Afforestation and reforestation for the restoration of forests, provision of fuelwood, and timber harvesting (Program 7) ; (2) Reduction in the demand for fuelwood and development of alternative sources of energy through a national energy strategy (Program 12) ; (3) Development of intensive agriculture through the rehabilitation of abandoned plantations and new plantations located in the savannah instead of the dense humid forest (Program 11).

118. Based on their positioning, these programs are likely to be the DRC's first major successes in its REDD+ initiative, and should be launched as quickly as possible.

119. Exhibit 16 also highlights two other categories of program :

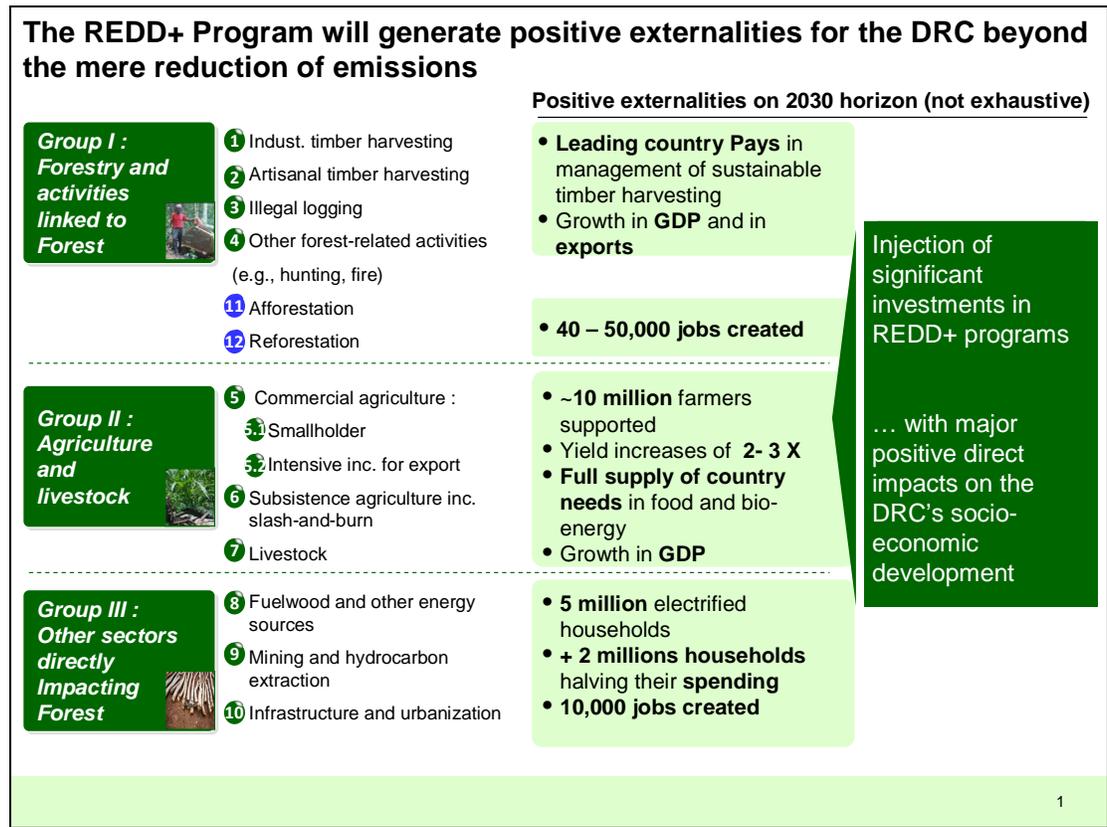
- i. Those with high impact but that are difficult to implement, needing a strong interministerial coordination and / or an expansive coverage of territory : these are mainly the programs related to subsistence agriculture (Program 9), smallholder commercial agriculture (Program 10), the management of permanent production forests (Program 5), and the limitation of industrial sector impact on the forest (Program 13).
- ii. The 'quick-wins' that have limited emissions impact but are easily implementable, such as valuing and extending classified forests (Program 6).

