



The Democratic Republic of the Congo

Post-Conflict Environmental Assessment

Synthesis for Policy Makers



United Nations Environment Programme

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About the Post-Conflict Environmental Assessment

In response to a request from the Government of the Democratic Republic of the Congo (DRC), in 2009 the United Nations Environment Programme (UNEP) initiated a national, multi-thematic assessment of priority environmental issues facing the country. Within the context of the DRC's ongoing peace consolidation and economic reconstruction, the main objectives of this assessment were to: (i) provide insight into and raise awareness of the key environmental and natural resource management challenges; and (ii) inform rational planning and help catalyse investments by the government and the international community. UNEP plans to follow up on its comprehensive DRC assessment by developing a country programme which will guide future interventions; this is a successful model implemented in over 10 post-conflict countries since 1999.

Following the preparation of detailed scoping and desk studies, 14 separate reconnaissance field visits covering all provinces and eco-regions of the DRC were carried out by a joint UNEP- Ministry of Environment, Nature Conservation and Tourism (MECNT) team. The significant investment in fieldwork covering the whole country is one of the defining features of this assessment, which comprised extensive interviews and focus group discussions, site visits, photographic and video documentation, remote sensing and mapping, and in-situ field measurements as well as sampling for laboratory analysis. Despite security constraints and the physical isolation of whole regions, the assessment team still managed to cover the entire country. A lack of reliable environmental baseline data created important gaps, but it was nevertheless possible to compile considerable information through fieldwork.

Consultations with national and development partners were an integral part of the assessment process. Several workshops involving a wide range of stakeholders were organised both during the design and scoping of the assessment and to review its findings, conclusions and recommendations. As such, the assessment has been reviewed and endorsed by the main government counterpart (MECNT) and relevant government line ministries and agencies.

The technical basis for this *Synthesis for Policy Makers* is the finalised draft of the main report, *The Democratic Republic of Congo Post-Conflict Environmental Assessment*. Focusing on policy-level issues, this synthesis report is primarily targeted at decision-makers and underlines structural challenges and strategic opportunities that are transformative in nature. Other key outputs from UNEP's post-conflict assessment project include a series of thematic technical reports, a film documentary, a photographic database and a website at: www.unep.org/drcongo

Note: Reference sources for this synthesis are provided in the main report.

Layout: Matija Potocnik

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Cover Image: Hassan Partow – The mighty Congo River embodies the cultural spirit of the Congolese and forms the economic lifeline of this vast and environmentally diverse African nation.

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Acronyms and abbreviations

ADF.....	Allied Democratic Forces
ADIR.....	<i>Action pour le Développement des Infrastructures en milieu Rural</i>
ANEE.....	National Association for Environmental Assessment
ASM.....	artisanal and small scale mining
BGR.....	German Federal Geoscience and Natural Resources Bureau
BTC.....	Belgian Development Agency
CARPE.....	Central African Regional Program for the Environment (USAID)
CBNRM.....	Community Based Natural Resource Management
CDM.....	Clean Development Mechanism
CICOS.....	International Commission for the Congo-Oubangui-Sangha Basin
CITES.....	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CNAEA.....	National Water and Sanitation Committee
CTC.....	Certified Trading Chains
DDR.....	Disarmament, Demobilization and Re-integration
DFID.....	UK Department for International Development
DRC.....	The Democratic Republic of the Congo
EITI.....	Extractive Industry Transparency Initiative
FAO.....	Food and Agriculture Organization of the United Nations
FARDC.....	Armed Forces of the Democratic Republic of Congo
FDLR.....	Democratic Forces for the Liberation of Rwanda
FLEGT.....	Forest Law Enforcement, Governance and Trade scheme of the European Union
FSC.....	Forest Stewardship Council
GDP.....	Gross Domestic Product
GECAMINES.....	<i>Générale des Carrières et des Mines</i>
GT 18.....	Thematic Group on Environment
GTZ.....	German Technical Cooperation
HIPC.....	Heavily Indebted Poor Countries Initiative
IBCSP.....	Ibi Batéké carbon sink plantation
ICCN.....	<i>Institut Congolais pour la conservation de la nature</i> (Congolesse Wildlife Authority)
ICGLR.....	International Conference on the Great Lakes Region
IDP.....	internally displaced person
IPCC.....	Intergovernmental Panel on Climate Change
IUCN.....	International Union for Conservation of Nature
LRA.....	Lord's Resistance Army
MECNT.....	Ministry of Environment, Nature Conservation and Tourism
METTELSAT.....	National Agency for Meteorology and Satellite Remote Sensing
MIBA.....	<i>Société Minière de Bakwanga</i>
MONUSCO.....	United Nations Organization Stabilization Mission in the Democratic Republic of Congo
NALU.....	National Army for the Liberation of Uganda
NBI.....	Nile Basin Initiative
NGO.....	non-governmental organization
NTFP.....	Non-Timber Forest Products
OCHA.....	United Nations Office for the Coordination of Humanitarian Affairs
ODA.....	Official Development Assistance
OKIMO.....	<i>Office d'Or de Kilo-Moto</i>
PES.....	Payment for Ecosystem Services
PRGSP.....	Poverty Reduction and Growth Strategy Papers
REGIDESO.....	State water utility company
REDD+.....	Reducing Emissions from deforestation and forest degradation in developing countries; and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries
SAESSCAM.....	Small-scale-mining technical assistance and training service
SAKIMA.....	<i>Société Aurifère de Kivu-Maniema</i>
SME.....	small and medium-sized enterprise
SNEL.....	State electricity utility company
SNHR.....	National Rural Water Service
SOMINKI.....	<i>Société Minière du Kivu</i>
UN.....	United Nations
UNDP.....	United Nations Development Programme
UNDSS.....	United Nations Department of Safety and Security
UNEP.....	United Nations Environment Programme
UNESCO.....	United Nations Educational, Scientific and Cultural Organization
UNHCR.....	United Nations High Commissioner for Refugees
UNICEF.....	United Nations Children's Fund
UNIDO.....	United Nations Industrial Development Organization
UN-REDD.....	The United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in developing countries
USAID.....	United States Agency for International Development
UXO.....	Unexploded Ordnance
WUA.....	Water User Associations
WFP.....	World Food Programme
WWF.....	Worldwide Fund for Nature

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(i) UN agencies: UN Stabilization Mission in DRC (MONUSCO), UNDP, FAO, UNESCO, UNHCR, UNIDO, UNICEF, UN Group of Experts on the DRC, WFP, OCHA and UNDSS; *(ii) DRC national ministries and agencies:* Ministry of Mines (including SAESSCAM), Ministry of Rural Development (including SNHR), Ministry of Agriculture, Fisheries and Livestock, Ministry of Energy (including REGIDESO and SNEL), Ministry of Health, Ministry of Industry, Ministry of Transportation (including METTELSAT, RVE, RVM), National Water and Sanitation Committee (CNAEA), National Commission on Energy, and state mining enterprises including GECAMINES, OKIMO, MIBA and SAKIMA; *(iii) international NGOs and network organisations:* Adelphi, Conservation International, International Peace Information Service, International Union for Conservation of Nature (IUCN), ProAct Network, Worldwide Fund for Nature (WWF), and Wildlife Conservation Society; *(iv) international development banks and agencies:* The World Bank,

USAID-CARPE, Belgian Development Agency (BTC), German Technical Cooperation (GTZ) and UK Department of International Development (DFID); *(v) national NGOs:* ANEE, Projet d'Étude des Effets Environnementaux des Conflits Armés en RDC (PÉCA-RDC), Réseau des Ressources Naturelles and Action pour le Développement des Infrastructures en milieu Rural (ADIR); *(vi) regional bodies:* International Commission for the Congo-Oubangui-Sangha Basin (CICOS) and the Nile Basin Initiative (NBI); and *(vii) other partners:* University of Kinshasa, University of Kisangani, University of Lubumbashi and Spiez Laboratory (Switzerland).

The *Synthesis for Policy Makers* is based on the main report, *The Democratic Republic of the Congo Post-Conflict Environmental Assessment*. This synthesis report was prepared by Hassan Partow, DRC Programme Manager, UNEP, under the overall guidance of Henrik Slotte, Chief, Post-Conflict and Disaster Management Branch, UNEP, and Ibrahim Thiaw, Director, Division of Environmental Policy Implementation, UNEP. Substantive contributions were provided by Stephanie Mansourian-Stephenson, Michel A. Bouchard, Dieudonné Musibono, Andrew Morton, René Abedi, Denis Mahonghol, Altan Butt, Robert Kasisi, Marisol Estrella, Mario Burger, Alfred Jacob, Renard Sexton, Henri Esseqqat and Catherine Sullivan. Special appreciation also goes to Stephanie Wolters and Julie Marks for their review and editing of the report.

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Synthesis for Policy Makers

1. Overview: from crisis to opportunity

Since the 2002 peace accords, the Democratic Republic of the Congo (DRC) has been emerging from a long period of State decline and protracted crisis, the roots of which go back to at least the mid-1970s. Today most of the country is at peace and experiencing a burst of economic rebound activity. Nevertheless, the DRC is still a fragile post-conflict country with enormous needs for reconstruction and economic growth. The opportunities are huge - the country's vast natural and mineral wealth is one of the richest on Earth. With its immense potential, the DRC could have a bright future as a leading powerhouse of African growth and development.

Since 2003, progress has been made in rebuilding the Congolese State, including the holding of national elections in 2006, the passing of key constitutional and legal reforms, and the establishment of new institutions such as provincial assemblies. Although some advances

have been made in the security sector, there is continued instability in the eastern part of the DRC and the situation remains fragile. Second generation post-conflict elections scheduled in November 2011 will be critical for consolidating the DRC's hard-won peace.

It is important to recognise that, since 2004, the DRC has succeeded in halting declining trends on social and economic issues, and is registering progress, albeit slow, in key areas. Although development indicators remain low and generally below pre-conflict levels, important improvements have been made in terms of macroeconomic management, raising primary education enrolment, reducing infant and maternal mortality, improving drinking water supply, alleviating malnutrition, increasing the land area under formal protection, and re-launching ecotourism. For example, real gross domestic product GDP growth has averaged between 5-6 percent, drinking water access in rural areas increased from 12 to 17 percent, while the protected area has increased from 9 to 12 percent of national territory. Equally important has been the remarkable re-emergence of people-based social enterprises as an integral part of a Congolese bottom-up phenomenon, and the rapid take-off of new information and communication technologies.



The DRC's rich resource base should make it an engine of African growth and development

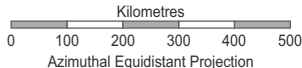
Map 1. General map of the DRC



- The territories listed below are shown on the map by number.
- EQUATEUR**
 - 1 Libenge
 - 2 Bosobolo
 - 3 Mobayi-Mbongo
 - 4 Budjala
 - 5 Lisala
 - 6 Bomongo
 - 7 Makanza
 - 8 Bongandanga
 - 9 Bolomba
 - 10 Lukolela
 - 11 Bikoro
 - BAS-CONGO**
 - 1 Moanda
 - 2 Lukula
 - 3 Tshela
 - 4 Seke-Banza
 - 5 Luozzi
 - 6 Songololo
 - 7 Mbanza-Ngungu
 - 8 Kasangulu
 - 9 Madimba
 - 10 Kimvula
 - KWILU**
 - 1 Idiouf
 - 2 Kenge
 - 3 Kikwit
 - KASAI-OCcidental**
 - 1 Kazumba
 - 2 Dibaya
 - 3 Dimbelenge
 - KASAI-ORIENTAL**
 - 1 Kabeya-Kamwanga
 - 2 Lupatapata
 - 3 Miatji
 - 4 Tshilenge
 - 5 Katanda
 - 6 Kamiji
 - 7 Luliu
 - 8 Ngandajika
 - 9 Kabinda
 - 10 Lubao
 - BANDUNDU**
 - 1 Yumbi
 - 2 Bolobo
 - 3 Mushie
 - 4 Kwamouth
 - 5 Popokabaka
 - 6 Masi-Manimba
 - 7 Bulungu
 - KATANGA**
 - 1 Kaniama
 - 2 Malemba-Nkulu
 - 3 Kipushi
 - SUD-KIVU**
 - 1 Shabunda
 - 2 Kalehe
 - 3 Idjwi
 - 4 Kabare
 - 5 Walungu
 - 6 Uvira

DEMOCRATIC REPUBLIC OF THE CONGO

- International boundary
- Province boundary
- District boundary
- GOMA District (city)
- Territory boundary
- ⊗ National capital
- ⊙ Province capital



Sources:
 International Boundaries, UNCS;
 rdc-humanitaire.net, OCHA/RDC;
 SALB, WHO;
 VMAP0, NGA;
 various maps and atlases.

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

UNEP/DEWA/GRID-Europe 2009



UNEP/Spiez Laboratory team carrying out a sampling survey of mining pollution in Katanga

UNEP's post-conflict environmental assessment aims to provide a better understanding of the underlying challenges facing the DRC and to help identify and develop promising opportunities to support sustainable economic reconstruction and national peacebuilding. While this report does not lay out a new development pathway for the DRC, it does hope to galvanise and inform the ongoing debate between the Congolese and their partners on environmentally sustainable development planning, employment creation, governance reforms and options for leveraging necessary funding.

1.1 Assessment approach

This multi-disciplinary assessment is problem-driven, focusing on the most urgent environmental and natural resource management issues confronting the DRC. The aim of this issues-based approach is to identify structural constraints and, to the extent possible, innovatively transform these constraints into opportunities, as well as build on successful initiatives. UNEP's environmental assessment underlines the DRC's exceptional human, cultural and natural assets. By supporting the ongoing consolidation of peace and the initial post-conflict economic rebound with policies and investments promoting sustainability, this

assessment projects a positive and hopeful future for the DRC.

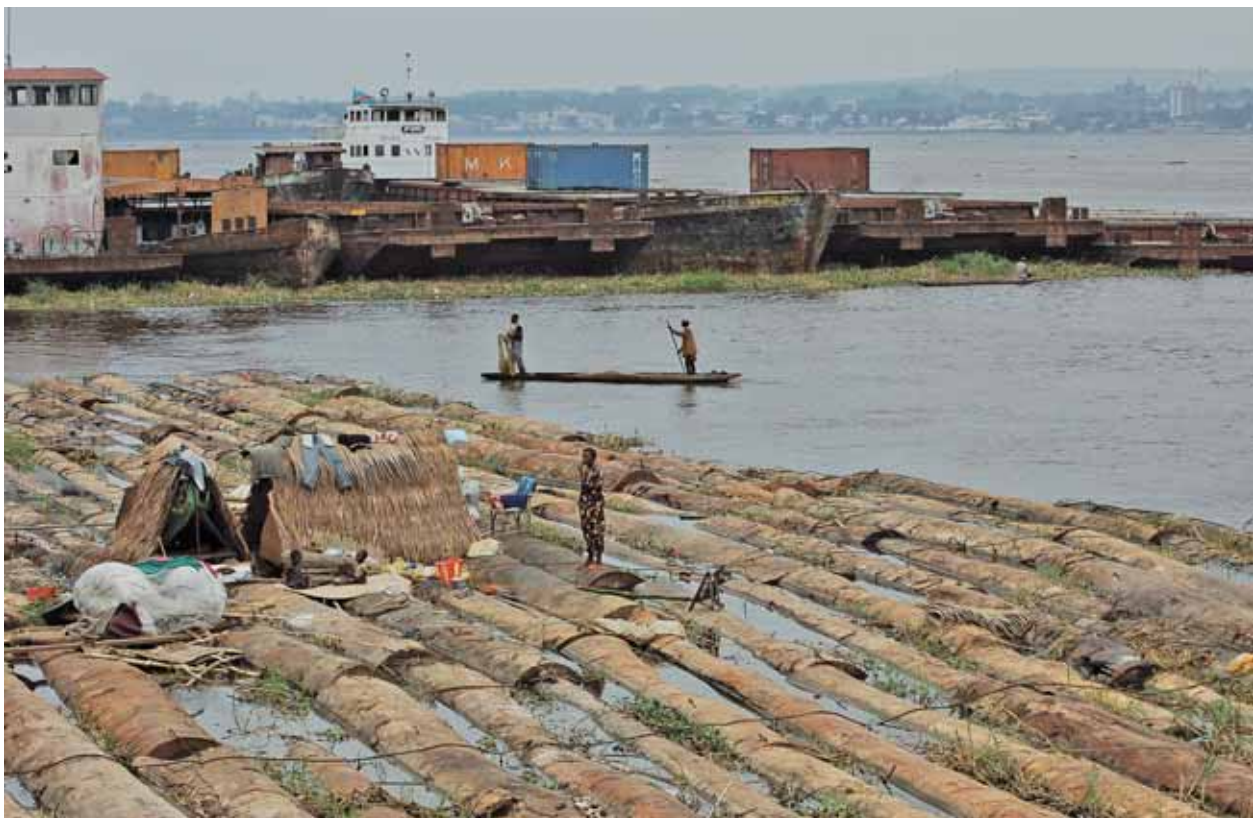
At the same time, the assessment proposes key policy actions as well as a set of priority recommendations - both at the global and sectoral levels - that are primarily aimed at the DRC's policy- and decision-makers and its development partners. A central question is how the proposed interventions - with a tentative cost estimate of at least USD 200 million per annum, equivalent to approximately 2 percent of national GDP - will be financed. Notwithstanding the critical importance of conventional aid, current levels of Official Development Assistance (ODA) simply do not match the scale of the challenge. Although the DRC's successful completion of the Heavily Indebted Poor Countries Initiative (HIPC) in 2010, and the increased revenue from rising commodity prices should provide an important opportunity to increase national budget spending on environment and natural resource management. However, given the many competing priorities, it will take time for this to happen. Meanwhile, galloping population growth and corresponding development needs signify that environmental degradation will continue unabated. Consequently, bridging this funding gap remains a key question.

1.2 Development vision

The DRC's national development vision as set out in its Poverty Reduction and Growth Strategy Papers (PRGSP 1 & 2) is to stimulate economic recovery and alleviate poverty through a growth focused strategy. It emphasises generating economic growth by attracting large-scale infrastructure investments and leasing industrial concessions to extract the country's vast natural capital. Specifically, over the period 2011-2015, the PRGSP2 aims to accelerate growth in extractive industries and infrastructure investments to an average of between 8-9 percent. In fact, the key natural resource sectors - mining, forestry, oil and gas – have been experiencing rapid growth over the past decade. The key question is how to promote and maximise broad-based benefits from the development of the DRC's natural assets given the State's limited institutional capacity for controlling fraud and corruption, and managing wealth redistribution and social service provision. Specifically, which development models should the DRC consider to ensure that the harnessing of its natural resources is socially inclusive, environmentally sustainable and supports peace consolidation?

