The Forests of the Congo Basin

State Of The Forests 2021

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This publication is dedicated

to the memory of our two colleagues,

Dr. François HIOL HIOL

and

Dr. Alain Marius NGOYA-KESSY

who contributed to the writing of this report but passed away before its publication

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Acronyms

ABS	Access and Benefit Sharing
ACHPR	African Commission on Human and Peoples' Rights
ADP	Amsterdam Declarations Partnership
AfCFTA	African Continental Free Trade Area
AFD	Agence Française de Développement
AfDB	African Development Bank
AFI	Accountability Framework Initiative
AFOLU	Agriculture, Forestry and Other Land Use
AFP	Agence France Presse
AFR100	African Forest Landscape Restoration Initiative
AFTF	Adaptation Fund and other Trust Funds
AGANOR	Agence Gabonaise de Normalisation
AGB	Above Ground Biomass
AGCD	Administration Générale de la Coopération au Développement (Belgian Administration for Development Cooperation)
AGEOS	Gabonese Studies and Space Observations Agency
AIDS	Acquired immunodeficiency syndrome
ALOS 2	Advanced Land Observing Satellite
AMS	Agroproduce Management Services
ANAFOR	Agence Nationale d'Appui au Développement Forestier (National Forestry Development Agency, Cameroon)
ANOR	Agence des Normes et de la Qualité (Standards and Quality Agency)
ANPN	Agence Nationale des Parcs Nationaux du Gabon (National Agency for National Parks of Gabon)
APN	African Parks Network
APNC	Avant-projets de Normes Camerounaises (Preliminary drafts of Cameroonian Standards)
APOI	African Palm Oil Initiative
AR6	Sixth IPCC assessment cycle reports
ARLI	African Resilient Landscapes Initiative
ARSO	African Organisation for Standardisation
ASD	Association pour la Santé et le Développement (Association for Health and Development)
ASSECCAF	Association des Exportateurs du Cacao & Café de la RD Congo (Association of Cocoa & Coffee Exporters of the DRC)
ATIBT	Association Technique Internationale des Bois Tropicaux (International Tropical Timber Technical Association)
BAU	Business As Usual
BCS	Broad Community Support
BDBV	Ebola Bundibugyo
BEAU	Bureau d'Etudes d'Aménagement et d'Urbanisme (Planning and Urban Consulting Office)
BFAST	Breaks for Additive Season and Trend

BGF	Biodiversité et Gestion Durable des Forêts (Biodiversity and Sustainable Forest Management)
BIOPAMA	Biodiversity and Protected Areas Management
BMEL	Federal Ministry of Food and Agriculture (Germany)
BMR	Black Mountain Riders
BMU	Federal Ministry of the Environment, Nature Conservation and Nuclear Safety (Germany)
BMZ	Federal Ministry for Economic Cooperation and Development (Germany)
BOMBV	Ebola Bombali
BOOMING GREEN	Name of Forestry Entreprise
BSM	Benefit-sharing mechanism
BSP	Benefit Sharing Plan
BUR	Biennial Update Report
CA	Central Africa
CAFI	Central African Forest Initiative
CAGR	Compound Annual Growth Rate
CAISTAB	Stabilization and Equalization Fund
CAR	Central African Republic
CARPE	Central Africa Regional Program for the Environment
CBD	Convention on Biological Diversity
CBFF	Congo Basin Forest Fund
CBFP	Congo Basin Forest Partnership
CBG	Name of forestry company
CBSL IP	Congo Basin Sustainable Landscapes Impact Program
CBSP	Partnership for Biodiversity Conservation
CCC	Citizens' Convention on Climate
CCI	Community Contribution to Integration
CCICED	China Council for International Cooperation on Environment and Development
CCPA	Companhia da Celulose e Papel de Angola (Angola Pulp and Paper Company)
CCUP	Companhia de Celulose do Ultramar Portugues (Portuguese Overseas Cellulose Company)
CDC	Cameroons Development Corporation
CDC	Centers for Disease Control and Prevention
CDF	Congolaise de Développement Forestier
CDM	Clean Development Mechanism
CDP	Carbon Disclosure Project
CEA	Economic Commission for Africa
CEB	Compagnie Equatoriale des Bois
CEBAT	Corridor Ecologique des Batéké (Batéké Plateau Ecological Corridor)
CED	Center for Environment and Development
CEMAC	Communauté Économique et Monétaire de l'Afrique Centrale (Central African Economic and Monetary Community)
CER	Certified emissions reduction
CF	Community forests
CFA	Collaboration for Forests and Agriculture
CFR	Central Forest Reserves