D. The positive impact of REDD+ on the DRC

120. The REDD+ process is part of a greater national process allowing for the involvement of all of the Congolese stakeholders in the achievement of common goals. In addition to the ambitious GHG emissions reductions targeted, the REDD+ Plan has significant positive externalities for the country (please refer to Exhibit 17) :

- i. It will reinforce institutional and legal reform, strengthening the State's sovereignty on national territory
- ii. It will direct investment towards programs with significant benefits on the country's economy and society at different levels:
 - a. The creation of jobs in afforestation / reforestation projects (up to 40-50,000 jobs), forest monitoring and management, agricultural extension programs, etc.
 - b. The development of the agricultural sector with programs reaching up to 10 million farmers by 2030 and leading to significant yield improvements (on order of 2-3 X), and thus increasing the country's food security.
 - c. The promotion of energy reform, with electrification programs reaching up to 5 million additional urban households.

EXHIBIT 17: The positive impact of REDD+ on the DRC



121. Winning this challenge will allow the DRC to transform the menace of climate change into a sustainable socio-economic growth opportunity.

Definition of a Priority Action Program for the next 24 months, "Urgent REDD+ Plan 2010 – 2012" in order to accelerate the implementation of the REDD+ Plan

122. In order to achieve the determined objectives within their deadlines—namely, the DRC's transition to a carbon sink by 2030—the country intends to accelerate the roll-out of priority programs over the next two years. The actions to be performed will be delineated in an « Urgent REDD+ Plan 2010-2012 » that will integrate and complete those already in motion and carefully timed (ref. exhibit 18). In order to accomplish this, the DRC has two primary objectives :

123. the acceleration of the « transverse section » of the strategy, a key enabling factor for the success of the program, around :

- i. The finalization of REDD+ strategy at the national level as well as the launch of provincial measures (pilot provinces to be defined), in the next six months,
- ii. The establishment, in the next 12 months, of a structure--charged with the materialization of the REDD+ Plan and its results—which can be reinforced subsequently ;
- iii. The definition and establishment of an initial MRV phase permitting sufficient basic knowledge of the forest cover in 2010, to be followed by more detailed measures on the 2011-2012 horizon. In the context of the first phase, reliable proxys could be put into place starting in 2010, notably to enable the measurement of pilot project results.

124. the launch of pilot projects in the prioritized sector-specific programs, programs with high impact and short-term feasibility, such as :

- i. The reduction of demand for fuelwood and increase in supply in the cadre of coherent territorial projects based on the project BABEK model, which was launched in the region of Kinshasa. In the context of this pilot project, two complementary actions can be performed : the distribution of high efficiency ovens and the launch of afforestation projects for the sustainable supply of fuelwood (30 to 40,000 ha over 2 years).
- ii. The rapid launch of afforestation and reforestation projects (related to CDM projects) that could cover between 30 and 60,000 ha over two years.

125. Programs that are potentially high-impact but that are also significantly lengthy to implement can also be started in this phase, such as those contributing

to the increase in revenue of small commercial producers, that could target from 30 to 50,000 ha in the first year, in the context of aggregation or extension programs to be supported by international partners.

EXHIBIT 18: Potential timeline for the DRC's « Urgent REDD+ Plan 2010-2012 »

Error! Objects cannot be created from editing field codes.

126. This essential “Urgent REDD+ Plan 2010-2012” will need to be supported by the necessary financing, notably in the context of IWG-IFR.

Appendix 1 – Methodological approach

This study focuses on future deforestation due to several factors and technical abatement opportunities costing less than EUR 60 per ton of CO₂ equivalent (tCO₂e), as shown on DRC's abatement and cost curve. We have defined technical abatement opportunities as those that do not have a material effect on people's way of life. Our approach and results are both consistent with the national imperative of continued development and growth. They combine a technical analysis with a realist approach in order to represent at best the risks and opportunities of the country regarding deforestation and degradation.

The reference curve (BAU) and the abatement cost curve analyse 10 factors of deforestation and degradation and their abatement potential as well as 2 levers of carbon sequestration. All factors and levers are linked directly or indirectly to the growth of the country's economic sectors and its national and regional demographics. They are described in the Parts 2 and 3 of this report.