1.3 Limitations of the concession system

During this critical peacebuilding phase, UNEP's assessment advocates for a fundamental rethinking of the DRC's business-as-usual 'frontier approach' to the development of its natural resources. This frontier mindset, which has driven much of the DRC's development in the 20th century and prevails to this day, is based on generating financial resources through a concession system. Conventionally, these large-scale commercial concessions have been granted in the mining and forestry sectors but have also more recently extended to oil and gas exploration and land acquisitions for agriculture and biofuels. Also included under the concession category are a range of resource barter and infrastructure construction arrangements, some of which have been concluded outside the legal framework. As a result, today, more than half of the DRC's immense territory is covered with mining, forestry and oil exploitation and exploration permits that sometimes overlap not only with each other – causing serious commercial disputes - but also with protected areas including natural World Heritage Sites (see map 2). This extractive concession-based development

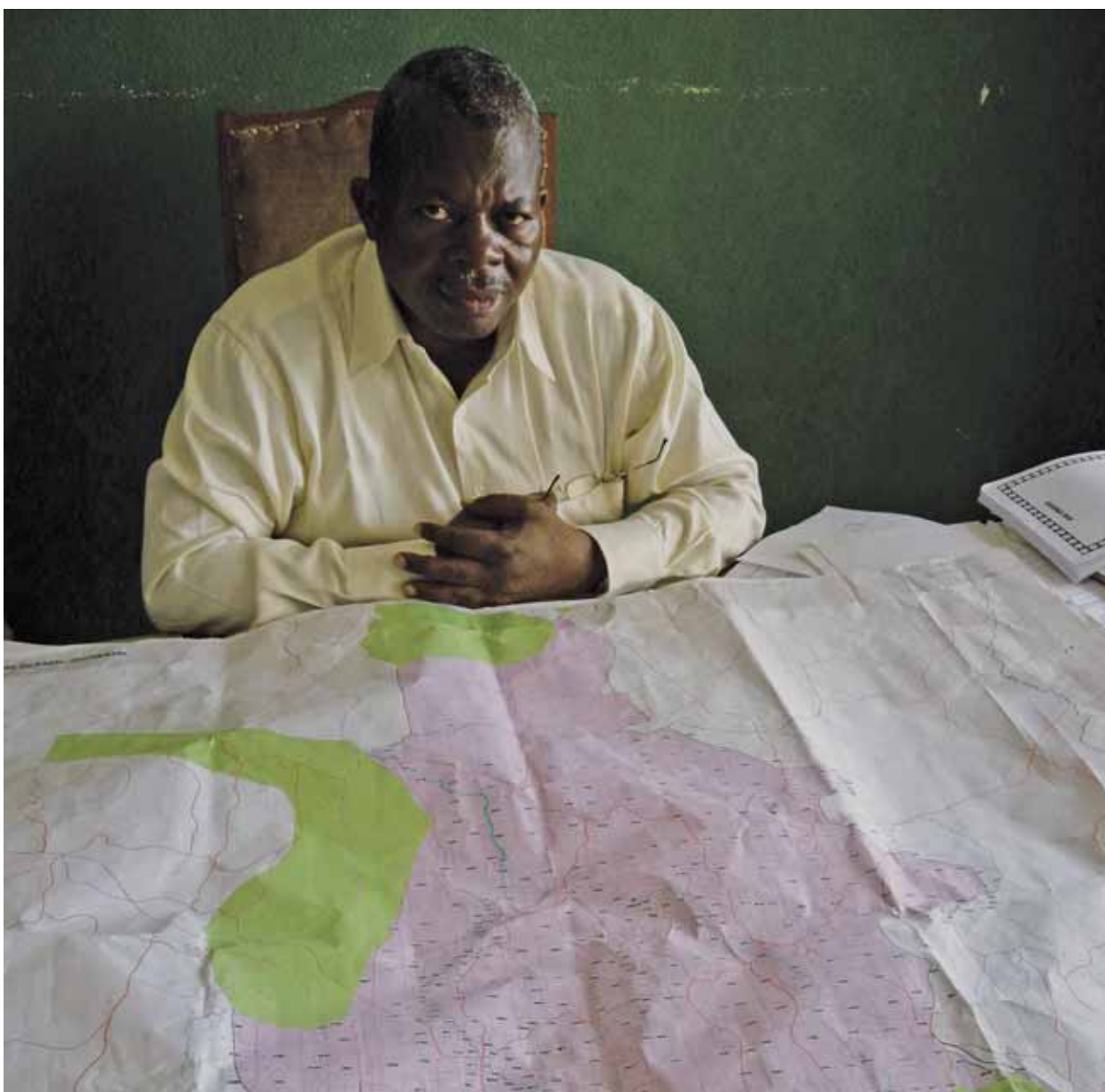


Less than a third of industrial timber is processed in local plants, with the majority exported as logs

approach rooted in virtually limitless “natural rent” capture, however, has not succeeded in reducing poverty and creating employment. Moreover, it has generated social conflict, depleted the DRC’s natural capital and damaged ecosystem services on which the poor are most dependent for their livelihoods. As such, it is neither socially nor environmentally sustainable.

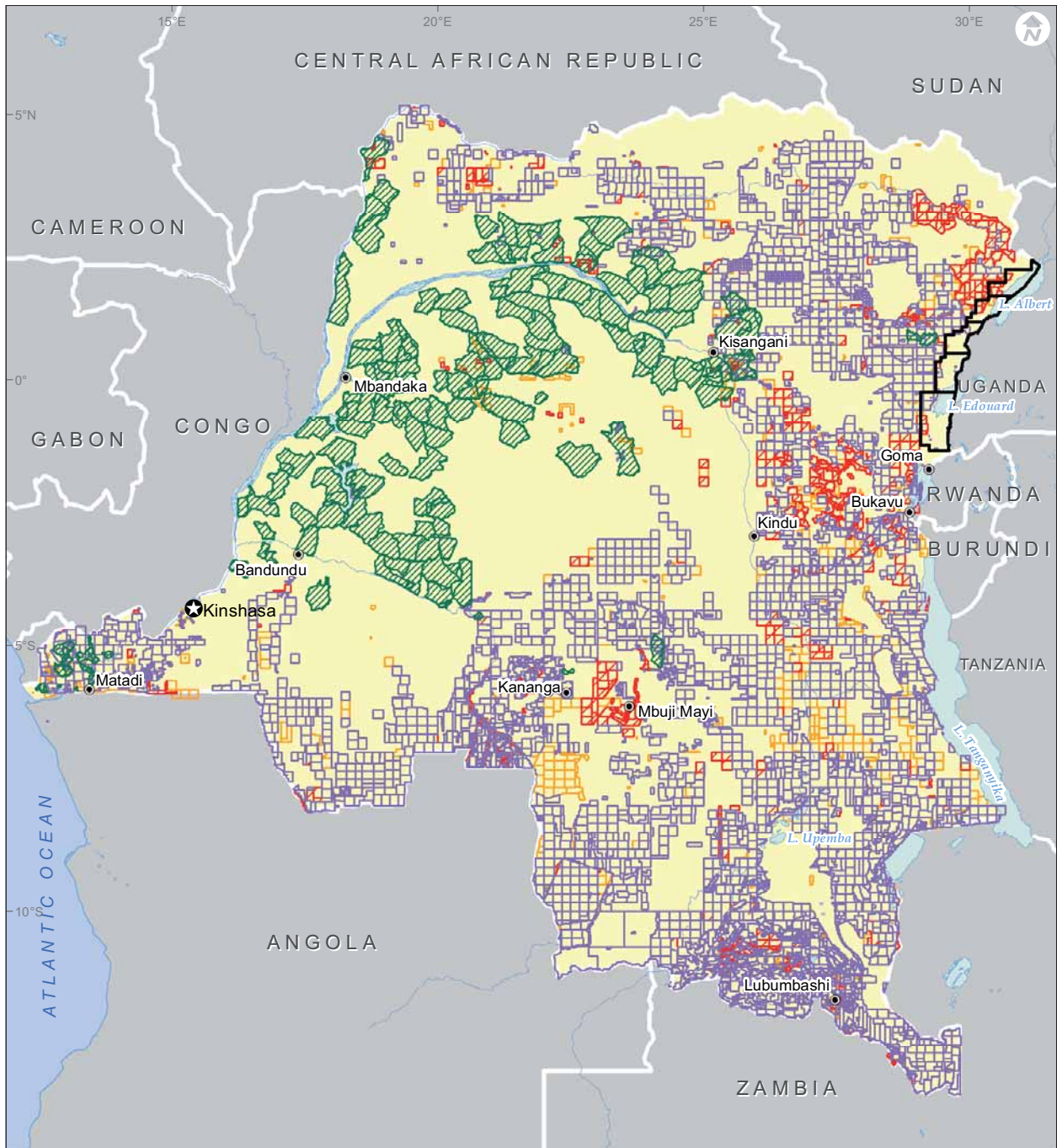
At the same time, it is important to recognize and applaud the substantial progress made by the DRC in strengthening the administration of its natural resources, and particularly in

improving the normative framework of concession governance. This includes establishing a new legal regime (Forestry Code 2002, Mining Code 2002, Environment Law 2011) as well as a complex process of reviewing, forestry and mining concession licences. Nevertheless, the government’s limited capacity to curb predatory investments, negotiate win-win agreements, and enforce compliance needs to be considerably strengthened. The benefits of many concession agreements continue to be one-sided, while persistent reports of underhanded deals, particularly in the mining and oil industries are a worrisome indicator for the future.








The head of Kasai Occidental’s Mining Division with a concession map showing most of the province demarcated into mining blocks

Map 2. Mining, forest and oil concessions in the DRC



Oil, Mining and Forest Concessions

-  Mineral mining (gold, copper, cobalt, etc.)
-  Non-mineral mining (sand, stone, etc.)
-  Mining exploration
-  Oil concessions
-  Forest concessions



Sources:
 Administrative: RGC, ESRI, Geonames.
 Mines: Cadastre Minier, IPIS.
 Forest concessions: FORAF.

The boundaries and names shown and the designations used on this map do not imply official endorsement by the United Nations.



While large-scale concessions such as Tenke Fungurume Mining, the DRC's largest private investment, use cutting-edge technology and follow international standards, they create limited employment

This assessment asserts that even if governance and transparency standards were more rigorously applied, improved governance of natural resource concessions alone will not be able to deliver the development dividends necessary to stimulate the levels of economic growth necessary to lift the majority of Congolese out of poverty. Despite the advantages that these extractive concessions may provide – particularly fiscal revenue and infrastructure development – so far they have for the most part remained isolated “investment enclaves” with limited ‘trickle down’ effect. Notably, they have provided limited work opportunities and have had little impact on the well-being of the majority of Congo’s population, including local communities. For example, the largest private investment in the country’s history of over USD 2 billion to develop the huge copper-cobalt reserves in Tenke Fungurume has employed around 2,900 people. At this rate, trillions of dollars of investment would be required to develop the DRC, clearly not a practical option. Moreover, large investments in industrial mining have been limited to stable mining regions, and there have been only minor projects in other provinces, particularly those emerging from conflict.

Various initiatives to promote socially and environmentally responsible investments in the natural resource sector, including through due diligence, transparency and certification schemes, are a welcome development. Even so, these novel technical mechanisms to improve accountability are unlikely to have the desired effect on development as they do not address the central question of generating employment on the necessary scale. Moreover, from a social welfare perspective, state mining enterprises such as GECAMINES, MIBA, OKIMO and SOMINKI used to provide their staff and families with a whole range of social benefits as well as services to urban centres. With the disintegration of these flagship companies, however, these services were never replaced and have resulted in important social problems. Furthermore, the risk of concession-based development is significantly aggravated by the historical vulnerability of a natural resource export economy to commodity boom and bust cycles. There is a critical need to examine additional avenues of development which prioritise job creation and improving the livelihoods and living conditions for the majority of the Congolese population.

2. Key policy actions

Based on the challenges and opportunities identified in this assessment, UNEP proposes that the Government of the DRC consider four policy actions to promote sustainable wealth creation, poverty alleviation and long-term peace building. These options include: (i) capitalising on the DRC's emerging social economy to generate employment; (ii) maximising synergies through area-based development programming; (iii) integrating economic valuation of ecosystem services into all development planning and (iv) engaging in a 'green economy' transition to achieve sustainable development.

Main message to policy makers: broaden the development paradigm to harness the potential of the DRC's emerging social economy and small-scale sector for job creation, sustainable natural resources management and peace consolidation. Priority should be given to creating an enabling policy framework and support structures including financial services for social enterprises to develop in a coherent and sustainable fashion.

Key sectors: mining, forestry, agriculture, fisheries, and water supply.



Water user associations are a positive example of the DRC's emerging social economy which has considerable potential for job creation

2.1 Capitalise on the DRC's emerging social economy and small-scale sector to generate employment and support inclusive growth and peace building

UNEP's assessment calls for enlarging and diversifying the DRC's development model beyond its present focus on infrastructure investments and industrial concessions. It makes the case for a complementary development pathway based on promoting the social economy.¹ The social economy is an integral part of the Congolese reality involving a vibrant and growing group of actors that have emerged from the DRC's vast informal and artisanal sector. This group comprises nascent grassroots initiatives that can take a wide array of organisational forms including: (i) associations and proto-cooperatives; (ii) small and medium-sized enterprises (SME); and (iii) local development and community-based natural resource management initiatives. These emerging forms of social enterprises and collective action have the potential to become a major foundation for national economic development.

The development of the DRC's embryonic social economy was sparked by the unravelling of the State, the informalisation of the economy and the collapse of social services, which led to the spontaneous creation of "associations". These self-help solidarity networks are found across natural resource based sectors – agriculture, mining, forestry, fisheries and water – and continue to thrive to this day. They were created by Congolese people who used their proper resources to deal pragmatically with their own development priorities.

Feasibility studies are needed to develop and formalise social economy organisational models and determine how they can be strengthened to meet the development needs of Congolese. At the same time, the configuration of these social enterprises will need to be tailored to specific local social systems, land tenure arrangements, the needs of vulnerable groups and natural resource

1) The ILO defines the social economy as a concept "designating enterprises and organizations, in particular cooperatives, mutual benefit societies, associations, foundations and social enterprises, which have the specific feature of producing goods, services and knowledge while pursuing both economic and social aims and fostering solidarity". ILO, 2009, *Plan of Action for the Promotion of Social Economy Enterprises and Organisations in Africa*.

type (e.g. minerals: diamonds, gold, tin, etc., forestry, water, fisheries, etc.). In this process, such social enterprises have numerous opportunities to integrate sustainable development objectives and to create “green jobs”.

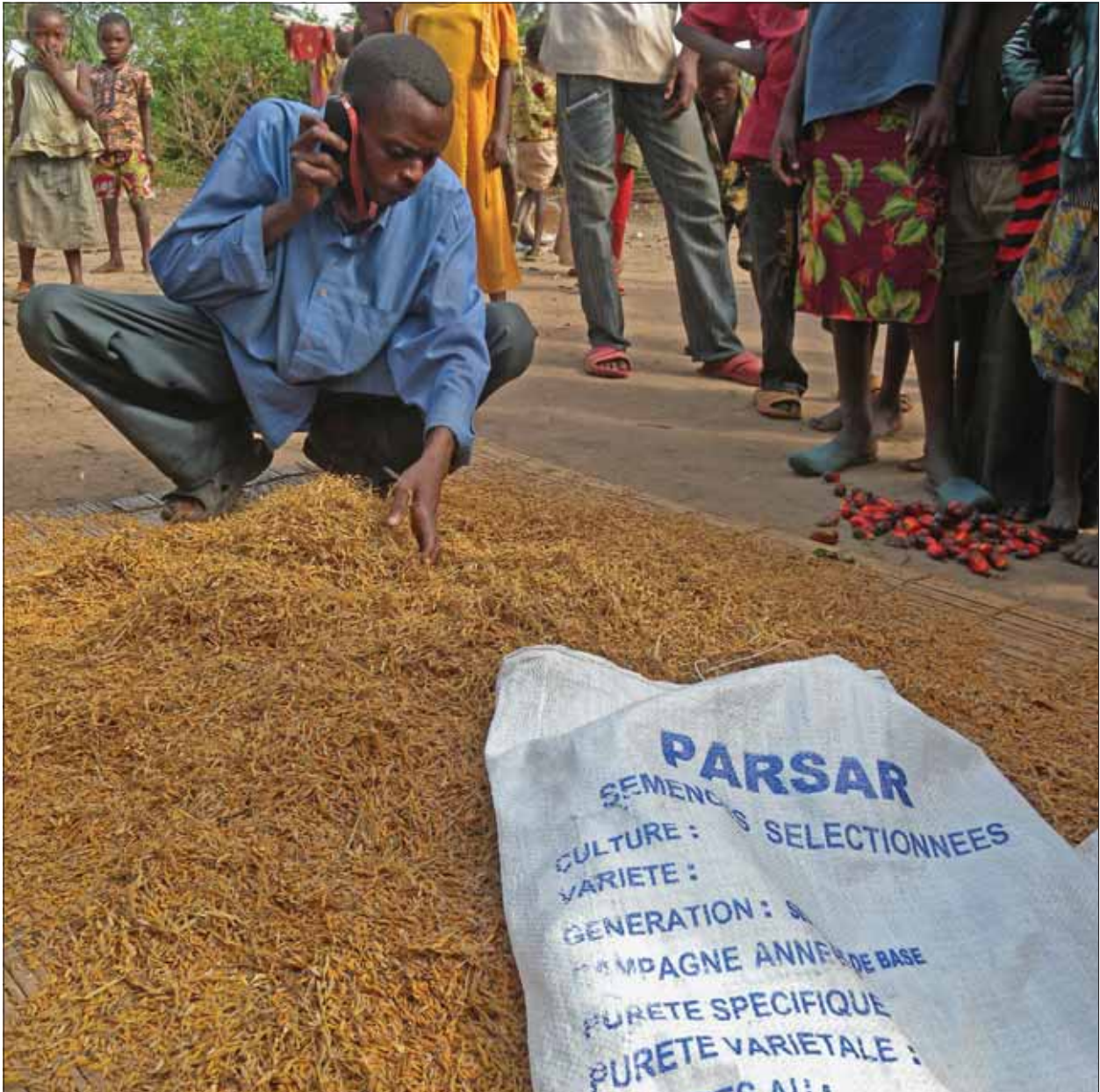
The social economy is identified as a key driving force capable of catalyzing successful transformative change by marshalling employment-led economic development. The social economy concept can also help anchor peace in the DRC by contributing to the reintegration component of Congolese ex-combatants under the national programme for Disarmament, Demobilization and Re-integration (DDR).