CGF	Consumer Goods Forum
CHIRPS	Climate Hazards Group InfraRed Precipitation with Station data
CHP	Combined Heat and Power
CIB	Congolaise Industrielle des Bois
CICOS	Commission internationale du Bassin Congo-Oubangui-Sangha (International Commission of the Congo-Oubangui-Sangha Basin)
CIF	Climate Investment Fund
CIFOR	Center for International Forestry Research
CIRAD	French Agricultural Research Centre for International Development
CIRMF	Centre International de Recherches Médicales de Franceville
CLD	Comités locaux de développement (local development committees)
CNC	COMIFAC National Coordination
CNES	Centre national d'études spatiales (French Government Space Agency)
CNIAF	Centre National D'Inventaire et d'Aménagement des Ressources Forestières et Fauniques (National Centre for Forest and Fauna Inventory)
CoC	Chain of custody
CODELT	Conseil pour la Défense Environnementale par la Légalité et la Traçabilité (Council for the Defense of the Environment through Legality and Traceability)
CODHOD	Comité des droits de l'Homme et Développement (Human Rights and Development Committee)
COFOR	Congolese subsidiary of the French Group FRM
COMIFAC	Central African Forests Commission
COMTRADE	United Nations Commodity Trade Statistics Database
CONAREF	Commission nationale des réformes foncières (National Land Reform Commission)
COP	Conference of the Parties
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
COVID 19/ SARS-CoV	Corona Virus Disease 19
CP	Convergence Plan
CSO	Civil Society Organization
CSR	Corporate Social Responsibility
CTCN	Climate Technology Centre and Network
CTD	Decentralized Territorial Community
DACEFI 2	Développement d'Alternatives Communautaires à l'Exploitation Forestière Illégale.
DCRBL	Domaine de la Chasse et Réserve de la Boumba Lumene (Bombo Lumene Game Reserve)
DECAT	Ministry of Decentralization and Spatial Planning (DRC)
DFI	Development Financial Institutions
DFID	Department for International Development (UK)
DIAF	Direction des Inventaires et Aménagement Forestiers (Directorate of Forest Inventories and Management)
DNE	Designated National Entity
DRC	Democratic Republic of the Congo
EBO-SURSY	Viral haemorrhagic fever capacity building and surveillance
EBOV	Ebola Virus
ECCAS	Economic Community of Central African States

ECO	Eucalyptus du Congo
ECOFAC	Ecosystèmes d'Afrique Centrale (Central African Forest Ecosystem Programme)
EEDD	Education à l'Environnement et au Développement Durable (Environmental NGO)
EFC	Eucalyptus Fibre Congo
EG	Equatorial Guinea
EID	Emerging infectious disease
EODA	Environmental official development assistance
ERAIFT	Regional Post-Graduate Training School on Integrated Management of Tropical Forests and Lands
ER-P	Emission Reduction Program
ERPA	Emission Reductions Payment Agreement
ERPD	Emission Reduction Program Document
ER-PIN	Emission Reductions Program Idea Note
ESA	European Space Agency
ESCO	Name of coffee grower
ESG	Environmental, social and governance
ESIA	Environmental and Social Impact Assessment
ESMS	Environmental and Social Management System
ETF	Enhanced Transparency Framework
ETM	Enhanced Thematic Mapper
EUTR	European Union Timber Regulation
EVD	Ebola virus disease
FAO	Food and Agriculture Organization of the United Nations
FCDM	Forest Canopy Disturbance Monitoring
FCPF	Forest Carbon Partnership Facility
FENSED	Femme Environnement, Santé et Education (National NGO)
FEODA	Forestry and Environmental Official Development Assistance
FFEM	Fonds Français pour l'Environnement Mondial (French Global Environment Facility)
FIP	Forest Investment Program
FLEGT	Forest Law Enforcement, Governance and Trade
FLR	Forest Landscape Restoration
FMS	Forest monitoring system
FMU	Forest Management Unit
FODER	Forêts et Développement Rural (National NGO)
FOLU	Forestry and Other Land Use
FONAREDD	REDD+ National Fund in RDC
FOREQUAL	Project on Forest Inequality
FPIC	Free, prior and informed consent
FRA	Forest Ressources Assessment
FREL	Forest Reference Emission Level
FRL	Forest Reference Level
FRMi	Forest Ressources Management International
FSC	Forest Stewardship Council
GCCA+	Global Climate Change Alliance Plus
GCF	Green Climate Fund