DEFINITION OF THE REFERENCE CURVE (BAU) FOR EMISSIONS DUE TO DEFORESTATION AND DEGRADATION

Emissions volumes in the reference scenario (named "Business-as-usual" or BAU) are calculated for 10 factors of deforestation and degradation (cf. Part 2). Each identified factor is projected until 2030 to derive the number of deforested and degraded hectares. Based on scientific literature and interviews with experts, emissions volumes issued through deforestation and degradation are then computed according to the ecosystem where deforestation/degradation happened and according to the activity that caused deforestation or degradation.

Emissions are net and include the loss of above-the-ground carbon as well as below-the-ground carbon but do not take into account soil carbon²⁹. Emissions are computed based on a projection of factors of deforestation and degradation. These factors are built up from various economic, social, political and environmental variables taken into account in the simulation. The outcome is an estimation of the deforestation rate and its evolution by 2030, according to a social and economic scenario consistent with the demographic trends and the economic opportunities of the country.

²⁹ Please see below for further definition details

Two other methodologies are sometimes used to compute future emissions :

- The first one projects emissions based on historical emissions. This methodology is sometimes adjusted with some major variables with a high impact on deforestation and deforestation. This approach is less relevant for DRC as historical evolution is hardly correlated to future forecasts. The low deforestation rate is mainly due to scattered economic activity and to deforestation factors at low growth. DRC is presently in a stable political and social situations that could lead to dramatic changes of these parameters. Growth of some sectors still at an exploratory stage can increase rapidly (mines, oil extraction, commercial agriculture), with a direct impact on deforestation and degradation. In addition to them, rural exodus, demographic growth and public investments are new variables that will eventually influence deforestation and degradation factors. A careful and holistic analysis of each of these factors is therefore required to forecast the future emissions due to deforestation and degradation.

The second consists in computing the emissions based on the current stock of carbon of standing trees. This methodology is less scientifically detailed for our purpose of defining deforestation and degradation factors and mitigation levers (with their respective potential and costs). Hence, this methodology has not be retained for the exercise of this report. Estimations presented in this report do not take into account carbon sequestration of current standing forests.

DEFINITION OF THE EMISSIONS REDUCTION POTENTIAL AND OF THE COSTS ASSOCIATED WITH IT (ABATEMENT AND COST CURVE)

The abatement and cost curve for emissions from deforestation and degradation depicts the entirety of the technical solution space (levers), their relative impact in terms of emissions reductions (expressed in millions of tons of CO₂ equivalent) and their estimated cost for a given year. Each lever is independently analyzed in order to quantify both the potential reduction as well as the associated unit costs.

The abatement and cost curve's basic logic consists in demonstrating the emissions reduction potential and its associated unit cost for each lever relative to a reference scenario for a given year and for a pre-determined fossil fuel price. In other words, the cost curve is a tool serving to evaluate the potential emissions reduction of several levers and to compare their incremental costs. This tool is not to be used to calculate the price of carbon.

In order to ensure consistency in comparison between levers and sources, all of the emissions and carbon absorption measures have been measured in a coherent way, through use of « CO₂ equivalents », measured in metric tons

(tCO₂e). The order of classification of the emissions mitigation levers is then based on the measures with the least associated cost (in € per t CO₂e) in 2030.

The estimations for the analysis conducted and presented in this report are based on varying degrees of certitude (please refer to Appendix 4).

Calculation of emissions mitigation potential

The mitigation potential is defined as the difference between the emissions volume for a particular source in the reference scenario (BAU) versus the volumes after application of mitigation measures (levers).

Each lever is analyzed individually to define its exact content based on a program or a foreseeable and realistic policy as well as to calculate its mitigation potential. Hence, the mitigation presented in this report is not the technical maximum of each lever but instead the realistic maximum according to implementation capacity (without consideration of the costs). The nature of the mitigation levers themselves as well as their potential come from an analysis of economic choices, in order to isolate the levers combining a high mitigation potential without inhibiting the country's economic growth. For example, the lever reallocating intensive agriculture plantations in shrubby savannahs and savannah-forest mosaics is the best mitigation alternative to the simple elimination of agricultural activity of this type, which would be economically inconceivable for the country.

The estimations have been defined on the basis of interviews, of similar projects in the country, and of scientific literature.