Practically, social enterprises must be supported at the level of public policies and improved access to resources including micro-finance. Today, these associations and proto-cooperatives are, however, facing important challenges, as they have been

amalgamated under the non-profit and charity organisations category, and as a result have not been able to emerge as fully-fledged social enterprises. This categorisation must be addressed by a policy review with the aim of facilitating legal identity, removing ‘red tape’ and allowing social enterprises access to finance. At the same time, it is important to develop policies that encourage linking the employment generation potential of social enterprises with the massive value-added transformation capacity of large enterprises and multinational corporations. For example, Tenke Fungurume Mining in Katanga is providing micro-credit loan-guarantees for SMEs and job creation opportunities for non-company employees in the area around its mine. Finally, it is noteworthy that most of the ‘success stories’ reported involve nascent social economy organisations and micro-investments, which typically have a significant impact on a large population base.



To help ex-combatants reintegrate into society and earn a living, UNDP assisted them to organize into fishing associations such as the one above in Kasenyi, Ituri district



The farmer association in Imbongo, Bandundu Province, experiments for the first time with planting improved sorghum on grassland savanna to relieve pressure on gallery forests

Box 1. Farmers' associations: a growing movement

Given the weakness of state structures and the limited number of intermediaries, one area of growing importance is the expansion of farmer organisations in the DRC. The momentum by farmers to organise themselves into associations to increase agricultural productivity and income through improved production, marketing and local processing activities represents a critical step forward. These farmer associations offer an important opportunity to channel sustainable agricultural practices that could raise productivity. In Bandundu Province, for example, there are now 1,900 farmer organisations grouped under 58 "coordinations" (coordination bodies), which are federated under 13 "faïtière" (platforms, one by territory), and represented by a commercial agency based in Kinshasa. The creation of a legal framework to facilitate the growth of farmer organisations and long-term capacity building support, however, is critically needed to ensure the success of this grass-root model.



The Batéké Plateau, the hinterland area supplying Kinshasa with most of its charcoal energy needs, is a promising region for applying an integrated development approach

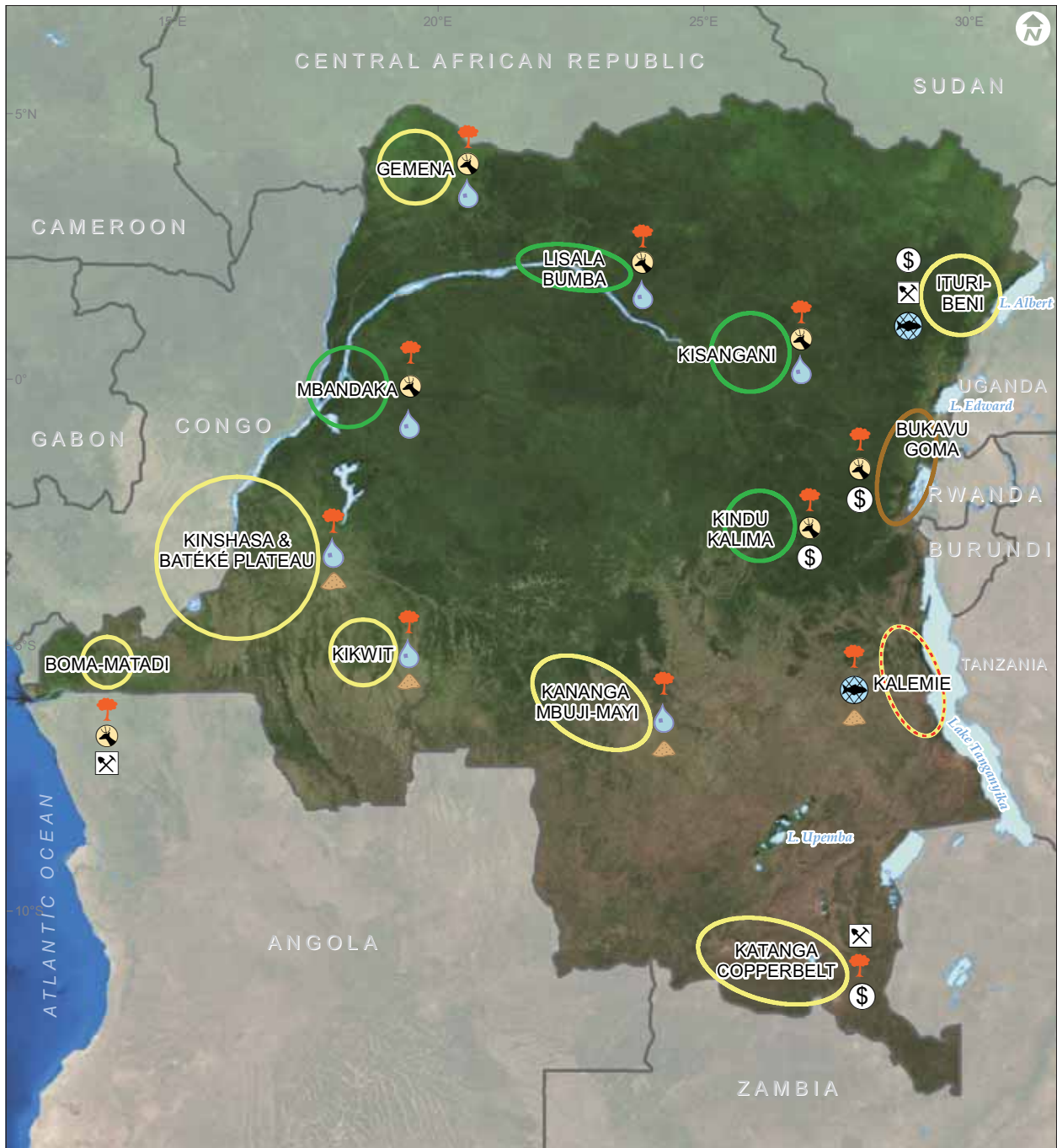
2.2 Maximise synergies through area-based development programming

In view of the enormous size of the DRC, regional disparities, variable security conditions, internal geographic isolation and limited government reach, practical action projects and programmes should be designed and implemented using an area-based approach. The underlying premise of this strategy is that in determining the best course of action, the geographic area and its specific set of inter-related problems is generally a more appropriate entry point than a single issue or sector. The spatial scale for intervention can be set at the territorial-administrative level (province, district, urban commune, etc.) and/or by physical region (e.g. Batéké Plateau, Katanga Copperbelt, Ituri Forest, Lake Albert, Lukunga micro-catchment, etc.). In the case of the DRC, the most appropriate intervention scale is in many cases likely to be at the provincial and territory levels. By grouping multi-stakeholder and multi-sector development efforts within a defined geographic zone, it should be possible to maximise their effectiveness and synergistic impact. Demonstration areas should provide examples of the credibility and value of this approach to decision-makers and prompt their replication and expansion.

The area-based approach also fits well with the DRC's ongoing decentralisation process, and the new PRGSP's focus on the development of growth poles. Furthermore, it is in line with the 'One UN' approach and the recent designation of Area Coordinators in those parts of the country that are still in a post-peacekeeping phase. As part of this strategy, the latter are mandated to plan and integrate the activities of the UN system and its partners at provincial and sub-national levels. While sectoral policies and regulations should typically be developed at the national level, ideally these should be informed by and draw upon lessons learned from area-based development programmes.

The process of selecting geographic areas for intervention would also need to consider emerging poles of growth, particularly given the environmental pressures that they are likely to exert on their hinterland regions. It should also take into account environmental degradation 'hot spots' identified during the course of this assessment, many of which are in fact associated with spheres of dynamic economic activity, particularly around urban centres (see map 3). Transboundary aspects of border zones will also need to be considered in area-based programming; these may need to be embedded under existing regional arrangements.

Map 3. Priority hot spots for area-based integrated development



Priority zones for area-based integrated development

Ecological region	Priority environmental issues
Savanna	Deforestation
Rainforest	Erosion and soil degradation
Afro-montane	Water access
Emerging priority zone	Poaching
	Mining/oil pollution
	Illicit exportations
	Over-fishing



Sources:
Administrative: RGC, ESRI, Geonames.
Michel Gerkens, UNEP Fieldwork

The boundaries and names shown and the designations used on this map do not imply official endorsement by the United Nations.

2.3 Integrate economic valuation of ecosystem services into all development planning

An economic valuation of the DRC's natural capital and ecosystem services would make a strong case for integrating the environment into national accounting and economic decision-making. While a precise economic assessment of the country's massive natural resource endowment is necessary, it is already known that the estimated 1.55 million square kilometres of forests currently provide the most significant opportunity for revenue generation through the growing carbon market. The most important instruments are the Reducing Emissions from Deforestation and Forest Degradation (REDD) scheme and the Kyoto Protocol's Clean Development Mechanism (CDM).

As the country with the second largest forest carbon stock in the tropical world, the DRC clearly has a major stake in the carbon market and has engaged intensively in the REDD+ preparatory

process. It is anticipated that REDD+ projects could potentially generate up to USD 900 million in revenue per year for the country between 2010 and 2030. A national REDD+ strategy with a time horizon until 2030 is currently under development and should be ready for implementation in 2013. The DRC will need to create a robust REDD+ monitoring system that meets international carbon trading standards and to build capacity to enable effective implementation of a national emission reduction programme.

Meanwhile to speed up the implementation phase, the DRC's REDD National Coordination has developed six early action programmes for investment for which it has so far succeeded in mobilizing up to USD 60 million from the World Bank's Forest Investment Programme. In addition to forest conservation and climate change mitigation benefits, participating in a future REDD+ initiative could help catalyse considerable funding to improve livelihoods and address the DRC's multiple environmental challenges.



The DRC's immense forest reserves provide a huge opportunity to tap into the growing carbon market with REDD+ projects potentially mobilising up to USD 900 million per year



Artisanal miners working under desperate conditions. A green transition in the DRC should primarily focus on sustainable job creation, particularly for youth

2.4 Engage in a green economy transition to achieve sustainable development

UNEP believes that the ongoing global dialogue on the “green economy” offers an innovative conceptual umbrella which the DRC can adapt to its specific context to support economic reconstruction and peace consolidation. UNEP defines a green economy as one that results in ‘improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities’.² It is an economy that values natural capital and invests in people by creating decent, well-paying jobs.

That said, the DRC is embarking on the immense challenge of rebuilding its devastated economy from a low point, and will need to define a green economy model that is tailored to its own post-conflict challenges and will maximise its many unique opportunities. A green economic transition in the DRC will need to confront the root causes of poverty, poor governance and political instability which have played a major role in driving environmental destruction.

2) UNEP, 2011, *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication - A Synthesis for Policy Makers*, (www.unep.org/greeneconomy)

Successful green transformation in the DRC should therefore primarily focus on creating decent work – particularly for youth and women - by building on the country’s embryonic social economy and promoting ‘green jobs’, including for demobilised former combatants. By prioritizing concrete and environmentally-friendly job creation, a green economy would help ensure inclusive economic and social development and strengthen the foundations for a lasting peace in the DRC while maintaining the country’s exceptional natural capital.

In addition, as the country rebuilds its highly degraded infrastructure and industries after years of de-mechanisation, enhancing resource, material and energy efficiency will provide the DRC with a cost-effective way to expand its development opportunities while reducing resource use and waste. Finally, by gaining greater value from its vast natural resources – including through schemes such as REDD as well as related Payment for Ecosystem Services (PES) instruments - the DRC would be better placed to achieve economic diversification and reduce the country’s dependence on primary commodity exports, and to invest in developing its service industries, particularly eco-tourism.

The recommendations from this assessment aim to support the creation of enabling conditions for the DRC’s green economy transition (see section 8).



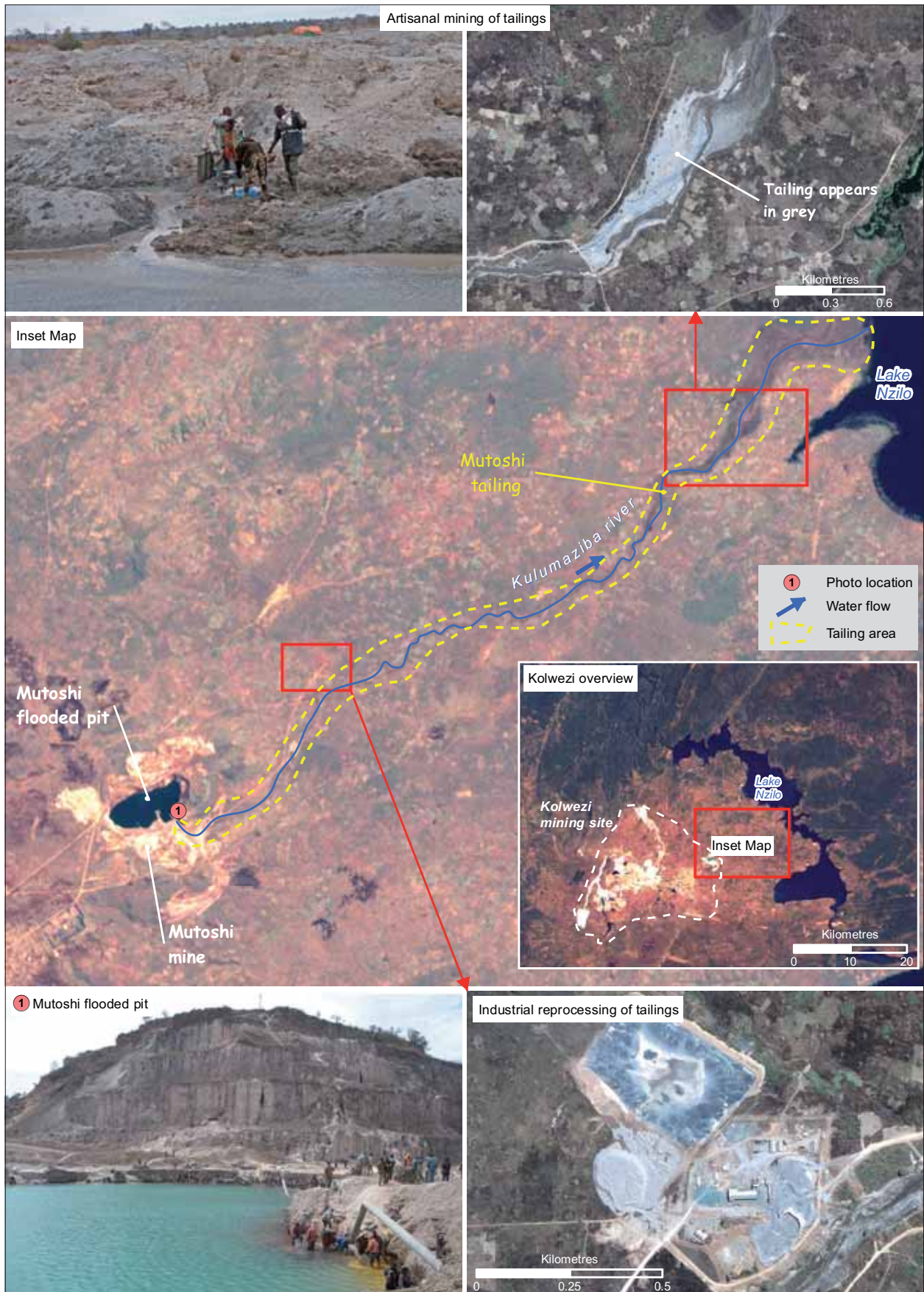
New investments are aiming to exploit the copper-loaded tailings held in Kulumaziba River and in the process clean-up the environment

Box 2. Using resource efficient technologies to clean-up Katanga’s mining environment

Over the past decades, mining technology used in Katanga’s Copperbelt was not efficient and the resulting waste tailings still contained a relatively high level of metals. Consequently, operators tended to “stockpile” these rich tailings behind small dams in valleys for later reprocessing. Meanwhile, the tailings became a constant source for releasing leached metals into surface waters, and most likely, groundwater as well.

Resource efficient technologies to recover the enormous stock of mineral wealth held in the waste tailings of yesteryears are a promising investment that is already bearing fruit on the ground. A case in point is the tailings from Gécamines Mutoshi copper processing facility near Kolwezi, which are unique in that it was discharged directly into the Kulumaziba River. Extending downstream over a distance of around 17 kilometres and a depth of up to three meters, these tailings hold a coarse high grade malachite concentrate estimated at around 1.5 million tonnes of 6.8 percent copper. Industrial and artisanal exploitation of these tailings is under way, which if properly managed can help decontaminate the river bed.

Figure 1. Reprocessing the Mutoshi mine tailings: a potential environmental reclamation project



3. The importance and fate of the DRC's natural capital

The DRC's natural capital is one of the planet's most important. At present, its natural wealth is still relatively intact and in good condition. Yet, a rapidly growing population, projected to reach almost 110 million people in 2030, coupled with intense international resource competition for raw materials is placing multiple pressures on the country's natural resource base. Under these circumstances, the DRC's future outlook gives cause for serious concern. If these trends are left unchecked, it will be difficult for the country to successfully pursue a sustainable development course.

- 1) The DRC is one of the main mining centres in the world. Its considerable untapped mineral reserves are of strategic importance to the global economy (estimated to be worth USD 24 trillion). Yet the legacy of a century of mining in various parts of the country, and particularly in Katanga, has created considerable environmental liabilities and a new modern approach to mining is required.
- 2) The DRC's tropical rainforest extends over 1.55 million square kilometres and accounts for more than half of Africa's forest resources. As the tropical world's second largest forest carbon sink, the DRC's forests are a critical global ecosystem service provider. The rate of forest loss estimated at 0.2 percent per annum remains relatively low, but is a growing problem in certain areas.
- 3) The DRC possesses an outstanding mega-biodiversity reservoir that ranks fifth in importance at the global level and is unequalled in Africa. It boasts five natural World Heritage Sites and many flagship and endemic species. While not quantified, species depletion from uncontrolled hunting and increasing habitat fragmentation is a major concern as it may lead to irreversible losses. The conflict has threatened protected areas, and ecotourism, once a booming industry, is almost non-existent.
- 4) Over half of Africa's water resources and 13 percent of global hydropower potential flows through the DRC. Yet, only an estimated 26 percent of the DRC's population has access to

safe drinking water, one of the lowest supply rates on the continent. Similarly, access to electrification is estimated at 9 percent in a country with vast energy resources.