GCLP	Green Commodities Landscape programme
GDP	Gross Domestic product
GEDI	Global Ecosystem Dynamics Investigation
GEF	Global Environment Facility
GFC	Global Forest Coalition
GFG	Global Forest Goals
GFW	Global Forest Watch
GHG	Greenhouse gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Agency for International Cooperation)
GML	Governing Multifunctional Landscapes in Sub-Saharan Africa
GNU	Germany, Norway and United Kingdom Initiative
GoC	Government of Cameroon
GOC	Government of the Republic of the Congo
GoR	Government of Rwanda
GoRDC	Government of the Democratic Republic of the Congo
GPFLR	Global Partnership on Forest and Landscape Restoration
GPI	Global Peatlands Initiative
GPSNR	Global Platform for Sustainable Natural Rubber
GRSB	Global Roundtable for Sustainable Beef
GS	Gold Standard
GSCCP	Green Supply Chain Cooperation Platform
GSEZ	Gabon Special Economic Zone
GTZ	German Technical Cooperation Agency
HCR	High Commissioner for Refugees
HCS	High Carbon Stock
HCSA	High Carbon Stock Approach
HCV	High Conservation Value
HDI	Human Development Index
HF	Haemorrhagic fever
HFHD	High Forest High Deforestation
HFLD	High Forest Low Deforestation
HIV	Human immunodeficiency virus
HLPF	High-Level Political Forum for Sustainable Development
HTLV	Human T-lymphotropic virus
HTP	Humid Tropical Primary Forest
HTS	Humid Tropical Secondary Forest
ICC	International Coffee Council
ICCN	Institut Congolais pour la Conservation de la Nature (Congolese Institute for Nature Conservation)
ICENECDEV	International Center for Environmental Education & Community
ICO	International Coffee Organization
ICRAF	World Agroforestry Research Centre
ICS	Improved cookstoves
IDDRI	Institut du Développement et des Relations Internationales (Independent policy research institute and a multi-stakeholder dialogue platform)
IDH	Dutch Initiative for Sustainable Trade

IDRC	International Development Research Centre
IEC	Information, education and communication
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IFCO	Industrie Forestière du Congo
IFO	Industrie Forestière de Ouesso
IGE	Institut des Géosciences de l'Environnement (French Institute of Environmental Geosciences)
IIP	Integrated Industrial Platforms
IKI	International Climate Initiative
ILO	International Labour Organization
INDC	Intended Nationally Determined Contribution
INEAC	Institut National pour l'Etude Agronomique du Congo Belge (National Institute for Agronomic Study of the Belgian Congo)
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IPLCs	Indigenous Peoples and Local Communities
IRD	Institut de recherche pour le développement (French public research institution)
ISABU	Institut des Sciences Agronomiques du Burundi (Institute of Agricultural Sciences of Burundi)
ISAR	Institut des Sciences Agronomiques du Rwanda (Institute of Agricultural Sciences of Rwanda)
ISCC	International Sustainability and Carbon Certification
ISFL	Initiative for Sustainable Forest Landscapes
ISO	International Organization for Standardization
ISPO	Indonesian Sustainable Palm Oil
ITPC	International Tropical Peatlands Center
ITTO	International Tropical Timber Organization
IUCN	International Union for Conservation of Nature
IWC	International Woodland Company
IWGIA	International Work Group for Indigenous Affairs
JAXA	Japan Aerospace Exploration Agency
JICA	Japan International Cooperation Agency
JRC	Joint Research Center (European Union)
KFW	Kreditanstalt für Wiederaufbau (German Development Bank)
KRC	Karisoke Research Center
LAS	Legality Assurance System
LCCS	Land Cover Classification System
LDC	Least Developed Countries
LDN TSP	Land Degradation Neutrality Target Setting Programme
LDN	Land Degradation Neutrality
LDNF	Land Degradation Neutrality Fund
LFHD	Low Forest High Deforestation
LFLD	Low Forest Low Deforestation
LiDAR	Light Detection and Ranging
LKTS	Lesser Known Timber Species