Calculation of the costs associated to the reduction of GHG emissions and the sequestration of carbon

The majority of mitigation costs are calculated as incremental implementation costs for a technology, a program, or a policy leading to reduced emissions for each of the factors relative to those calculated in the reference scenario (BAU). These costs are expressed in € per t CO₂e of reduced emissions. The mitigation costs include the annualized reimbursement of capital investments and operational costs. The complete costs for the mitigation levers are calculated in two dimensions, distinct from one another in approach as well as in implementation of associated lever :

- Programmatic costs taking into account the entirety of costs associated with program roll-out,
- Opportunity costs taking into account the societal cost that each lever implies. In certain cases, mitigation measures come from a change in resource allocation rather than the utilization of alternative technology. In these particular cases, the mitigation levers are developed based on an opportunity or replacement cost. For example, the deforestation related to intensive agriculture in dense humid forest can be mitigated by the allocation of these same plantations in zones with a lower carbon density (shrubby savannahs or savannah-forest mosaics). The cost of this lever (€ 13 per t CO₂e) represents the cost inflicted to society in its entirety (in this case, the producer) in order to pursue this reallocation of land. In effect, the producer will need to incur higher costs (fertilizer, seeds, preparation of the land) in order to plant, and his yields will be inferior. The mitigation cost for this lever is thus the loss of benefit incurred.

The **programmatic costs** regroup two types of variable costs :

- The variable costs to enable and kick-off the program (for example the plantation costs, training programs, and follow-up to the launch, recurring investments in material, establishment of a program office or base, etc.).
- The variable costs over the lifetime of the program or « to perpetuity » (for example the program's operational costs, the supervision costs, the inputs (fertilizer, seeds) to be provided at a determined frequency, etc.).

These costs have all been annualized and actualized.

In using a logical growth order on the curve from left to right, we only consider a new lever once the all of the levers at lower cost points have already been deployed.

The total mitigation cost estimated here does not include the collection of transaction costs, communication or information costs, subsidies or « carbon » costs, or the consequent impacts on the economy. These costs depend on political choices, which are not part of this exercise. The identified levers are nevertheless judged as the best alternatives to reduce the emissions without clearly harming the country's growth.

Given the duration of the considered period (approximately 20 years), a margin or error in estimation is inherent to the approach. The macro-economic variables such as the lifecycle, interest rate, petroleum price and exchange rate have a considerable impact on the results and the margin of error. The estimated costs specific to each lever, will however not be significantly affected.

The change in individual behavior is also excluded from the curve, despite representing an additional mitigation potential. Behavioral change depends on economic and non-economic factors, such as the educational system, awareness campaigns, social tendencies, or political changes. For this reason, a part of these changes is included in the overarching strategy in order to capture a portion of this potential.

Instead of adopting the perspective of a specific economic or social actor, the abatement and cost curve approach adopts a « societal perspective, » illustrating the costs that society on the whole must incur. At the global scale, this societal perspective allows for the utilization of the abatement and cost curve as a factual basis for discussion of existing mitigation levers, with the possibility of comparing abatement and potential across countries ; this allows for a discussion of the mechanisms and indicative measures that need to be established (for example, subsidies or « carbon » taxes, or mechanisms such as CDM).

Estimation of GHG emissions associated with deforestation and degradation

Any differences between the estimations presented in this report and the estimations published previously can be explained in several ways :

- i. *A larger cross-section of emissions sources considered.* This estimation includes that of emissions linked to deforestation and degradation of the forest, through the 10 factors considered the most significant. Peatlands have not been considered in the analysis, given their weak presence in the country. The analysis of emissions is only focused on emissions linked with above-ground carbon and below-ground carbon (mainly roots). It does not include the rest of the carbon contained in the soil (« soil carbon »), in light of the scientific uncertainties associated with the quantification of this carbon as well as its absence in the majority of analyses looking to arrive at mitigation levers.
- ii. *Utilization of net emissions versus grosse missions in forestry.* The estimations of emissions due to deforestation and degradation are net estimations, meaning that they include the emissions related to the loss of carbon due to deforestation / degradation activities, but they also include the sequestration of carbon due to the ensuing

natural regrowth. The sequestration linked to the regrowth is calculated by projecting the average periodic sequestration due to natural regrowth. The calculation does not include non-natural regrowth besides fallow (such as afforestation or reforestation). This estimation of net emissions is the closest methodology to the guidelines of the IPCC at this point³⁰.