- 5) With 80 million hectares of arable land, the DRC has the potential to be Africa's granary but only around 3 percent of this land is presently under cultivation, mainly by subsistence farmers. Consequently, the DRC has the highest level of food insecurity in the world, with an undernourishment rate of nearly 70 percent.
- 6) The Congo basin has the highest fish diversity of any African river and supports the largest inland fisheries on the continent, with an estimated potential production of 520,000 tonnes per year. While at the national level this resource is under-exploited with imports accounting for around 30 percent of fish consumption, uncontrolled exploitation has led to serious overfishing pressures at the local level.

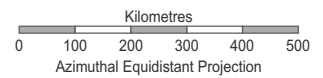
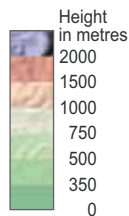


Over half of Africa's surface waters flow through the DRC. The Congo River north of Mbandaka, Equateur Province

Map 4. DRC physical map



- International boundary
- ◌ Lake and reservoir
- ◌ Marsh
- River
- ⊛ National capital
- △ Summit
- ▲ Volcano



Sources:
 International Boundaries, UNCS;
 Hole-filled seamless SRTM data V4, CIAT;
 rdc-humanitaire.net, OCHA/RDC;
 VMAP0, NGA;
 various maps and atlases.

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

UNEPA/DEWA/GRID-Europe 2009

4. Role and consequences of natural resources in conflict

4.1 Natural resources financing and sustaining conflict

Natural resources are widely acknowledged to have played a key role in the DRC's complex cycle of conflict. Heavily inter-linked with regional conflicts, the conflicts in the DRC have been termed 'Africa's World War' due to the involvement of a large number of countries - both directly and by proxy - and the high cost in human lives estimated at 5.4 million people. Active combat in the DRC is currently centred in the eastern part of the country (the Kivus and north-eastern Orientale), where around 20 armed groups remain active. It continues to be primarily waged by militias originating from neighbouring countries, particularly the Democratic Forces for the Liberation of Rwanda (FDLR), the Lord's Resistance Army (LRA, Uganda) and the Allied Democratic Forces/National Army for the Liberation of Uganda (ADF/NALU). A slew of small and medium-sized armed groups including local defence militias known as Mai-Mai as well as the Congolese army itself, however, contribute to high levels of insecurity and ongoing conflict.

The link between natural resource plundering and conflicts both within the DRC and at the regional level has been established in UN investigations³ and other studies. It has also been explicitly recognised at the highest political levels, including in UN Security Council resolutions; in the mandate of the United Nations Organization Stabilization Mission in the DRC (MONUSCO); and in the Lusaka Declaration of the International Conference on the Great Lakes Region (ICGLR) signed by 11 Heads of State. It is therefore important not to isolate the role of natural resources from other drivers of conflict particularly as it is deeply intertwined with multiple fundamental issues of political power, economic livelihoods, ethnic identities, extensive informal trading networks linked to global markets and both national and regional rivalries. At the local level, access to arable land and fishing grounds, has been an important source of violent clashes,

particularly in the Kivus and Ituri and more recently in western Equateur Province. The conflicts have in turn created situations whereby unsustainable use of natural resources is frequently a matter of survival.

It is important to distinguish the limited role of natural resources in *instigating* the outbreak of conflict with documented evidence of its substantial contribution to *financing, sustaining and perpetuating* conflict. As most armed groups lack a reliable financial sponsor, they depend on a wide range of sources to generate funds and stay in business, including easily plundered natural resources. Minerals (tin, gold, niobium and tantalum - "coltan", and tungsten) are the main 'conflict resources' fuelling a multi-million dollar international trade. According to the UN Group of Experts on the DRC (2010) virtually all mining sites in the Kivus are under the control of



With guns slung over their shoulders and dressed in civilian clothes, police and soldiers often become a law unto themselves in many of the DRC's remote mining sites

³ Final Report of the Panel of Experts on the Illegal Exploitation of Natural Resources and Other Forms of Wealth of the Democratic Republic of Congo (UN Security Council, 2002).



Gorillas have also fallen victim to the DRC's violent conflicts

an armed force. Militarised resource extraction is occurring with the involvement of both national and foreign militias as well as Congolese army units (FARDC). Other resources implicated in conflict financing include high-value timber, charcoal, ivory, and fisheries which are mainly supplied to regional markets. Significantly, armed groups also raise substantial funds by levying 'taxes' on mining and other activities, including transport, marketing and cross-border trafficking. While bushmeat trade and illegal export of live species (e.g. primates, reptiles, parrots) has been exacerbated by the conflict, this commerce is not reported to be an important source of funding for armed groups.

Several initiatives have been launched to track and vet the minerals supply chain. These include industry-led certification schemes, such as the Kimberley Process and ITRI Tin Supply Chain Initiative, as well as government and internationally-supported schemes such as the German Federal Geoscience and Natural Resources

Bureau (BGR) Certified Trading Chains (CTC) in Mineral Production and MONUSCO's *Centre des Négoce*. One of the potentially most important initiatives is the Minerals Tracking and Certification System officially adopted at the ICGLR's Lusaka Summit in 2010. It provides a regional framework to harmonise, monitor and control the illegal exploitation of and trade in natural resources, which endorses and draws on the Extractive Industry Transparency Initiative (EITI) and OECD guidelines.⁴ Finally, due diligence legislation has recently been adopted, notably the United States 'Dodd-Frank Act' (2010), to increase transparency and accountability in the minerals market. The effectiveness of these initiatives in controlling the illegal mineral trade, however, remains limited, and despite their critical importance they have also had unintended, negative consequences on local economies.

4) OECD, 2010, *Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas*.



Living conditions in overcrowded camps are difficult (Mungote IDP camp in Kitchanga area, North Kivu)

4.2 Major environmental consequences of protracted conflict

Large-scale population displacement

Conflict-induced population displacement, both internally within the DRC and refugee flows from neighbouring countries, has had a considerable negative environmental impact. Several major waves of population displacement have occurred since the mid-1990s, with many groups being displaced multiple times. Despite the formal end of the Second Congo War (1998-2002) with the signing of peace agreements between the DRC, Rwanda, Uganda and warring groups in 2002, more than 2.4 million people have been displaced from their homes since then, mainly in eastern DRC. More recently in 2009, fighting in western DRC has caused over 110,000 people to flee into the neighbouring Republic of Congo.

One of the key characteristics of displacement in the DRC is that over 90 percent of all internally displaced persons (IDPs) live with host communities or in rudimentary shelters in makeshift camps. Only in parts of North Kivu have organised camps been established and receive regular, although inadequate, relief services through a major

humanitarian response programme. Given the size and high mobility of IDPs in eastern DRC, large-scale environmental degradation as well as resource scarcity and competition have emerged as serious issues. The most pronounced environmental impact has been deforestation by displaced people to meet their energy (fuelwood and charcoal) and housing needs. In addition, many IDPs are actively engaged in the informal charcoal trade as a way to earn money. With four of the country's five national parks listed as World Heritage Sites and located in the eastern conflict zone, substantial encroachment and wildlife poaching has occurred as displaced people flee into protected areas. Informal IDP camps have been established both around and within park boundaries and one recent survey, for example, estimated that the Virunga National Park was losing at the peak of the crisis the equivalent of 89 hectares of forest each day due to illegal fuelwood harvesting. Tensions between park authorities and IDPs remain high, and are a growing flashpoint of conflict. Conflict-induced migrations have also been an important driver of the DRC's rapid and unplanned urbanisation, straining basic services and exacerbating the solid waste management problem in urban centres, as observed for example in Goma, the capital of North Kivu province.

Environmental footprint of humanitarian operations

With an estimated 10 million people requiring humanitarian assistance, the DRC is served by one of the United Nation's largest and most complex peacekeeping and emergency programmes, costing over USD 1.5 billion per annum. Despite the protracted nature of the crisis, humanitarian planning and action has had a short-term orientation which has relegated environmental sustainability to a lower priority. While some UN agencies and non-governmental organizations (NGOs) have made some progress in addressing the environmental footprint of displaced populations (e.g. by introducing fuel efficient stoves and fuelwood plantations), the scale of the need vastly outstrips supply capacity and available resources. Important priorities are improved planning and governance of IDP camps, official and unofficial, as well as investing in rehabilitating abandoned camps. Critical services provided as part of the overall relief effort, such as drinking water, have been inadequately coordinated and typically comprise once-off activities with limited quality control and maintenance. For example, due to the generally poor construction of water supply structures, a large part of this "humanitarian infrastructure" has fallen into disrepair. As humanitarian operations are expected to persist in the coming years, there is an urgent need to enhance their environmental

sustainability through the systematic integration of appropriate, environmentally-sound technologies and best practices based on existing guidelines. Priority areas requiring support include provision of sustainable energy, shelter, water, waste management and sanitation. In addition, a specific challenge exists in the eastern region where there is a marked communication gap between the key stakeholders in the environment, development, humanitarian and peacekeeping groups which needs to be addressed through the creation of appropriate dialogue platforms.



To reduce fuelwood use, organisations such as Mercy Corps and WWF are training rural people and internally displaced persons to build fuel efficient cooking stoves and manufacture bio-briquettes (Rugari, North Kivu)



A thriving charcoal market inside the Virunga National Park, which reportedly supplies up to 80 percent of Goma's charcoal consumption



A demining operation on the outskirts of Kisangani, Orientale Province

Direct physical impacts from armed conflict

Direct environmental impacts of sporadic but intense fighting over the last 15 years in the DRC have largely been the result of occasional battles in forests and protected areas, the movement of armed forces, and most significantly, from landmines and other unexploded ordnance (UXO) that still dot the landscape. According to the UN Mine Action Service, the Kivus, Equateur, Orientale and Katanga provinces are the most impacted. Of the DRC's estimated 884 mined sites, only 72 have been cleared, while 438 of the 1,342 UXO locations have been neutralised. Landmine experts suggest that many

more sites have not yet been reported, mostly from areas that were previously inaccessible for security reasons.

Although pre-dating the Congo wars, large-scale rioting and pillaging by an unpaid Congolese Army from 1990-1993, particularly in Kinshasa but also elsewhere in the DRC, had a devastating impact on the country's infrastructure and environment. For example, over 10 percent of the public water utility REGIDESO's 94 water treatment centres were sabotaged and much of the protected area infrastructure and environmental monitoring equipment were lost during this period.

5. Post-conflict challenges to environmental and natural resource management

5.1 The geography and dynamics of environmental degradation

As large swathes of the DRC open up to resource exploitation after many years of physical isolation, a discernible pattern of environmental degradation in a series of sequential “waves” is emerging around several economic growth poles. These development ‘hot spots’ occur around three main areas: rapidly growing urban centres, rehabilitated and newly opened roads, and corridor border regions with dynamic transboundary trade. Despite the important development opportunities that such developments represent for marginalised regions, there is concern that it is occurring in a context of weak or absent environmental governance, especially in areas controlled by armed groups. Under such circumstances, the presence of demand centres and physical accessibility have emerged as two key degradation drivers.

Artisanal forestry, charcoal production and mining are the principal resource utilisation activities fuelling this degradation process, but it is also visible in unmanaged fisheries, such as in Lake Albert. In the case of artisanal forestry, the degradation cycle starts with logging of high-value timber, mainly for export. This is followed by a wave of unmanaged exploitation directed at mid-



The Bunia-Mambasa road through the Ituri rainforest is a prime deforestation frontier, where high-value ‘red woods’ are coveted. Despite official check points, controlling illegal timber exports to neighbouring Uganda and Kenya has proven difficult



Wearing a jeweller loupe, with an electronic scale and calculator at hand, a diamond dealer is ready for business in Demba, Kasai Occidental

value timber for the domestic market, then felling for charcoal production and clearance for agricultural cultivation. Although sequential resource targeting is highly variable and situation-specific, there is a pattern of selective removal starting with high value resources and ending with indiscriminate resource harvesting of low value products. Spreading from growth poles, the waves travel along roads, particularly newly opened and rehabilitated segments, depending on the transport and workforce capacity available. Once exploitation inwards from a road - typically up to 10 km - becomes difficult, mainly due to access and labour constraints, it either moves further along the road or shifts to a lower grade resource.

In terms of livelihoods and long-term economic development, the above-mentioned degradation pattern usually triggers an unregulated ‘boom and bust’ cycle. While the initial stage of high-value logging and artisanal mining ‘rush’ generates quick benefits, these gains are not sustained, as people shift to charcoal production and subsistence agriculture. A well-established artisanal mining camp typically turns into a village dependent on subsistence farming. Once the initial boom from a new mining site or deforestation frontier subsides, the population typically slips into a vicious circle of resource overuse and poverty.

Figure 2. Deforestation frontier expansion around Mbuji-Mayi, Kasai Oriental

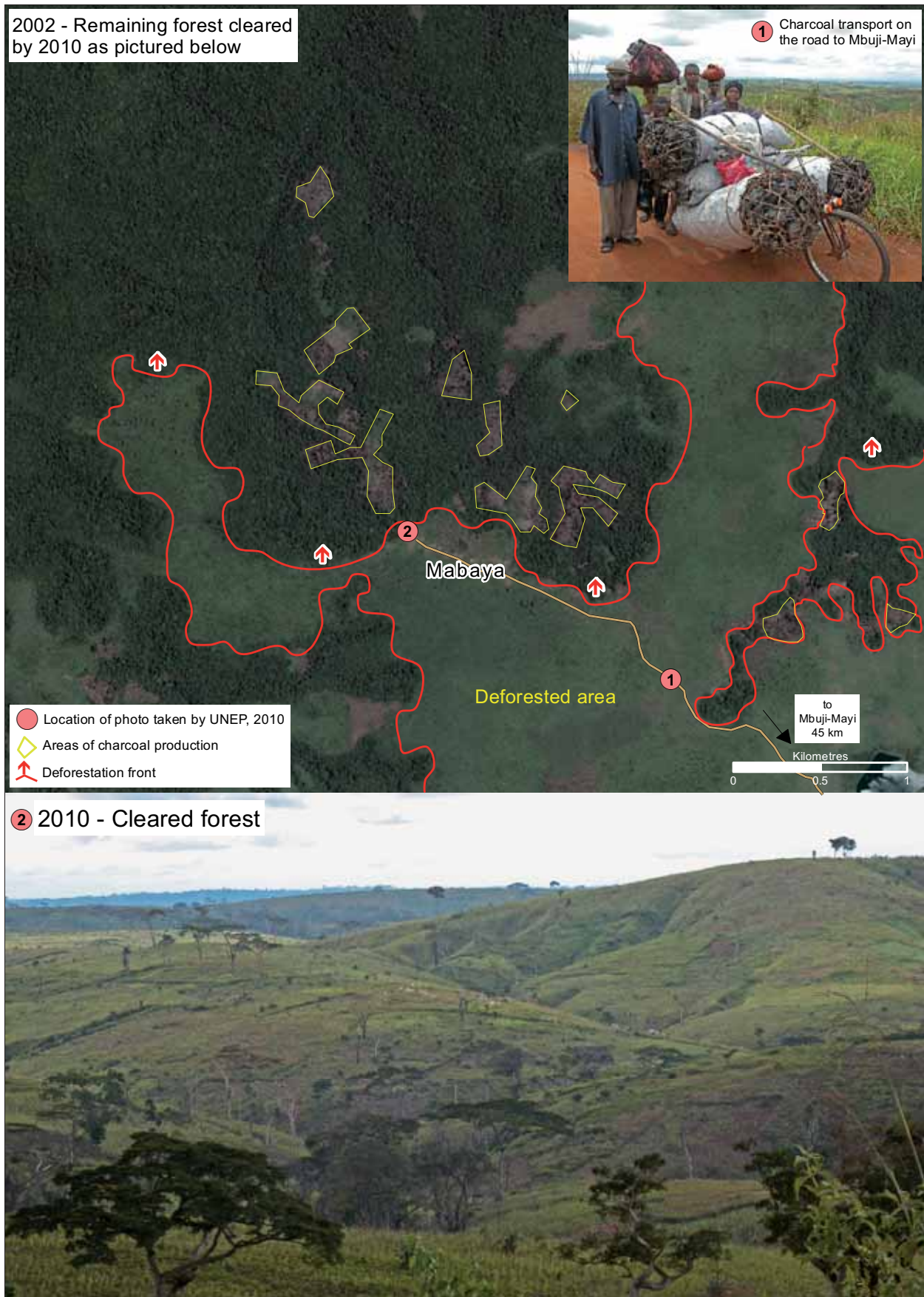


Figure 3. Diamond mining rush on the Sankuru River, Kasai Oriental



5.2 Synopsis of priority issues by sector/theme

The primary challenges to sustainable environmental and natural resource management in the DRC identified by this post-conflict environmental assessment are summarised below by economic sector and/or environmental theme (see full DRC assessment report for details).

Mineral resources

The DRC is one of the world's most important mining countries. The sector is divided into large-scale industrial mining, which characterised mining activity up to the late 1980s, and artisanal and small scale mining (ASM). With the decline of State mining conglomerates (GECAMINES, MIBA, OKIMO, SAKIMA), ASM has emerged as the most widespread form of mineral exploitation since the early 1990s, accounting for around 90 percent of production. An estimated 1.8 to two million ASM workers are involved in mineral extraction, and as many as twelve million people - 18 percent of the population - are dependent directly or indirectly on artisanal mining.

This assessment identified the following environmental issues associated with large scale mining: landscape degradation; water and air pollution; radioactive contamination; and deterioration of social welfare. For small-scale and artisanal mining the priority issues are: mercury contamination; bio-physical degradation; health hazards; human rights abuses; child labour; lack of access to funding and markets; and impacts on forests, biodiversity and protected areas.