LLOV	Lloviu virus
LOI	Letter of Intent
LPG	Liquefied Petroleum Gas
LSFLRA	Large Scale Forest Landscape Restoration in Africa
LTS	Long-term strategies
LULUCF	Land Use, Land Use Change and Forestry
LUP	Land Use Planning
M&A	Merger and Acquisition
MANIEMA UNION	Name of Forest Concession
MARV	Marburg virus
MDF	Medium Density Fiberboard
MDG	Millenium Development Goal
MECNT	Ministry of Environment, Nature Conservation and Tourism (DRC)
MEDDEFCP	Ministry of the Environment, Sustainable Development, Water, Forests, Hunting and Fisheries (CAR)
MEEATU	Ministry of Water, Environment, SP and Urban Planning (Burundi)
MERS	Middle East respiratory syndrome
MINADER	Ministry of Agriculture and Rural Development (Cameroon)
MINATE	Ministry of Spatial Planning, Environment and Tourism (Burundi)
MINDCAF	Ministry of State Property, Surveys and Land Tenure (Cameroon)
MINDDEVEL	Ministry of Decentralization and Local Development (Cameroon)
MINEE	Ministry of Water and Energy (Cameroon)
MINEPAT	Ministry of the Economy, Planning and Regional Development (Cameroon)
MINEPDED	Ministry of the Environment, Protection of Nature and Sustainable Development (Cameroon)
MINEPIA	Ministry of Livestock, Fisheries and Animal Industries (Cameroon)
MINFI	Ministry of Finance (Cameroon)
MINFOF	Ministry of Forests and Fauna (Cameroon)
MINMIDT	Ministry of Mines, Industry and Technological Development (Cameroon)
MOU	Memorandum of Understanding
MPV	Monkeypox virus
MRV	Measurement, Reporting and Verification
MSME	Micro, Small and Medium Enterprise
MSPO	Malaysian Sustainable Palm Oil
NAMA	Nationally Appropriate Mitigation Actions
NAP	National Adaptation Plan
NAPA	National Action Plan for Adaptation
NASA	National Aeronautics and Space Administration
NBESA	National Biodiversity and Ecosystem Services Assessment
NBSAP	National Biodiversity Strategy and Action Plan
NDC	Nationally Determined Contribution
NEPAD	Nouveau Partenariat pour le Développement de l’Afrique (New Partnership for Africa’s Development)
NEPCON	Certification organization (now named “Preferred by Nature”)
NER	Net Emission Reduction
NFA	National Forest Authority
NFMS	National Forest Monitoring System
NGO	Non-governmental organization