³⁰ Methodology from the « McKinsey GHG Abatement Cost Curve V2.0 », McKinsey & Company, 2009

Appendix 2 – How to read the abatement and cost curve for emissions from deforestation and degradation

The abatement and cost curve for emissions from deforestation and degradation represents the possibilities of reducing GHG emissions under a cost of € 60 per t CO₂e avoided (in line with the IPCC's guidelines). It also shows the range of mitigation actions possible due to available technologies today or extremely likely to be available by 2030. This curve is a « snapshot » of the reduction potential and of the associated costs for the year 2030.

The horizontal (x) axis represents the cumulative emissions reduction potential in the year 2030 per identified lever. This potential is calculated as the difference in emissions between the BAU reference scenario and the scenario with implementation of mitigation actions (detailed in Part 3). This potential is estimated to be completely fulfilled in 2030—meaning that it will attain 100% of the maximum potential identified for the lever. Therefore, the horizontal axis represents the abatement potential for each lever for the year 2030. This potential will be smaller for the preceding years as it will not have reached its maximum. For example, in 2020, the program aiming to increase the productivity of subsistence agriculture may not have reached the total population for the program. The real potential will thus be inferior to the maximum potential identified for the lever.

The vertical (y) axis of the curve represents the average cost associated to avoiding the emissions equivalent to 1 ton of CO₂ (t CO₂e) in 2030 for the specific lever. The cost is an average generated for all of the sub-costs of the lever over the course of the lifecycle over which the costs extend. All of the costs are in €2009. The graph is ordered from left to right, and begins with the levers with the lowest mitigation costs, ending at the levers with the highest associated costs.

Finally, it is important to note that the curve adopts a societal perspective of mitigation costs (excluding taxes, subsidies, and with a capital cost similar to requisite long term rates). This methodology is coherent because it allows to compare levers and their associated costs by countries, by sector, and by lever itself.

However, this also means that the costs calculated differ from the individual perspective of a consumer or of an enterprise, in this sense that these economic actors could incur different costs (taxes, subsidies or interest rates).

The curve can therefore not be used to determine the economic equilibrium between different investments from an individual perspective, nor to determine the price of a ton of CO₂e.

Appendix 3 – Level of confidence of hypotheses

The level of confidence of hypotheses (please refer to Exhibit 19) differs depending on the lever or factor considered, due to the availability of reliable sources and local knowledge.

Data for which the level of confidence remains low will require further analysis at a later stage.

EXHIBIT 19 : Level of confidence of hypotheses for each lever and factor

| Level of confidence of hypotheses per factor and lever | | | |
|---|---|---|---|
| Emissions factors and abatement levers | Reference curve BAU | Abatement potential | Abatement cost |
| Group I : Forestry and activities linked to the Forest  | 1 Industrial harvesting 2 Artisanal harvesting | ● Large syndication (MECNT, CN-REDD, ONG) | ● Interviews with experts (MECNT, ONG) |
| | 3 Illegal harvesting | ● No detailed data available | ● No detailed data available |
| | 4 Other activities (hunting, fires, fishing, ...) | ● Interviews with expert | ● Interviews with expert, few benchmarks available |
| | 11 Aforestation 12 Reforestation | • N/A | ● Interviews with experts (MECNT), empirical cases, no detailed analysis available |
| Group II : Agriculture and livestock  | 5 Commercial agriculture : 5.1 Small holders extensive agr. 5.2 Intensive agr., incl. for exports | ● Large syndication, interviews with experts | ● Interviews with country and international experts, countries/program benchmarks, past programs, |
| | 6 Subsistence agr., incl. slash-and-burn • Livestock 7 | ● Interviews with experts, scientific literature benchmarks | ● Program benchmarks, interviews with international experts |
| | 8 Fuelwoods and other energies | ● No detailed data available | ● Interviews with experts, countries benchmark, empirical cases |
| | 9 Mining and oil extraction | ● Large range of values between sources | ● Program benchmark, few data available |
| 10 Infrastructure and urbanisation | ● Interviews experts and historical simulation | • N/A | • N/A |

Level of confidence
 ● High
 ● Medium
 ● Low

SOURCE : see Bibliography 5

Appendix 4 – Bibliography

Democratic Republic of Congo (and Africa)