Mining contracts awarded under opaque circumstances during the conflict period have been renegotiated or cancelled by an inter-ministerial Revisitation Commission. Nevertheless, the overall state of contract transparency remains wanting as the number and status of un-revisited contracts are unknown and few of the renegotiated agreements are in the public domain. Moreover, controversy surrounds the terms of several new mining contracts. Also, disputes involving artisanal miners and local communities occupying concession areas for which industrial companies have obtained legal titles remain an issue.

Most mining operations in Katanga, the DRC's main mining centre, are open pit mining, causing extensive

land and landscape degradation. An environmental sampling survey in Katanga's Copperbelt region carried out in 2010 by UNEP in collaboration with the Swiss Spiez Laboratory showed that surface water pollution close to tailing and waste sources is extensive, with the main concerns arising from cobalt and copper. Equally dust particles of less than 10 micrometre particles were found to be relatively rich in cobalt and lead, and are suspected to be a major source of human exposure. A recent biomonitoring study in the Copperbelt has shown substantial exposure to several metals, especially in children. Urinary cobalt concentration in the sampled population is the highest recorded for a general population.

Furthermore, some of the mineral deposits in Katanga's Copperbelt region contain uranium associated with copper-cobalt mineralisation, and may eventually pose radiation health risks to workers and surrounding communities. Specifically, radioactive contamination is a concern at the Shinkolobwe uranium mine, where high levels of radiation were measured by UNEP.



Mercury is widely available in the gold mining town of Mongbwalu, Ituri district



Toxic cobalt salts, with concentrations slightly above 10 percent, form an attractive pink colour on the river beds drawing the interest of both humans and animals

Box 3. 'Pink poisons' threaten Katanga's rivers and groundwater

Remarkably high levels of heavy metal contamination along river beds were measured during UNEP's environmental sampling survey in the Katanga Copperbelt region. Cobalt, zinc and copper salts accumulate through capillary effects from the river to the river bank surface during the dry season. These salts form a very soluble layer of almost pure cobalt-zinc sulphate that is washed back into the system during the rainy season. These 'pink salts' can be considered to be 'pure poison' and present a high health risk to humans. Cobalt toxicity can cause heart and thyroid damage, contact dermatitis, asthma and hard-metal lung disease. Epidemiological studies are under way to determine the health impacts of such exposure on Katanga's population. The high heavy metal concentrations are equally a threat to livestock, aquatic species and other wildlife.

The small-scale and artisanal mining sector brings with it additional concerns. In particular, UNEP observed widespread and dangerous use of mercury in artisanal gold processing in Ituri. An estimated 15 tonnes of mercury are used annually in ASM gold mining in the DRC, making it the second largest source of mercury emissions in Africa. Land degradation with direct disturbance of water bodies, floodplains and river banks is also common. In addition, among the impacts of the ASM sector on forests, biodiversity and protected areas are deforestation, illegal poaching and park encroachment, related to the *ad hoc* establishment of settlement camps by the miners as well as the actual mining operations.

In terms of social concerns, the ASM sector usually does not comply with minimum health and safety standards. As a result, artisanal miners are exposed to accidents, poor working conditions, inadequate hygiene and sanitation. The ASM sector in the DRC is vulnerable to violations of human rights such as the use of child labour, which is widespread. Financing and greater market access, which could introduce economies of scale, are very limited, and act as a major constraint to improvements in the sub-sector.



A gold dealer heats a clump of mercury containing gold amalgam on the roadside beside his shop. As the burning is done in the open air, toxic mercury vapours spill directly on streets crowded with people and children



Artisanal mining causes extensive damage to landscapes due to mass deforestation and rampant excavation. Alluvial diamond mining along the Tshibungu River in Kasai Occidental

Figure 4. Extensive environmental footprint of large-scale industrial mining in Kolwezi, Katanga





*A large Irico tree (*Chlorophora excelsa*) is felled by artisanal loggers in less than one hour using a chainsaw*

Forestry Resources

Overall, the DRC's extensive forest resources are in good condition, but they are being lost and degraded at an increasing rate, particularly in critical areas such as gallery forests in the west and hilly landscapes in the east. While the overall national deforestation rate remains relatively low, at 0.2 percent, in some parts of the country, notably in the north and south savanna plateaus and gallery forests, deforestation rates are much higher. Under the current status quo, it is estimated that by 2030 the deforested area could reach 12-13 million hectares, or the equivalent of 8-9 percent of DRC's total forest area, while forest degradation could affect 21-23 million hectares or 14.5-16 percent of the country's forest. Such levels of deforestation and forest degradation would more than double the DRC's current carbon emissions to 390-410 million tonnes.

UNEP has identified the key drivers of forest degradation and deforestation in the following

order of priority: (i) slash and burn agriculture with reduced fallow periods; (ii) fuelwood and charcoal collection which accounts for 95 percent of the population's energy needs; (iii) unregulated artisanal and small-scale logging which is estimated to represent 75 percent of total timber exports from the DRC; and finally, (iv) road infrastructure opening previously pristine areas up to human activities.

While the DRC has a potential for timber exploitation estimated at 10 million m³/year, official timber exploitation (mainly industrial production) amounted to just 310,000 m³ in 2006. In contrast, artisanal and illegal logging was calculated as totalling approximately 1.5-2.4 million m³ in 2003 – up to eightfold official figures. Both artisanal and industrial logging are overshadowed by annual fuelwood and charcoal production, estimated at 72 million m³.

The allocation of timber concessions has been haphazard, and a moratorium was finally established in 2002. In 2011, 80 of 156 contracts were cancelled bringing the total area under timber concessions (mainly by European operators) to 12.2 million ha. To strengthen management of large-scale timber operations, voluntary certification schemes, such as the Forest Stewardship Council (FSC), provide a market-based tool to establish sustainability standards in the sector. In the case of the DRC, progress is still needed to reach certification status but efforts are under way to improve governance in the sector. One of the notable initiatives in this regard is the ongoing discussions between the DRC government and the European Commission to formalise a Voluntary Partnership Agreement under the EU's Forest Law Enforcement, Governance and Trade (FLEGT) scheme.

In the context of the establishment of a green economy, the valuation of the DRC's non-timber forest assets is another key issue. Non-Timber Forest Products (NTFPs), such as medicinal plants and foods, are of particular importance to a large majority of the Congolese population and the international community as a whole. While some trade is already regulated under the Convention on International Trade in Endangered Species of

Wild Fauna and Flora (CITES), further expanding and formalising the sustainable management and trade in NTFPs could represent an important opportunity for the DRC.

Land

Land management is an underlying challenge in post-conflict DRC. An ambiguous land tenure system, weak land use planning and land degradation are the three main issues. Land degradation is primarily caused by vegetation removal for subsistence agriculture and fuel wood collection. In several urban centres, severe gully erosion from unplanned construction and lack of drainage systems has reached a critical point. In part, land degradation is accentuated by the ambiguity created by the prevailing dual tenure system of customary rights which prevails over 97 percent of the DRC and "modern" laws. Even in urban centres such as Kinshasa, only an estimated 30 percent of land has recognised property deeds.

Weak land use planning is a national problem, exacerbated in urban areas by the influx of large numbers of displaced people and rapid outward migration from rural areas due to the collapse of agriculture.



Non-timber products such as edible forest fruits sold by this woman in Libenge, Equateur, provide a substantial share of poor households' livelihoods and income



Several participatory mapping initiatives to assist communities in land and resource decision-making are currently under way in the DRC

Agriculture

Much of the DRC's population is dependent on slash-and-burn, rain-fed agriculture for its subsistence. The consequent vulnerability is reflected in the alarming levels of food insecurity, with as many as 70 percent of the population estimated to be malnourished according to the FAO/WFP. As women are responsible for close to 70 percent of agricultural production, there is a high-level of gender imbalance associated with these risks. The main issues identified for this sector are: food insecurity; unsustainable subsistence agriculture; poor access to markets and inadequate transport infrastructure; food contamination; dilemma of plantation agriculture; deforestation, soil erosion and land degradation; and an under-utilised potential for agroforestry and conservation agriculture.

Food insecurity is a major concern in the DRC, whose population grew by approximately 20 percent between 1995 and 2005, while its agricultural output dropped by 25 percent. Farming practices are unsustainable and inefficient, and with little or no inputs, large areas of land are required as soil fertility is rapidly depleted. Disintegration of transport infrastructure and resulting geographical isolation has led to the collapse of the rural economy as farmers are unable to easily sell their produce, purchase inputs or receive support from agricultural extension services. Over 50 percent of

farmers live more than eight hours from a trading centre and with no facilities for refrigeration or for appropriate storage of food crops, post-harvest losses can reach up to 80 percent in some areas. Furthermore, years of conflict have taken their toll as farmers have lost whatever tools or inputs they had and, today, they struggle to procure basic materials. At the same time, population growth, deforestation and slash-and-burn agriculture have accentuated the vicious cycle of land degradation. In urban and peri-urban agriculture, vegetable contamination from the application of untreated sewage is an emerging issue of concern.

The "dilemma of plantation agriculture" lies in the DRC's huge potential for plantations of various crops, including biofuels, versus their potential negative environmental and social impacts. Whereas 29 percent of the DRC's agricultural land was previously cultivated under large scale plantations, today most are no longer operational. Foreign interest is reportedly returning, however, raising concerns over potential 'land grabbing'. Environmental issues associated with plantations include the use of agrochemicals, the introduction of exotic species and the risk of natural forest conversion. On the other hand, there is an under-utilised potential for agroforestry and conservation agriculture despite the existence of successful agroforestry schemes such as at Mambu and Ibi Village in the Batéké Plateau.



Low yields from slash-and-burn agriculture cannot ensure food security for the DRC's rapidly growing population (Mambasa, Ituri district)



Once one of the world's leading palm oil cultivation centres, Kikwit's palm oil factories have been left to decay since the 1990s

Box 4. Decline of Kikwit's palm oil plantations

With an eye on its good soils and favourable climatic conditions, the *Huilleries du Congo-Belge* (then a branch of the multinational Unilever), chose Kikwit and its surroundings in 1911 to establish large commercial palm oil plantations. Producing approximately 80,000 tonnes of oil every month, the oil produced was mainly used to manufacture soap and margarine. Most of these products were exported to Belgium.

The company employed thousands of people and also purchased palm oil from individual farmers, thereby providing a decent quality of life for entire families. Unfortunately, this flourishing industry came to an end with the advent of the post-colonial nationalization process which led to mismanagement at the company headquarters and eventually, the complete halt of the industry. Today, all that is left are abandoned factories and thousands of hectares of unmanaged palm trees, interspersed with natural vegetation.

The decline of the palm oil industry left Kikwit's population massively unemployed and resulted in food insecurity. In order to cope with the loss of livelihood, many targeted gallery forests for slash and burn agriculture and charcoal production. Degradation of gallery forests has also had detrimental impacts on watercourses which provide the main source of drinking water for the local population.

Given that Kikwit is relatively well connected to markets with road and water connections to Kinshasa as well as the two Kasai provinces, the potential for recovering commercial agriculture is strong and would be an important contribution to re-building a sustainable local economy.



Two of the DRC's iconic species, the mountain gorilla and the endemic okapi (forest giraffe)

Biodiversity and protected areas

The DRC possesses the highest level of biological diversity in Africa. This rich natural endowment is of local and global significance, yet today, 190 species are classified as critically endangered, endangered or vulnerable on the IUCN Red List of Threatened Species. Endemic species such as the northern white rhinoceros are now close to extinction, only a few hundred mountain gorilla remain while the bonobo, human being's closest-living relative, is increasingly under pressure from commercial bushmeat hunting.

The main issues affecting biodiversity and protected areas are: encroachment on park integrity; unregulated bush meat hunting; human-wildlife conflict; ivory poaching; limited community-based management in buffer zones; and under-developed wildlife tourism. Most of the DRC's parks are situated in the east of the country, a zone which faces significant population pressure and armed conflict. As a result, park encroachment - with subsequent deforestation, poaching, artisanal mining and farming in those areas - and incursions by armed militias are frequent, severely compromising park integrity. Furthermore, in many instances,



An estimated 1.7 million tonnes of bush meat are consumed in the DRC each year, with a price value of over one billion US dollars

because of poor community consultation, park delimitations remain contentious and park authorities frequently only manage a small portion of the parks, with the remainder falling outside of a commonly agreed park management plan. Forceful eviction of populations for the creation of parks, has led to continued conflict and antagonism between park authorities and communities in the DRC.

Many species, including endangered ones, are threatened by unregulated and unsustainable bush meat hunting. Estimates suggest that between 1.1 and 1.7 million tonnes of bush meat are consumed in the DRC each year, for a total value of over USD 1 billion per year. The exact extent of the problem, however, remains undocumented, preventing it from being properly managed. Equally, sustained international demand for ivory continues to place pressure on the DRC's elephant population. The DRC's total elephant population dropped from about 62,000 in 2002 to about 23,000 in 2006. Human-wildlife conflict is on the rise in the DRC as a growing population expands into areas of importance for biodiversity. Potential ecotourism revenue from the DRC's parks and wildlife is estimated to be huge, although it currently remains untapped.

Water resources

Despite being Africa's most water-rich country, the DRC faces a severe drinking water crisis with

around 51 million people lacking access to potable water. This assessment found inadequate access to drinking water; pollution and degradation of drinking water sources from land-use changes; poor construction and maintenance of water systems; untapped hydropower potential; and a data vacuum, as being the most pressing issues concerning water resources management. The DRC has one of the lowest access rates to safe drinking water, estimated at only 26 percent of the population. The country possesses plentiful freshwater resources with potential annual per capita water availability estimated at 19,967m³ (2008), but in reality each Congolese has access to an average of only seven cubic metres of water per year. Moreover, water availability is highly unequal with as little as three percent of the population having access to safe water in some rural zones. Distribution is highly unequal in urban areas too: 85 percent of water connections are found in four provinces (Kinshasa, Bas Congo, Katanga and South Kivu).



In the past decade more than 200 park guards have been killed in eastern DRC, equivalent to around 10 percent of the national ranger force

With the gradual decay of State institutions since the mid-1970s, baseline data for water is either non-existent or out of date, leaving a significant data vacuum. Water samples taken during UNEP field missions suggest that biological contamination is a serious problem due to inadequate protection of water sources. For instance, spot checks of over 50 'improved' urban and rural drinking water points revealed a 92 percent incidence of bacteriological contamination, including pathogenic microbes of faecal origin, with subsequent high risks for human health. Also, elevated suspended sediment loads from deforestation and poor land use practices are threatening many critical drinking water sources and seriously impacting water treatment operations, such as at the REGIDESO centres in Lukunga (Kinshasa) and Kindu (Maniema).

Poor construction and maintenance of water systems as well as the virtual absence of regulatory oversight is another cause for concern. A survey commissioned by the World Bank and Water and Sanitation Programme in 2005 found that most of the DRC's small rural water supply systems (serving 3,000 – 30,000 people) were of poor

quality. The DRC's vast water resources also represent a significant hydropower opportunity. However, this option remains largely untapped with total installed capacity representing only 2.5 percent of existing potential.

Fisheries

The DRC boasts exceptionally high freshwater fish diversity. Although ecological investigations are incomplete and research remains ongoing, over 690 fish species have been recorded in the Congo basin, of which an estimated 80 percent are endemic. Lake Tanganyika alone counts a total of 2,156 fish species, of which close to 30 percent are endemic. With one of the largest catches (239,000 tonnes) from inland fisheries in Africa, fish and fish products account for an estimated 25-50 percent of the Congolese population's protein intake. Yet this is a sector where little information exists and where regulations and enforcement remain lax. The main concerns for fisheries are: collapse of industrial fishing; unregulated artisanal fishing; post-capture challenges; deforestation and pollution; and lack of information.



Despite recent improvements, almost 51 million Congolese are without access to safe drinking water



The economic importance of the DRC's fishing sector is today largely underreported, but was estimated in the 1980s to represent 17 percent of GDP

Until the 1970s semi-industrial fishing was prevalent in Lakes Tanganyika, Edward, Albert and Mweru. Today, the DRC's fisheries sector is almost completely outside the formal economy, with artisanal fisher-folk accounting for 95 percent of the national fish catch. Small-scale artisanal fishing is practically unregulated and in many cases inappropriate fishing gear is used, particularly small mesh sizes that capture juveniles. There is limited respect for spawning and nursery grounds and periods, coupled with weak enforcement and supervision of fishing practices. Post capture challenges include transport, storage, and marketing, leading to a mainly subsistence approach to fisheries exploitation. Deforestation and pollution which affect freshwater resources

also threaten fisheries, particularly from mining in southern Katanga. While a fair amount of research on fish species ecology and diversity is being conducted by academics and scientists, there are major knowledge gaps about the state of the resource and its utilisation, which is fundamental to ensuring sustainable management of the sector.

Climate change

Despite its low contribution to anthropogenic climate change, the DRC's population faces high impact risks, particularly increased food insecurity associated with changes in rainfall variability patterns. Climate scenarios including those from the Intergovernmental Panel on Climate Change (IPCC) portray a rise in temperatures closer to the equator and a shortening of the rainy season in the southern plateau. Notably the drought prone region of Katanga is expected as of 2020 to lose two months of its rainy season, from seven months today.

The key issues identified with respect to climate change are: a limited knowledge base and projections; vulnerability of rain-fed small-scale agriculture; limited preparation for climate change adaptation; and the need to seize on the DRC's considerable carbon market potential. The most alarming issue is the vulnerability of rain-fed small-scale agriculture on which the majority of the DRC's population rely for subsistence. Extreme events expected under climate change scenarios, compounded by dry seasons alternating with sudden precipitation, are likely to affect soil structure, fertility and quality and thereby, its ability to sustain sufficient crops for the country's population. The risk of fires is also likely to increase. With carbon stocks in the DRC's forests estimated at 27,258 million tonnes, the country holds the key to either vastly increasing carbon emissions by clearing forests, or alternatively maintaining these stocks and being rewarded for it. Promising schemes in which the DRC is actively engaged include REDD+ and the CDM of the UN Framework Convention on Climate Change. Already through projects such as the Ibi Batéké carbon sink plantation (IBCSP), the DRC is benefiting from carbon funding. Such initiatives, however, need to be expanded and replicated across the country.

The DRC's National Adaptation Plan of Action has identified two priority interventions to enhance the country's adaptation to climate change. These are: (i) electrification of urban and rural areas, and (ii) enhancement of pastoral and agricultural production capacity, both of which are urgent measures that need to be implemented to support the population's adaptation to anticipated climate change.

Industry

Aside from industrial natural resource extraction in the mining and forestry sectors, the DRC's small industrial base is dominated by manufacturing and food processing, both of which have been in steep decline due to years of mismanagement, lack of investment, and the population's growing dependence on various informal artisanal activities to make ends meet. The key obstacles to a more diversified and sustainable industrial development are a weak supportive regulatory environment, poor enforcement capacity, energy constraints and limited access to credit. Deteriorating infrastructure and subsequent geographical isolation as well as increased insecurity have led to the decline of many agro-industries at the provincial level. Weak land use planning and enforcement have allowed people to settle in an ad-hoc manner in designated industrial areas, and likewise for

industrial facilities to be sited in residential and inappropriate locations as observed in Kinshasa's industrial area and in the mining cities of Katanga's Copperbelt (Lubumbashi, Likasi, Kolwezi). Due to limited formal controls and monitoring, untreated industrial effluent and solid waste is commonly disposed of directly into the environment, leading to a high risk of ecosystem contamination in certain areas (e.g. Lake Tshangalele, Pool Malebo).



In 2011, the Ibi Bateke Carbon Sink Plantation became the first initiative to be registered in the DRC under the Clean Development Mechanism



Industrial and commercial wastes are openly burnt near Kinshasa's industrial area. Currently, the country does not have any engineered landfill sites



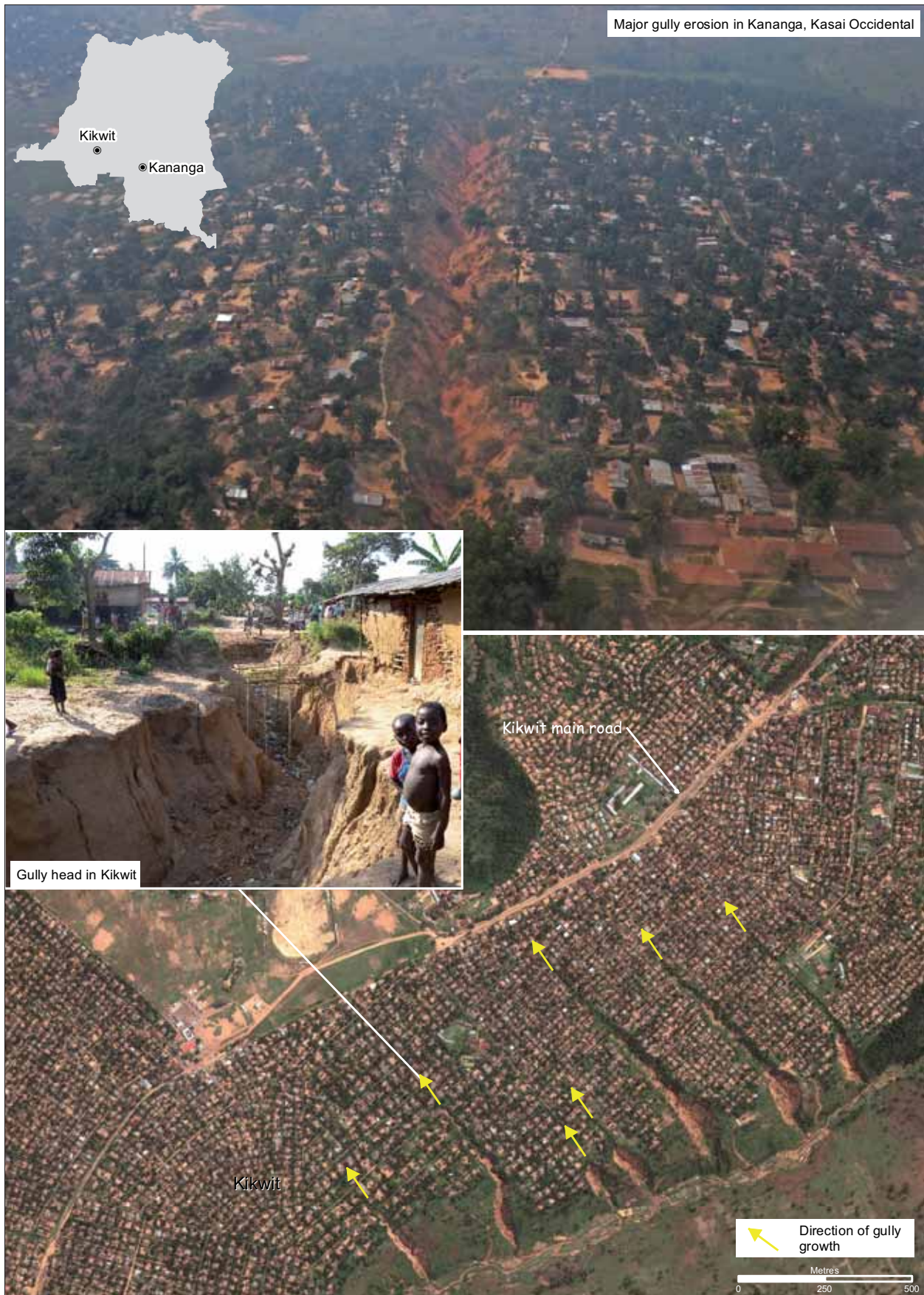
With the collapse of transport infrastructure, a “bicycle economy” has emerged around many urban centres, effectively curtailing trade to a radius of 30 to 50 kilometres (Kananga, Kasai Occidental)

Urbanisation

The DRC’s urbanisation rate is at an unprecedented 4.6 percent. Ranked in 2010 as the third most populous city in Africa, Kinshasa (8.75 million) is projected to become the most populous African city by 2030. Another salient feature is the rapid growth in the number of secondary urban centres hosting populations of several hundred thousand people. Fast urban growth has been substantially accelerated by conflict-induced population displacement and rural migration accentuated by economic collapse of the countryside. Due to the weakness of urban governance and practical absence of land use planning beyond the limits of historic city centres, urbanization is accompanied by minimal (if any) expansion of infrastructure installations and basic services.

It is estimated that 75 percent of the DRC’s urban population live in slums. As a result, large cities such as Mbuji-Mayi and Kananga resemble agglomerations of unintegrated villages. Furthermore, given their intense energy needs, rapidly growing urban centres become major consumer centres of wood and charcoal, leading to considerable deforestation in the surrounding areas. Due to chaotic and uncontrolled urban growth, vast informal settlements often develop into degradation hotspots, characterized by severe gullies, poor sanitation and substantial peri-urban deforestation and are highly vulnerable to disasters such as landslides. Providing basic services, including energy and water supply, and addressing environmental problems in urban centres, including in financially strapped secondary cities is one of the key challenges facing the DRC.

Figure 5. Major gully erosion in the DRC's urban centers



Transport

There is a striking gap between supply and demand in the DRC's transport system. A large part of the infrastructure was developed during the colonial era with exports in mind, and is now in an overall state of disrepair. Today, national development plans and substantial foreign investment are targeting the sector's rehabilitation, with a major focus on roads. The two main issues identified by this assessment are: an access dilemma and construction impacts including inadequate maintenance.

The access dilemma is that although improving transport infrastructure is essential for the development of the country's many isolated regions, it typically comes at a high environmental cost, particularly where previously remote pristine zones are opened-up in a context of pervasive weak governance. Equally, the impacts of transport infrastructure expansion, particularly roads, can be high, with land disturbance, habitat fragmentation, carbon dioxide emissions and pollution increasing. Furthermore, the high vulnerability of the DRC's mainly earth road network to frequent equatorial

torrential rainfall, coupled with limited maintenance capacity, means that they are at high risk of rapidly degrading into gullies.

Energy

The DRC has a huge hydropower potential of 100,000 MW, the equivalent of 13 percent of the world's hydropower potential. Yet the domestic rate of electrification remains low, and is currently estimated at no more than nine percent, while less than three percent of the DRC's hydropower potential is exploited. There is an urgent need to develop a sustainable mix of energy sources as a basis for restarting most economic activities. The main issues in the energy sector which this assessment identified are: poor access; imbalance in energy mix; artificially low electricity pricing and over-reliance on biomass. Limited access to electricity is a major constraint to investment according to a survey of 341 firms in the DRC. If fully developed, the Inga Dam development schemes would not only be able to cover domestic energy needs, but could also generate a substantial revenue stream from electricity sales to neighbouring countries and regional power pools.



Many village settlements in the DRC are aligned along roads



Every day throughout the DRC, thousands of Bayanola – ‘strong men’ – push bicycles carrying charcoal loads of 200-250 kilograms into urban centres to meet the burgeoning energy demand

While the DRC is rich in a range of energy sources (oil, natural gas, solar, biomass, hydropower), the vast majority of the country’s energy needs (95 percent) are currently being met from biomass. As a result, the DRC’s domestic energy demands cause the loss of around 400’000 hectares of forest each year. Furthermore, as the energy sector is heavily subsidised with weak cost-recovery, the public electricity company, SNEL, does not have sufficient funds to effectively maintain its infrastructure and expand investments.

Natural hazards

While information is scarce, overall the DRC’s vulnerability to disasters is considered to be very high given the multiple natural hazards faced and the increasing proportion of the population exposed to these hazards, particularly in densely populated displacement camps and urban centres. The three main natural hazards prevalent in the

DRC are biological, hydro-meteorological and geological in nature. Environmental degradation is frequently an underlying factor contributing to disaster risk and intensity. For instance, deforestation and agriculture practiced on steep slopes increase the risk of landslides or mudslides and flash floods. The main issues associated with natural hazards are lack of baseline data; increased outbreaks of epidemics linked to periods of conflict and natural hazards; floods in the Congo basin and droughts in the southern plateau and high vulnerability to geological hazards in the Albertine Rift. Existing data points to epidemics – linked to periods of conflict - being the most deadly natural hazard affecting the population. Between 1970 and 2010, 62 major epidemic events, primarily from bacterial and viral infectious diseases, killed close to 8,300, and affected an additional 663,000 people. Disruptions in health services, food insecurity, poor water and sanitation services and displacement exacerbate the impact of such health hazards.

6. Underlying structural constraints to environmentally sustainable development

Analysis of the above-mentioned post-conflict challenges revealed a number of common underlying factors. The structural constraints examined in this section stem from decades of gross mismanagement, corruption and poor governance and have been significantly worsened by the recent conflicts in the DRC. These distortions present a major impediment towards improving environmental and natural resource management in the DRC. Unless the negative dynamic created by the coalescence of these systemic constraints is reversed, the degradation of the country's natural capital is likely to accelerate.

6.1 Informalisation of the economy

The radical informalisation of the economy and society – an exceptionally long process of economic regression and State decay which started in the 1970s and has been exacerbated by recent conflicts - has had enormous impacts on natural resources extraction and management. With the collapse of State enterprises as well as

State-managed co-operatives, the disintegration of public services and the stagnation of the private sector, the 'informal economy' which cuts across all sectors, has overtaken the formal economy. An estimated 80-90 percent of the DRC's population is engaged in the informal sector. In economic value, this parallel economy is estimated to be three times the size of the DRC's formal GDP. In the conflict pockets of eastern DRC such as in Masisi and Walikale in North Kivu and parts of Ituri, an informal war economy has taken over with militarised natural resources exploitation and trade lying beyond the purview of state administrative institutions.

Although the governance frameworks to formalise economic activity are gradually being put in place, the DRC's undiversified economy – based almost entirely on natural resource extraction – has remained informal to this day with major environmental and social consequences. Economic informalisation is strongly paralleled by the growing substitution of the State in the management of social sectors and service delivery by international organisations, donors and NGOs in what has been termed 'government-by-NGO', or the 'NGOisation' of the country.



Most of the DRC's population functions in the informal sector



The DRC has the largest artisanal mining workforce in the world, estimated at around two million people

Box 5. Significance of the informal, artisanal and small-scale sectors in the DRC's economy

Extreme fragmentation and informalisation of economic activity is a distinguishing feature of the DRC's economy. Most of the population is engaged in one-person survival-mode occupations that are largely dependent on natural resource extraction. Economic groupings of more than five people are an exception. Not even the provision of social services has been spared from informalisation. Highlighted below are salient facts about the DRC's informal sector and nascent social economy:

- Most of the population - 65 percent - is dependent on low-yielding subsistence agriculture, based largely on slash and burn practices, and has extremely limited access to distribution and marketing systems.
- The omnipresence of women and youth in the DRC's parallel economy is one of its distinctive characteristics.
- With around two million artisanal miners, the DRC has the largest ASM workforce in the world. Supporting approximately 18 percent of the DRC's population, the ASM sector accounts for around 90 percent of mineral production.
- Annual timber production from artisanal logging is approximately 5-8 times larger than industrial logging. Both are dwarfed by uncontrolled fuelwood and charcoal production, which by volume is 30 times larger than artisanal logging.
- Up to 1.7 million tonnes of bushmeat, or wild meat, are harvested annually from unregulated hunting and poaching. The economic value of bushmeat is estimated at USD 1 billion per year, more than industrial and artisanal logging combined.



A man balances on a log to cut it using a two-handed saw in a gallery forest near Kasasa, Kasai Occidental

Box 5, continued

- Non-meat forest foods, which are gathered without any formal controls, play a critical role in the food security and livelihoods of a large part of the DRC's population. The market value of these forest foods as well as other forest products (e.g. medicines) has not been estimated or quantified, but it is known to be significant.
- Artisanal fishing accounts for 95 percent of the DRC's fish catch, estimated at 239,000 tonnes per year.
- A major breakdown in social service delivery, namely drinking water, sanitation and waste management, has occurred. For example drinking water supply in urban areas fell from 68 percent in 1990 to 37 percent in 2010. As a result, these services are largely provided through makeshift arrangements that are generally of poor quality and rapidly fall apart due to lack of maintenance.
- SMEs are estimated to employ around 200,000 people or 5 percent of the total workforce. Employment creation in the SME sector has been virtually non-existent in the period 2006-2010; a significant setback given its major role in job creation and the opportunities offered by the DRC's exceptional natural resource base.
- Although social enterprises – namely proto-cooperatives and associations – have been more dynamic than the SME sector, their critical importance in mobilising formal employment is not adequately appreciated and harnessed. For example, the number of saving cooperatives accredited with the Central Bank in 2010 is less than 20 percent of those registered in the 1970s.

6.2 Survival-based foraging livelihoods

With the shrinking of the formal economy, most Congolese have had little choice but to pursue pragmatic survival strategies based largely on the harvesting of natural resources. Weak governance and a protracted crisis have transformed foraging livelihood strategies – known as *'cueillette'* – into a standard way of life for the majority of the population. Referred to popularly as *'la*

débrouillardise', *'Système D'* or *'Article 15'*, which mean fending for oneself, this forager economy is based on a number of strategies including: slash and burn shifting cultivation, fuelwood and charcoal production, artisanal mining and forestry, wildlife poaching, uncontrolled fishing and gathering of non-timber forest products. Foraging activities are strongly gendered, with women and children playing a prominent role, and are therefore, more susceptible to exploitative relationships.



Livelihood strategies in the DRC centre on survival, relying on a foraging culture and resourceful 'débrouillardise' skills (above and opposite)



The meagre pickings from a *'cueillette'* livelihood strategy offer the poor multiple tangible benefits and means for self-preservation. Consequently, the DRC's resource-based foraging economy has demonstrated dynamism and resilience, and in the apparent chaos a particular form of order has emerged encompassing complex supply chains and informal trade networks. While a foraging economy has been the only income-generating option

available to a large part of the DRC's population, it offers limited opportunities to advance beyond basic subsistence and build technical capacity and capital assets to improve production and resource management over the medium to long-term. It also represents a threat to the natural resource base, as weak state institutions coupled with high levels of corruption mean that there is essentially no control over resource extraction or use.



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Heavily mechanised industrial mining of the past contrasts sharply with today's hand picking of mineral ore by artisanal workers

6.3 Deep de-industrialisation and de-mechanisation: a low-productivity trap

One of the most serious consequences of the DRC's profound economic informalisation is the deindustrialisation and demechanisation of its key economic sectors (mining, forestry, agriculture, fisheries). With the growing resource demands from newly industrializing countries and a growing global population, the DRC risks sinking further down the levels of the supply chain, to become nothing more than a provider of raw materials to the rest of the world. The danger of becoming structurally locked into a colonial trade pattern of exporting raw materials and cash crops is therefore very real. Extensive demechanisation currently also limits the possibilities of taking advantage of economies of scale and raising production. However, if supported by strategic policies and investments, the DRC's low level of industrialisation, combined with its rich natural resource base can open attractive opportunities for leapfrogging and adopting clean and resource-efficient technologies.

6.4 Emerging social enterprises constrained by weak governance

The decline in social enterprises, particularly State-sponsored cooperatives initiated with external support in the 1980s, has accelerated the demechanisation of production and the reversion of Congolese society to subsistence-based livelihoods with important consequences for day-to-day natural resource management. Nevertheless over the past few years, there has been a rapid expansion of ad-hoc initiatives by the population to create entrepreneurial self-help groups in natural resource-based sectors such as forestry, mining, agriculture and fisheries. In areas where the government is unable to deliver basic services, business-oriented social organisations have also emerged, for example water user and waste collection associations. The grassroots momentum by Congolese civil society to form proto-cooperatives and artisanal associations represents a major step forward in organizing, centralizing and formalizing fragmented individualized activities in more rational and constructive economies of scale. Furthermore, development partners have

been supporting the creation of voluntary local development committees and community-based natural resource management schemes.

Emerging social economy organisations, however, are presently operating in a governance vacuum without the prerequisite legal sanction to safeguard and support their development. As a result, most social enterprises register as non-profits (*Association Sans But Lucratif*) which, while providing legal identity, curtails their access to credit, as banks and other potential creditors are reluctant to provide them with loans. It is noteworthy that a recent survey has indicated 'absence of credit' to be the main constraint to the growth of the local private sector. Nascent social enterprises are consequently isolated from entry into the economic mainstream. This situation undermines the enormous potential of entrepreneurial social organisations to generate jobs and contribute to development programmes within an environmentally sustainable framework.