Ministère de l'Environnement, de la Conservation de la Nature et du Tourisme (MECNT) (Ministry of Environment, Nature conservation and Tourism)

MECNT ; Code Forestier

MECNT ; Statistiques des permis de coupe de bois et autorisations de coupe industrielle de bois d'œuvre ; 2009

MECNT ; Atlas forestier interactif de la République Démocratique du Congo, Mai 2009

MECNT ; Etude socio-économique du secteur forestier de l'hinterland minier du Shaba ; Juillet 1991

MECNT ; Le four en briques et la production du charbon de bois ; 1981

Ministère du Plan (Ministry of the Plan)

Ministère du Plan de la RDC ; Rapport National des Objectifs du Millénaire pour le développement 2009

Ministère du Plan de la RDC ; Document de la stratégie de croissance et de réduction de la pauvreté ; Juillet 2006

Ministère du Plan de la RDC ; Monographies et programmes d'actions prioritaires par province ; 2009

Ministère du Plan de la RDC ; Programme d'actions prioritaires du gouvernement (PAP) juillet 2007 à décembre 2008 ; Août 2007

Ministère du Plan de la RDC ; Résultats des enquêtes sur l'emploi et la consommation des ménages 2004-2005; Septembre 2008

Ministère du Plan de la RDC ; Conférence des gouverneurs de provinces sur le processus DSRP – Atelier multisectoriel d'harmonisation et de validation des stratégies sectorielles

Other ministries and international institutions

Banque Centrale du Congo ; Condensé d'informations statistiques ; Décembre 2007

Ministère du Développement Rural de la RDC ; Programme de réhabilitation et d'entretien des 45.000 Km des routes de desserte agricole en RD Congo ; Août 2009

Ministère du Développement Rural de la RDC ; Politique et stratégie de développement rural; Avril 2009

Ministère du Développement Rural de la RDC – Lévi Luzolo; Elaboration de la Politique et des stratégies nationales du développement rural en RDC; Octobre 2006

Cadastre minier de la RDC ; Rapport quinquennal 2003-2008 ; 2009

Ministère de l'énergie ; Document de politique du secteur de l'électricité en RDC ; Mai 2009

Ministère de l'énergie ; Plan quinquennal 2007-2011 secteur eau et électricité – volume I Identification des projets ; Novembre 2007

Ministère des Infrastructures, Travaux Publics et Reconstruction ; Projet Pro-Routes ; Juillet 2009

Ministère de l'agriculture ; Etude du secteur agricole – Rapport de diagnostic et Note d'orientation ; 2009

UN-REDD and World Bank

UN-REDD – UN collaborative on REDD in developing countries Joint Program Document ; UN-REDD DR Congo Quick Start Program Year 1 ; Juin 2009

World Bank – Enhancing Institutional Capacities on REDD1 issues for Sustainable Forest Management in the Congo Basin - Project information document ; Décembre 2008

World Bank – FCPF R-PIN proposition for DRC; Mars 2008

World Bank – Grant for a Forest and Nature Conservation Project; Mars 2009

Other national and international studies

UNICEF – USAID; Enquête nationale sur la situation des enfants et des femmes MISC2 /2001 – Rapport de synthèse

CARPE – Wildlife Conservation Society – ICCN – Smithsonian Tropical Research Institute ; Forêt de l'Ituri et le processus REDD en RDC; Octobre 2009

Délégation de la Commission Européenne ; EURATA : Profil Environnemental (PEP) de la République Démocratique du Congo ; Octobre 2005

The Woods Hole Research Center; REDD in DR Congo: A first Look, presentation for the UNFCCC in Bali; Décembre 2007

BTC CTB - La coopération Belge - Africa Tervuren - CIFOR – CIRAD ; Quel avenir pour les forêts de la République démocratique du Congo? Instruments et mécanismes innovants pour une gestion durable des forêts; 2007

Mayaux et al – Land Cover Map of Africa; 2003

Rainforest Foundation; Use of non timber products in Congo Basin; Février 2007

CBFP; Congo basin forest partnership; Décembre 2008

EarthTrends; Forests drylands and grasslands in Congo; 2003

UNFCCC; Lean development mechanism project design document form for afforestation and reforestation project activities Ibi Bateke; Août 2009