6.5 Small and medium-sized enterprises handicapped by an unfriendly business environment

Despite progress in modernizing the financial system's legal framework and removing bottlenecks on private sector engagement, the DRC business environment remains burdensome. According to the World Bank's *Doing Business 2011* report which ranks the DRC at the bottom of its list (175 out of 183), if a firm were to pay all its taxes it would on average be equivalent to 340 percent of its profit. Onerous red tape complicates the start-up of small and medium-sized enterprises (SMEs) and penalises their competitiveness. A recent World Bank survey (2011) has shown that there has been virtually no growth in the DRC's SME sector over the past five years. Moreover, of the 6,000 private companies that existed 25 years ago only 5,000 remain today. On the other hand, it is noteworthy that large companies have been enjoying substantial growth. Lack of clarity on regulatory requirements,



An entrepreneur decries the administrative hassles in starting a new business to sell liquefied petroleum gas cylinders; a potential alternative to charcoal and fuelwood (Beni, North Kivu)

excessive procedural hassles and over-taxation, make it particularly difficult for SMEs and domestic entrepreneurs to yield a profit. Their lack of political patronage and weak negotiating power makes it very difficult for them to cut through red tape compared to larger companies. Given the limited incentive to formalise business transactions, the growth of the informal sector has accelerated to such a level that it has become a critical structural problem in the DRC economy. Not only does informality undermine entrepreneurship and the growth of SMEs by curtailing their access to credit, but it also means that they operate beyond the scope of environmental and labour laws, making it difficult to channel equitable and sustainable practices in their activities.

6.6 Breakdown of the banking system undercuts revenue generation and economic accumulation from natural resources

The breakdown of the DRC's banking system and its crucial intermediary role has amplified the opacity of economic transactions and impeded

the collection of financial data, particularly on the cross-border flow of funds. The weakness of the banking system substantially undermines the possibilities for organising and monitoring natural resource extraction. With an estimated 300,000 – 350,000 bank accounts for a population of 68 million in 2010, the DRC has one of the lowest banking ratios (0.5 percent) in the world. Although there has been exponential growth in the banking sector since 2005 and customer confidence is gradually returning, the economy continues to operate mainly in cash (largely in USD) through informal dealings. The microfinance sector is also under-developed, representing only 0.041 percent of GDP. The lack of financial records not only hampers the collection of critical statistics, but also significantly raises the risks of tax evasion, resource traceability, corruption and criminal activity. Enforcing environmental standards and improving transparency on natural resource exports is therefore significantly undermined by the fragility of the banking system. It also means that the population's access to credit is limited, thereby stifling its capacity to invest in production inputs and sustainable resource management.



The microfinance sector remains under-developed in the DRC. A savings and credit cooperative in Beni, North Kivu



The disintegration of the DRC's national road network is a major constraint to economic development and poverty reduction

6.7 Geographic isolation and dynamic border regions: different patterns of environmental degradation

A critical obstacle to economic growth is the complete degradation of the DRC's fluvial, road, railway and air transportation infrastructure. The country is spatially and structurally disconnected, with vast hinterland areas geographically isolated into virtual 'islands' that are cut-off both from the centre and from each other. Physical isolation has curtailed large-scale commerce and economic life has become acutely localised as people have reverted to subsistence existences. In large areas of the country people rely on bicycles, carts and pirogues for transport and trade, limiting local communities' and entrepreneurs' access to markets, and preventing them from diversifying livelihoods and breaking from a vicious cycle of resource foraging.

Resource-rich border regions – particularly southern Katanga, the Kivus and Ituri – that

double-up as trade corridors to southern and eastern Africa, exhibit a considerably more dynamic economy than isolated hinterland regions. With the adoption of new technologies (e.g. chain saws and nylon fishing nets), artisanal production – particularly of minerals, timber and fisheries - can rapidly rise to a semi-industrial scale. Improving resource management in border areas is often complicated by unregulated cross-border trade, insecurity and criminal networks.

6.8 Ambiguities over land tenure and weak land management

Land use planning and resource access in the DRC is complicated by a dual land tenure system of customary and statutory laws which often collide, resulting in considerable uncertainty and confusion. Although not legally recognized by government, customary tenure remains the *de facto* system through which most people manage and gain access to land and other natural resources, especially in rural and peri-urban areas.



Bambuti pygmies – experts of the forest – are highly vulnerable to being dispossessed of their ancestral lands and experiencing displacement, marginalisation and poverty

Due to potential overlaps and contradictions between customary and statutory land allocation, insecurity over land ownership is commonly experienced in the DRC and has been an important driver of social conflict, particularly in eastern DRC. Preliminary results from a UN commissioned survey (2011) have revealed that the two main causes of conflict (excluding the eastern war zone) are related to customary authority and local land disputes. For example, control over natural resources is the main source of conflict in the non-war zones of Orientale Province, while 76 percent of conflicts in Katanga province are related to land titles.

An unclear tenure regime and open access to common resources is widely considered to have discouraged farmers from investing in the intensification of agricultural production and improve natural resource management. Women, who play a pivotal role in agriculture, are particularly disadvantaged in accessing land

and often have to negotiate temporary use of marginal terrain. Diminishing land rights of vulnerable groups, particularly the Pygmies, including forced expropriation, is also an issue of growing concern.

Inadequate land tenure arrangements have led to uncontrolled land use which is accentuated by massive population displacement and rural migration with significant negative impacts on the environment. This situation is further complicated by the lack of a comprehensive land management plan establishing a spatial framework to direct and regulate development activities. The problem is evident in frequent incidents of conflicting and incompatible land uses, such as the granting of mining concessions within protected areas, rampant conversion of forests into agricultural fields through slash-and-burn practices, anarchic settlements in peri-urban areas and degradation of strategic drinking water sources due to agricultural and housing construction encroachment.

6.9 Data vacuum

Natural resource management in the DRC is severely handicapped by a profound absence of data. Institutionalised data collection systems started to collapse from the mid-1970s, and almost completely ceased to function in the wake of widespread rioting in 1990-1993 and the subsequent conflicts due to personnel abandonment and looting of monitoring stations. As a result, statistics today are largely unreliable and significant discrepancies are quoted for a wide range of key indicators. Data deficiencies cut across all sectors, from population censuses to estimates of drinking water supply, malnourishment levels, deforestation rates, biodiversity inventories, volume of fish catch, agricultural and mineral production and exports. Furthermore, surveying and mapping of natural resources is partial, outdated and incomplete. Although some investment has been made recently to install modern environmental observation infrastructure – particularly meteorological and liminographic stations – and ad-hoc surveys have been carried out (wildlife, forestry, hydrogeological), data collection remains grossly inadequate and underfunded. Furthermore, where data exists, it is often inaccessible due to archaic storage methods and the lack of a harmonised information management structure. Without the prerequisite baseline datasets and the capacity to carry-out long-term measurement of key parameters, it is impossible to make informed



Rebuilding the state's capacity to collect baseline environmental data for planning purposes is a priority. A recently installed automated weather station in Mbandaka, Equateur

decisions and design effective environmental management interventions.

6.10 Nascent environmental policy and institutional framework

Since the democratic elections of 2006, there has been a significant drive to develop and update environmental legislation and institutional arrangements. This is a major task that is currently ongoing. Nonetheless, environmental degradation continues unabated due to a poorly-enforced, piecemeal environmental legal framework. The lack of an overarching environmental policy has hampered the development of a comprehensive set of regulatory tools and environmental norms. Consequently, laws and regulations have arisen in an *ad hoc* and fragmented manner in response to emerging environmental concerns. Institutional reform is greatly needed, and is currently proceeding under the umbrella of the government-led national development plan for forestry and conservation (*Programme National Forêt et Conservation de la Nature* (PNFCN) which is supported by a consortium of international partners.

Institutional weakness has also hampered progress. Key constraints include: (i) a severe funding shortage, with only a small proportion of the MECNT's budget being disbursed to cover staff salaries, and a total lack of operational expenditure; (ii) inadequate human and technical capacity, with poor salaries and working conditions (particularly in remote areas) leading to disillusioned personnel and dissuading competent staff from remaining in the Ministry's employment and (iii) poor infrastructure (from offices to electricity supply) and deficient equipment (from vehicles to computers), particularly at the provincial level. Under these circumstances, the government's ability to address the country's wide range of environmental challenges, as well as comply with its commitments under multilateral and regional environmental agreements, is significantly limited. The DRC's move towards decentralisation is in itself creating a major challenge for environmental governance, particularly when it comes to coordination, enforcement and funding of the new entities that will be created. Overlapping mandates between MECNT and other institutional actors such as, the Ministries of Mines, Agriculture and Energy, add to these difficulties. In addition, strategies and platforms to integrate civil society and increase environmental awareness are wanting although these are now gradually emerging.

7. Opportunities for sustainable development, good governance and peace consolidation

UNEP's assessment identified a number of significant opportunities to sustainably manage the country's natural resources, promote good governance and support peacebuilding for the benefit of the DRC's present and future generations.

7.1 Build on success stories to create a 'virtuous circle' of development

There are many environmental 'success stories' in the DRC. A striking feature of the DRC's successful projects and activities is that while they are generally locally well known, awareness of their achievements and challenges is deficient at the provincial and national levels due to physical inaccessibility and limited resources. Consequently there is limited capitalisation on lessons learned. To overcome this limitation, there is a clear need to broadcast and popularize positive environmental management experiences and accelerate the systematic upscaling of successful models into national programmes.

Most of these successful initiatives involve nascent social enterprises and the small-scale sector as well as

cost-efficient micro-solutions, which generally serve a large population base. Notable examples include:

- the Mampu agroforestry project, the model for which could both stem the charcoal crisis around rapidly growing urban centres and improve livelihoods for disadvantaged groups;
- community-based water user associations to raise drinking water access in peri-urban and rural areas (see box 6);
- urban and peri-urban horticulture garden associations in Kinshasa and other major cities as a way to improve urban food security and create greener cities;
- community-based natural resource management plans to rationalise land use activities through zoning and participatory cartography (e.g. CARPE programme targeting critical biodiversity landscapes);
- the Ibi Batéké carbon sink plantation, which in 2011 became the first project in the DRC to obtain carbon credit financing through the CDM.

Equally important are the numerous self-help and co-management initiatives to better organise artisanal exploitation of natural resources through social economy enterprises – particularly associations and cooperatives – visible across key sectors including mining, forestry, agriculture and fisheries.



Urban farmer associations are a positive example of emerging social enterprises, which can help improve food security and 'green' the DRC's rapidly growing cities (Tshuenge, Kinshasa)



Newly constructed office of the Lubilanji Water User Association in Mbuji-Mayi, Kasai Orientale

Box 6. Example of a success story: improving drinking water access through people-based associations

An inspiring model of bottom-up development is offered by the creation of neighbourhood-based Water User Associations (WUA) to manage small piped networks for drinking water supply. The WUA programme aims to provide safe drinking water to 1.3 million people living in informal urban settlements and densely populated rural areas in five of the country's provinces. Although registered as not for profit organisations, the WUA essentially operates as a social enterprise with fulltime employees and a dedicated bank account. The association's aim is to at least break even and in cases where a surplus is generated, it is re-invested. The average final turnover for a WUA is considerable by Congolese standards falling in the range of USD 70,000 - 120,000 per annum. By becoming financially self-sustaining, the WUA has a better chance of ensuring infrastructure maintenance and providing a lasting water service. Importantly, social economy organisations such as WUAs also help to rebuild social cohesion and support national development by improving living conditions and creating job opportunities.

From the start, the development of a water supply network is placed under the management of water users who are grouped into neighbourhood associations (WUAs). Community ownership is assured by fixing water prices at a rate that allows for full-cost recovery of service delivery, and autonomous management of the water supply system through democratically elected bodies. Daily operations are performed by a professional management office staffed by community members, who receive monthly salaries and pay taxes.

WUAs are the brainchild of the Congolese NGO ADIR and are supported by an international partnership led by the Belgian Development Agency.



The head of the environmental office in Ituri district (right) apprehends a group of newly arrived immigrants about to start unauthorised logging activities

7.2 Positive reform of environmental governance

Positive change to reform and strengthen environmental governance in the DRC is under way and visibly enjoys high-level political support. The most significant progress has been in the development of a modern legislative framework, including the recently approved framework law on the environment, sectoral laws on mining and forestry, and a series of environmental laws (water resources, nature conservation and biosafety) that are currently under review in parliament. The economically pivotal mining and forestry laws focus on industrial-scale production which, while necessary for creating a favourable business environment and attracting critical foreign investment, do not effectively address small-scale and subsistence level activities by the majority of the population. It is therefore essential that the ground rules and best practices for

artisanal resource exploitation be developed during upcoming reviews of mining, forestry and related environmental laws. The next important step is to disseminate enacted legislation and develop subsidiary implementing regulations, guidelines and standards. Good progress has also been made in creating mechanisms to coordinate government and donor activities, particularly in the forestry, wildlife conservation and water sectors.

Despite ongoing institutional reforms, administrative structures remain weak, with extensive deficiencies in human, technical and financial capacity, and major gaps in coordination at multiple levels. There are, however, notable success stories of extending state authority, such as the Congolese Wildlife Authority's (ICCN) ability to secure the Virunga National Park since 2007 by stepping-up anti-poaching patrols, curtailing forest destruction for charcoal production and relocating IDPs, all of which has translated into increased tourism revenue.

7.3 Enhancement of regional environmental and natural resources cooperation

Regional environmental cooperation provides major opportunities for the DRC's economic development and reinforces peace-building efforts with neighbouring countries. With its immense size and extensive natural resource base, the DRC has traditionally emphasised economic self-sufficiency. However, with its strategic location at the junction of Central, Eastern and Southern Africa and given the growing importance of regional integration and globalization processes as driving forces for economic growth and development, it is no longer beneficial for the DRC to look only inwards. Realities prompting this strategic shift include the collapse of transport infrastructure, increasing integration of border areas with regional transport networks, significant cross-border commercial trade, particularly in the eastern provinces and Katanga, and an unfolding decentralisation process in which economic development is becoming increasingly a provincial and regional issue.

Regularizing large-scale trade in key commodities – particularly minerals, timber, charcoal, bushmeat and cash crops – should also help facilitate adoption of sustainable natural resource management practices. It is therefore critical that the DRC

actively engage in sustainable trade initiatives that are being developed through regional fora including the ICGLR, the Southern African Development Community and the Commission of Ministers in charge of Forests in Central Africa (COMIFAC). International certification initiatives such as the FSC for forestry, the Kimberley process for diamonds and the EITI for extractives, also provide market-based tools to secure sustainable management of these high-value natural resources.

Cooperation in the management of transboundary protected areas and shared ecosystems as well as investments in regional energy and transport integration can promote economies of scale and create cost-effective and environmentally-efficient solutions. A range of examples from the Greater Virunga Transboundary Collaboration, the Rusizi transboundary hydropower scheme and the Southern Africa Power Pool provide insightful models for environmental collaboration. Capitalising on the experiences of neighbouring countries in the sustainable management of natural resources through regional knowledge networks would also help to save time and resources. Collectively, regional environmental initiatives and projects can provide a platform to actively advance interstate dialogue, confidence building and peace consolidation.



The Inga dam development schemes have the potential to generate substantial revenue from electricity sales to neighbouring countries and regional power pools

7.4 Decentralisation of environmental management

In the DRC's administratively fragile post-conflict situation, the ongoing process of decentralisation represents both a major challenge and an opportunity for natural resources management. The new 2006 constitution and decentralisation laws of 2008 have profoundly transformed the architecture of the State with the number of provinces due to increase from 11 to 26 (including Kinshasa). Simultaneously, approximately one-thousand 'decentralised administrative entities' are to gain legal status and will be entitled to raise taxes, borrow money and to become company shareholders. Given the DRC's vast size, a robust decentralisation process offers a unique window of opportunity for the population to participate in the use and management of natural resources, launch development initiatives and build effective local institutions.

At the same time, the disintegration of State institutions means that decentralisation is not

so much one of governance reform as it is of institutional creation and reconstruction. While political decentralisation has been achieved in the 11 provinces, key fiscal and administrative aspects remain unclear and are yet to be resolved. The envisaged proliferation of decentralized institutions over the next several years will require substantial financial and human resources, including capacity to collect baseline information for planning purposes. It appears unrealistic – at least in the short-term - that new decentralized entities will be able to establish effective institutions and implement development activities given severe budgetary constraints and nascent governance capacity. As the central State withdraws and the 11 provinces are effectively 'dismembered', the risk of a "governance vacuum" is real and, as experienced in other countries, could create new centres of corruption and mismanagement. A transitional and sequenced approach is therefore required to prevent a governance void and gradually transfer the competencies of the central state to decentralized entities as part of a major capacity building process.



Building the environmental management capacity of newly decentralised administrative entities will be a priority

8. Recommendations

Ongoing post-conflict reconstruction provides a major window of opportunity for the DRC to engage in the key policy actions advanced through this assessment. These include capitalising on the DRC's emerging social economy and small-scale sector to generate employment, including 'green jobs'; maximising synergies through area-based development programming; and engaging in a 'green economy' transition to achieve sustainable development. Five broad recommendations are proposed below to facilitate the application of the suggested policy actions, and which could be further elaborated to help create the enabling conditions for a green economy transition. More detailed thematic recommendations are tabled in Annex I. The overall time frame for these recommendations is the medium to long-term (10-15 years), but as they comprise standalone actions they can be implemented in a staged manner over short-term cycles of 3-5 years. Prioritisation and sequencing of the recommendations should be made through a multi-stakeholder and participatory process within the framework of national, provincial and/or area-based environmental action plans.

1) Strengthen environmental governance and invest in capacity building

Strengthen State-led environmental governance through: (i) mainstreaming poverty-environment linkages into national development planning including economic valuation of ecosystem services in national accounting; (ii) development of policies, legislation, strategies, fiscal measures and investment plans that leverage relevant green economy principles as appropriate; (iii) major capacity-building, training and skills enhancement programmes including administrative and equipment support particularly at the provincial level and as an integral part of the ongoing decentralisation process; (iv) technical assistance to implement legislation and carry out environmental assessments of policies, programmes and projects; and (v) establish and institutionalise major environmental data collection programmes and information management systems in collaboration with academic and research institutions.

2) Mobilise the social economy to create jobs and enhance sustainable growth

The DRC's nascent and dynamic social economy represents an invaluable asset that can boost formal employment – particularly for youth, women and the most vulnerable groups of society. In the Congolese context, the social economy comprises diverse organisational forms that include but are not limited to: (i) associations and proto-cooperatives; (ii) SMEs; and (iii) local development and community-based natural resource management initiatives. Mobilising microfinance is critical to the success of social enterprises including through savings and credit cooperative organisations. In the DRC's challenging post-conflict reality, social economy organisations are viable vehicles for the integration of environmental objectives and occupational best practices across many economic sectors, including through the promotion of 'green jobs'. Supporting the institutionalisation of the social economy through targeted policies (technical qualification, credit, equipment and technology) should also substantially advance social equity and inclusive growth, which is critical to the DRC's pursuit of justice and peace.



Grassroot initiatives to create artisanal associations and proto-cooperatives can create much needed jobs as well as integrate relevant environmental objectives

3) Target smart green investments and build on success stories

Promotion of green investments in the DRC can be pursued through three main tracks. Firstly, quantifying the economic value of the DRC's vast ecosystem services - primarily from carbon sequestration, biodiversity benefits and watershed protection - is a prerequisite to informed economic decision-making. Financial and multiple-benefit valuation would provide the basis for engaging in a wide range of market-based carbon schemes, PES instruments and other reciprocal agreements that compensate land stewards for ecosystem conservation and restoration.

Presently, the most promising initiatives for the DRC are those being developed under the REDD+ scheme which has the potential to generate nearly USD 1 billion per annum; the CDM; and ecotourism. Yet, it is important to emphasize that there are a wide range of PES opportunities, including those that build on the creation of 'green jobs'.

Secondly, maximise opportunities to leapfrog the DRC's ongoing reindustrialisation and reconstruction by adopting new state-of-the art technologies that reduce energy and resource consumption while minimising waste generation and pollution and creating decent, well-paying jobs, including green work opportunities. Key sectors include mining, oil and gas development, electrification, renewable energies, transport and industrial agriculture.

Finally, the DRC's many sustainable 'success stories' that have delivered concrete results on the ground should be documented, replicated and expanded into national scale programmes. These include agroforestry schemes; community-based

water management projects; small-scale farmer organisations; urban and peri-urban agricultural associations; and community-based natural resource management initiatives.

4) Strengthen regional governance and cooperation

Fostering regional environmental cooperation to support economic development, help break natural resource and conflict linkages and promote peace-building efforts is essential for addressing many of the DRC's challenges. This includes active engagement by the DRC in: (i) various initiatives, particularly that of the ICGLR, to regularize trade in 'conflict resources' through the application of cross-border traceability and certification monitoring systems; (ii) development of transboundary protected area management plans including promotion of regional ecotourism circuits; and (iii) mobilising regional economies of scale and environmentally-sound investments in infrastructure schemes, particularly in the energy and transport sectors.

5) Prioritise the environmental sustainability of humanitarian action

Given the protracted nature of the DRC's humanitarian emergency and to ensure maximum returns on investment, relief operations need to be better linked to long-term recovery and reconstruction planning. Priority areas include camp management and rehabilitation, sustainable energy, shelter, water, waste management and sanitation. It is also important to establish multi-stakeholder dialogue platforms in the war-torn eastern part of the country to address the existing communication gap between environment, development, humanitarian and peacekeeping operations.

9. Financing the recommendations

Addressing a critical funding gap

Due to regional disparities and access constraints, this assessment has not attempted to carry out a detailed calculation of the level of financing needed to implement its recommendations. However, the funds needed are substantial. An indicative sum - corresponding to UNEP's global modelling scenario for a green economy transition - amounts to at least USD 200 million per annum, the equivalent of two percent of national GDP. To kick-start the process of greening key sectors of the DRC's economy, priority interventions recommended in this report will require multi-million dollar investments over at least the next decade. The most promising strategies for mobilizing finance at the scale required include:

Harnessing global market-based instruments on ecosystem services

In view of the DRC's globally significant natural capital, one of the major financing opportunities is from innovative global-level PES mechanisms. Today, the most promising area from which the DRC can marshal large-scale funding is from carbon market schemes, including REDD, CDM

and the voluntary carbon market. The DRC is already actively engaged in climate financing initiatives as one of the nine pilot countries under REDD+ and also recently registered its first carbon sequestration project (Ibi Batéké) under CDM. With preliminary estimates indicating that the carbon market has the potential to generate USD 1 billion per annum for the DRC, it is important that efforts to secure this financing are reinforced. At the same time, the DRC needs to pursue other climate regulation financing, such as the Green Climate Fund established at the Climate Conference in Cancun (2010), as well as payment schemes for biodiversity conservation services, including by promoting ecotourism and mobilizing funding from the Global Environment Facility.

Green schemes

Worldwide there is a growing market for certified goods, fair-trade products, organic foods and other plant-based and natural commodities. Many consumers are willing to pay more for such value added and specialised goods. Given the DRC's unique and vast natural resources, such niche markets could provide significant income to local communities, and if sustainably managed can offer an important opportunity to create green jobs and support social enterprises.



Although there has been a rise in development assistance, donor funding to the DRC remains chronically low on a per capita basis compared to other sub-Saharan African countries

Doubling Official Development Assistance (ODA) to the DRC

As the DRC rebuilds its capacity to raise internal resources, a significant part of the financing will need to be mobilised from development partners in the short to medium term. Although there has been a rise in ODA since the mid-2000s which accounts for approximately 50 percent of the DRC's national budget, donor funding remains chronically low on a per capita basis; USD 36 per head compared with the sub-Saharan African average of USD 47. Moreover, the country was ranked as the second-least developed nation in the world by the United Nations Development Programme in 2010. Recent commitments to double aid to Africa, as called for by the United Kingdom's Commission for Africa in 2005 and amplified by many others, are particularly relevant here. Given the country's size, geopolitical significance and the global environmental importance of its natural resources, a doubling of ODA for the DRC should be a priority. Specifically, assistance to environmental and natural resources management should be substantially augmented from its current low levels. Importantly, such funding should be provided in the framework of a green economy transition with a focus on supporting social economy organisations, creating 'green jobs' and micro-investments.

At the same time, it is important to recognize that conventional aid – particularly as development needs continually increase due to rapid population growth – is unlikely to increase at a rate corresponding to the scale of the challenge. Therefore, traditional aid, including from development finance institutions (the World Bank, bilateral development agencies) will need to focus more tightly on kick-starting major investments and in parallel on filling the gaps that cannot be supported through domestic financing. Multilateral development banks will also have a critical role to play in raising access to private capital and Foreign Direct Investment including through public-private partnerships.

There is also a need to enhance donor and government coordination through the Thematic Group on Environment (GT 18), and accelerate the shift from project-based delivery of development assistance to a coherent programmatic and sector wide approach as advocated under the Paris Declaration. Increased harmonization is equally required between the GT 18 with its current focus on forestry and protected areas management and other related sector working groups particularly infrastructure, energy and drinking water supply, mining and agriculture and rural development. Government and donor coordination fora offer an important opportunity to raise the presently negligible investment in the environmental aspects of these aforementioned key economic sectors. It is also important to emphasise that international aid is not only an issue of funding and should include technical assistance and capacity building given the low absorptive capacity of national institutions.

Increasing public financing and reform of taxation policies to open the space for local level financing through collective action

With the release of national funds through international debt relief under the HIPC in 2010 and increased revenue from rebounding commodity prices, the DRC's government should endeavour to gradually increase its public financing allocations for environmental and natural resources management. For sustainability purposes and to gradually break from its current aid dependence, the government should cover the operational costs of donor projects to the extent possible. At the same time, policy reforms are also needed to overcome onerous red tape and distortionary taxation to help open the space for bottom-up initiatives - particularly through social economy organisations, small and medium-sized enterprises and community-based natural resource management initiatives. Critically, access to microfinance credit is needed to jump-start self-help initiatives.

10. Way forward

With this post-conflict environmental assessment, UNEP has sought to set the stage for long-term international assistance to support the DRC in the equitable and sustainable use of its exceptional natural endowments. Given the scale and complexity of the challenges, and the level of financing required to implement the recommendations, the mobilisation of political support and funding will need to be underpinned by an organised process of advocacy and awareness raising. UNEP proposes to actively support its main government partner, the MECNT, in leading this effort.

To facilitate the fundraising process, UNEP will draw on the range of information products developed through this assessment to engage the international community. Government counterparts are for their part encouraged to secure funds from national budgets, as well as other extra-budgetary funding channels. It is foreseen that the awareness and fundraising effort will take at least one year following the report launch. Meanwhile, UNEP will endeavour to consolidate its ongoing projects in the DRC into a coherent national programme as well as start select quick impact projects. In addition, UNEP intends to catalyse follow-up action by key stakeholders and assume an advisory role to other agencies as part of the DRC UN Country Team.

A key step will be to build on the findings and prioritise the recommendations of this assessment through the development of a National Environmental Action Plan, as well as decentralised provincial and area-based environmental programming. UNEP is ready to assist the Government of the DRC in taking this multi-stakeholder and participatory process forward, including through the sequenced alignment of actions, definition of time frames and roles and responsibilities, and development of cost estimates. To bring the multi-sectoral recommendations to fruition, the full involvement of several line ministries and agencies, UN organisations, development partners, multilateral development banks, civil society organisations and NGOs is therefore indispensable. Where UNEP has a clear value-added advantage in executing the recommendations, it intends to pursue joint programming with other UN agencies and partners as its implementation model.

The imperative for the DRC to overcome entrenched poverty and recover 20 years of lost development is immense. Long-term support and commitment from the international community to assist the DRC realise its massive potential as one of Africa's richest countries and key engines for economic growth is essential. Indeed, assistance to the country needs to be doubled in line with international pledges. The price of conflict relapse and chaos to the people of the DRC and the international community will be much higher. In parallel, strengthening governance and national absorption capacity will be equally critical. As part of the overall response provided by the United Nations, UNEP looks forward to a continued partnership with the Government and people of the DRC, as well as its international partners, to help resolve the country's multi-faceted environmental challenges, and to build on its human and environmental capital to bring about sustainable economic recovery, lasting stability and peace.



The Congo River - the 'national highway' - has immense potential for leading the nation on a sustainable development path

Annex: Table of sectoral and thematic recommendations

Conflict, Displacement, Natural Disasters and the Environment	
Conflict and displacement	
R3.1.1	Provide technical support to MONUSCO to strengthen its ability to regulate the trade in high value natural resources and to mainstream environment in peace-keeping operations.
R3.1.2	Improve planning and governance of IDP camps, both official and unofficial, and invest in rehabilitating abandoned camps.
R3.1.3	Clean up landmines in order to facilitate access to land and enable appropriate natural resource management.
R3.1.4	Undertake studies on natural resources and conflict linkages and how to break them.
R3.1.5	Reinforce initiatives by the ICGLR and with MONUSCO to improve the traceability of supply chains for minerals and timber.
Natural Hazards and Disaster Risk Reduction	
R3.2.1	Strengthen institutional and technical capacities for country-wide monitoring and mapping of all major hazards, as a first critical step in developing more accurate and comprehensive risk and vulnerability profiles.
R3.2.2	Strengthen institutional capacities for disaster preparedness, including early warning systems, contingency planning and emergency response.
R3.2.3	Review national development strategies and sectoral plans and ensure that disaster risk reduction is mainstreamed in development planning.
R3.2.4	Improve national awareness of disaster risk and disaster risk reduction through training and capacity development.
R3.2.5	Invest in ecological restoration as a strategy for disaster risk reduction.
Environment and Natural Resources	
Forestry Resources	
R4.1.1	Strengthen the regulatory and policy framework for forests and incorporate within it sustainable forest management, agroforestry and climate mitigation.
R4.1.2	Improve technical capacity of forest services.
R4.1.3	Expand sustainable industrial and agroforestry plantations for fuelwood production.
R4.1.4	Support the DRC to implement enabling conditions, such as FLEGT, for sustainable and certified timber operations.
R4.1.5	Promote the sustainable harvesting of NTFPs as a source of revenue for the DRC's population.
Land	
R4.2.1	Improve land tenure legislation to take into account both modern and customary tenure.
R4.2.2	Reinstate an inter-ministerial land use planning committee with a clear mandate and deliverables.
R4.2.3	Engage communities and traditional authorities in participatory land use planning.
R4.2.4	Support responsible agro-investments.
Agriculture	
R4.3.1	Strengthen the DRC's agricultural policy to integrate sustainability.
R4.3.2	Support the grouping of smallholders into farmer organisations.
R4.3.3	Promote conservation agriculture.
R4.3.4	Develop extension services for rural farmers.

Wildlife and Protected Areas	
R4.4.1	Strengthen management capacity for the DRC's protected areas.
R4.4.2	Assess and register the different species sold as bushmeat in local markets and identify trade routes (also for ivory) so as to improve CITES enforcement.
R4.4.3	Promote sustainable ecotourism with community engagement.
R4.4.4	Support community-based natural resource management, community management of protected areas and joint management.
R4.4.5	Undertake research to identify major buffer zones and corridors that need to remain protected and managed for biodiversity purposes.
Water Resources	
R4.5.1	Develop a national water policy, sectoral water strategies and statutory regulations.
R4.5.2	Develop a comprehensive national water information system for the DRC.
R4.5.3	Invest in autonomous community-based management of micro-scale water infrastructure.
R4.5.4	Implement a capacity-building programme for decentralised water institutions.
R4.5.5	Develop and implement watershed-based source protection plans.
R4.5.6	Improve rural water access.
Fisheries	
R4.6.1	Carry out baseline studies and monitoring of fisheries resources to provide technical guidance on sustainable practices.
R4.6.2	Promote the organisation of fishermen under co-management structures.
R4.6.3	Promote investments and technical assistance in post-capture fishery products.
R4.6.4	Promote trans-boundary collaboration for sustainable fisheries management in the internationally shared Great Rift Valley Lakes.
R4.6.5	Develop sustainable aquaculture.
Climate Change	
R4.7.1	Strengthen, value and recognise internationally the role of the DRC's forests in reducing carbon emissions and in absorbing carbon.
R4.7.2	Build capacity to enhance climate change expertise and develop climate scenarios specifically for the DRC at the national and sub-national scales.
R4.7.3	Develop programmes to assess the vulnerability of communities to climate change and implement adaptation and mitigation measures.
R4.7.4	Include climate proofing in development planning.
Urban Environment	
R5.1.1	Improve urban governance.
R5.1.2	Increase supply and rate of urban electrification as an alternative to intense wood and charcoal fuel.
R5.1.3	Promote efficient use of, and alternatives to, fuelwood and charcoal as a cooking energy source in urban centres.
R5.1.4	Prioritize gully and soil erosion protection measures in urban planning.
R5.1.5	Expand urban and peri-urban horticulture (UPH) initiatives to improve food security and livelihoods in urban areas.
R5.1.6	Invest in urban water sanitation infrastructure to reduce pollution and improve public health.
R5.1.7	Carry out a feasibility study of efficient waste management in cities.

Mineral Resources	
R6.1.1	Improve environmental governance of mineral resources development.
R6.1.2	Clarify jurisdictional roles and responsibilities in the mining sector as it pertains to environmental management and monitoring.
R6.1.3	Carry out a strategic (sectoral) environmental assessment of mineral resources development in the key mining provinces.
R6.1.4	Undertake immediate remediation of pollution hotspots identified by UNEP during its field work in Katanga given their human health risks.
R6.1.5	Undertake detailed environmental audits in the six mining provinces.
R6.1.6	Promote environmental best practices in mining and the use of cleaner, more efficient, low carbon technologies.
R6.1.7	Formalize the artisanal mining sector in order to introduce better environmental and occupational health standards.
Industry, Transport and Energy	
Industry	
R7.1.1	Update and maintain an inventory of industries across the country to define the basis for a sector-wide strategic approach to sustainable development.
R7.1.2	Review and where necessary set a series of environmental and pollution norms and regulations for acceptable levels of industrial effluent and emissions to the environment.
Transport	
R7.2.1	Strengthen government capacity to implement systematically and rigorously environmental impact assessments for roads – and other transport-related infrastructure - and to ensure that the resulting recommendations can be fully implemented.
R7.2.2	Undertake a strategic environmental assessment for the transport system that would examine multi-modal transport options.
Energy	
R7.2.3	Carry out a strategic environmental assessment of the energy sector to define a sustainable energy mix.
R7.2.4	Provide training and support to the State energy bodies, and other key actors, to ensure that they are sensitised to principles from the green economy as they apply to the energy sector
R7.2.5	Facilitate the implementation of the “improved cooking stoves programme” at household level to improve energy efficiency
R7.2.6	Design and implement renewable energy pilot projects for conventional water utilities and autonomous, community-based water supply systems.
Environmental Governance and International Cooperation	
R8.1.1	Strengthen the environmental policy framework.
R8.1.2	Build capacity of provincial MECNT entities and strengthen the decentralisation of environmental management in the country.
R8.1.3	Develop a dedicated environmental data management centre
R8.1.4	Facilitate civil society and public participation in environmental decision-making
R8.1.5	Improve environmental education and awareness-raising.
R8.1.6	Strengthen capacities for transboundary environmental cooperation at all levels

Further information

Further technical information may be obtained from the UNEP Disasters and Conflicts Programme website at: <http://www.unep.org/disastersandconflicts/> or by email: postconflict@unep.org

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The Democratic Republic of the Congo (DRC) possesses diverse and outstanding natural resources which are important for the Congolese populations' livelihoods as well as being of strategic regional and global significance. Decades of state decay and successive conflicts have exposed the country's exceptional natural wealth to the chaos of informal and uncontrolled exploitation, with serious and long-lasting consequences. In the prevailing anarchy, illegal natural resource extraction patterns have developed which now fuel many of the DRC's conflicts and human tragedies.

The good news is that the DRC's natural capital is in an overall satisfactory condition, and most of the environmental degradation is still reversible. Significant threats to biodiversity, increasing deforestation and localised mining pollution in southern Katanga, however, do signal alarming trends that are of serious concern.

As the DRC's economic recovery continues with the gradual return of peace, the development needs of its growing population of nearly 70 million, coupled with new technologies, are rapidly transforming unregulated artisanal exploitation into semi-industrial 'resource mining'. Furthermore, the DRC's vast mineral reserves are again the object of intense foreign competition, placing great pressures on the country's forests, biodiversity and water resources. An underlying challenge is that these developments are occurring in a context of pervasive weak governance.

International assistance, including a doubling of aid, is urgently needed to support the equitable and sustainable use of the DRC's natural resources. The country's active engagement in market-based instruments for ecosystem services, particularly the carbon market and ecotourism, are promising sources of large-scale financing.

To combat poverty and promote inclusive growth, this assessment by the United Nations Environment Programme asserts that building on the momentum of an emerging Congolese social economy as an engine for employment-led green development is central to successful post-conflict recovery and the pursuit of sustainable peace.

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