Agrisystems consortium; Evaluation des actions agroforestières à Mampu; Mars 2009

Karsenty CIRAD; Forest Concessions and Concession Based Industry in Central and West Africa; 2007

Karsenty et al; Regulating industrial forest concessions in Central Africa and South America - Forest Ecology & Management; 2008

CIFOR; L'état de l'art de bois d'énergie en RDC : Analyse institutionnelle et socio économique de la filière bois d'énergie, Rapport Préliminaire Version 1; Août 2009

SODEFOR & Forêt Ressources Management; Projet d'aménagement forestier des concessions attribuées à la SODEFOR en RDC; Octobre 2009

Dieudonné Musibono Eyul'Anki; La RDC face aux enjeux de la géostratégie des ressources naturelles; L'Harmattan 2009

Chatham House DFID; The search for Innovative options for the Forests of DRC; Novembre 2008

UCL-GÉOMATIQUE - Université Catholique De Louvain (Belgique) ; Note d'information relative à la République Démocratique du Congo ; Novembre 2009 ;

Analyse quantitative des causes de la déforestation et de la dégradation en RDCongo ; 30 Septembre 2009

J. Putzel, S. Lindemann and C. Schouten; Drivers Of Change In The Democratic Republic Of Congo: The Rise And Decline Of The State And Challenges For Reconstruction”, Crisis States Research Center; Janvier 2008

Winrock International - S. Brown, T. Pearson, N. Moore, A. Parveen, S. Ambagis and D. Shoch ; Impact of selective logging on the carbon stocks of tropical forests : Republic of Congo as a case study

M. et al - Hawkins Wright; Logging in the Congo Basin: A Multi-Country Characterization of Timber Companies; Forest Ecology and Management Volume 214, Issues 1-3 --Timber Data; 2005

Econ Group / World Bank; Costing Power Infrastructure Needs in Southern and Eastern Africa

REDD

Projet Catalyst; Towards a global climate agreement_French - Ver 1.0; Juin 2009

Projet Catalyst; Low Carbon Growth Plans Advancing Good Practice; Août 2009

Biogeosciences, J. G. Canadell, M. R. Raupach, and R. A. Houghton; Anthropogenic CO2 emissions in Africa; Mars 2009

Ministerio des Ambiente de Ecuador; Yasuni-ITT Initiative: A big idea from a small country

Angelsen; REDD models and baselines; 2008

The Prince's Rainforest Project; Emergency package for tropical Forests; Mars 2009

Eliasch Review; Climate Change: Financing Global Forests; 2008

Hansen; Humid tropical forest clearing from 2000 to 2005 quantified by using multi temporal and multi resolution remotely sensed data; Juillet 2008

IIED Maryanne Grieg-Gran; The Cost of Avoiding Deforestation, Report prepared for the Stern Review of the Economics of Climate Change; Octobre 2006

IWG IFR; Final report; Octobre 2009

Wetlands International; The Global Peatland CO2 Picture; 2009-11-27

ITTO; Tropical Timber Market Report, focus on C markets; 2008

Meridian Institute; Reducing Emissions from Deforestation and Forest Degradation (REDD): An Options Assessment Report, prepared for the Government of Norway; Mars 2009

New Forests; Carbon Finance for Reduced Emissions from Deforestation and Degradation at the Forest Frontier

Climate Change

IPCC; World Mitigation of Climate Change chapter 9, Forestry; 2007

McKinsey & Co.; Pathways to a Low-Carbon Economy for Brazil; 2009

Office of the President, Republic of Guyana; Transforming Guyana's Economy While Combating Climate Change; Mai 2009

Dewan Nasional Perubahan Iklim, Indonesia; Indonesia CC White Paper – Interim report; Août 2009

Deutsche Bank Climate Change Advisors; Global Climate Change Policy Tracker: an investor's assessment; Octobre 2009

Other sectors and geographies

International Food Policy Research Institute; Ethiopia Public Agricultural Extension Review and Recommendations

Bill and Melinda Gates Foundation; Extension Strategy Briefing; 2009

<http://www.ecologyandsociety.org/vol11/iss1/art26/56> Ruiz-Perez,

Tullow's Oil 2008 CSR Report

ITTO, Merchantable timber growing stock and associated prices

Datastream, Historic Palm Oil Prices