NHP	Non-human primate
NICFI	Norway's International Climate and Forest Initiative
NIF	National investment framework
NP	National Park
NPFDP	National Plantation Forests Development Programme
NTFP	Non-Timber Forest Product
NTSIO	Name of an agroforestry project in DRC
NWP	Non Wood Product
NYDF	New York Declaration on Forests
OBAPAC	Observatoire des aires protégées en Afrique Centrale (Observatory for Protected Areas in the Congo Basin)
OCDD	Observatoire Congolais de Développement Durable (Congolese Observatory for Sustainable Development)
OCDH	Observatoire Congolais des Droits de l'Homme (Congolese Observatory for human rights)
ODA	Official Development Assistance
OFAC	Observatoire des Forêts d'Afrique Centrale (The Central Africa Forest Observatory)
OHHLEP	One Health High-Level Panel
OLB	Origine et Légalité des bois (Legal Timber Certification)
ONACC	National Climate Change Observatory
ONC	Office National du Café (National Coffee Office)
ORGE	Office Rwandais de Gestion de l'Environnement (Rwandan Environmental Management Office)
ORTPN	Office Rwandais du Tourisme et des Parcs Nationaux (Rwandan Office of Tourism and National Parks)
P3FAC	Public-Private Partnership for the sustainable management of Central African forests
PA	Protected Areas
PACC	Paris Agreement on Climate Change
PACEBCo	Programme d'appui à la conservation des écosystèmes du bassin du Congo (Congo Basin Ecosystems Conservation Support Programme)
PADI-DJA	Integrated Development and Planning Programme of the Dja Mining Loop and the Adjacent Border Area
PAFC	Pan-African Forest Certification
PALSAR-2	The Phased Array-type L-band SAR-2
PAN/LCD	Programme d'action nationale de lutte contre la désertification (National Action Program to Combat Desertification)
PANARDC	Programme d'Action National d'Adaptation au changement climatique (National Adaptation Programme of Action for Climate Change, DRC)
PCFN	Projet de Conservation de la Forêt de Nyungwe (Nyungwe Forest Conservation Project)
PCIAB	Puits de Carbone Agroforestier Ibi Batéké (Ibi Batéké agroforestry carbon sink)
PDRSO	Projet de Développement Régional du Sud-Ouest (South-West Regional Development Project)
PEA	Permis d'exploitation et d'aménagement (Exploitation and Planning Permit)

PEFC	Programme for the Endorsement of Forest Certification
PES	Payment mechanism for environmental services
PFM	Plantations Forestières de la Mvoum
PIREDD	Programme intégré REDD (REDD Integrated Programme)
PLADDT	Plan Local d'Aménagement et de Développement Durable du Territoire (Local Land-Use Management and Sustainable Development Plan, Cameroon)
PMU	Programme Management Unit
PNA	Parc National de l'Akagera (Akagera National Park)
PNAT	Plan National d'Affectation des Terres (National Land Use Plan in the Republic of Congo)
PNEFEB	Programme national sur l'environnement, les forêts, les eaux et la biodiversité (National programme on the environment, forests, water and biodiversity)
PNG	Papua New Guinea
PPECF	Programme for the Promotion of Certified Forests
PPP	Public-private partnership
PREDICT	Reducing Pandemic Risk, promoting Global Health
PRMK	Pépinière de Reboisement de Madingo-Kayes
PRONAR	Programme National d'Afforestation (National Afforestation and Reforestation Programme in the Republic of the Congo)
PRORENA	Protection et Réhabilitation des Ressources naturelles de l'Akagera (Project for the Protection of the Natural Resources of Akagera National Park, Rwanda)
PROREP	Projet de renforcement du potentiel en bois énergie durable en République du Congo (Project to enhance sustainable fuel potential in the Republic of Congo)
PRSP	Poverty Reduction Strategy Paper
RA	Rainforest Alliance
RAF	Right to Adequate Food
RAPAC	Réseau des Aires Protégées d'Afrique Centrale (Network of Protected Areas of Central Africa)
RCP	Representative Concentration Pathway
REAFOR	Relance de la Recherche Agricole et Forestière (programme for Reviving Agricultural and Forestry Research)
REDD+	Reducing emissions from deforestation and forest degradation, and enhancement of forest carbon stocks in developing countries
RELUFA	Réseau de Lutte Contre la Faim
REPALEF	Réseau des populations autochtones
RESTV	Ebola Reston
RFD	Réserve de Faune du Dja (Dja Wildlife Reserve)
RFUK	Rainforest Foundation UK
RIL	Reduced impact Logging
RIL-C	Reduced impact Logging for Climate
RIOFAC	Renforcement et Institutionnalisation de l'Observatoire des Forêts d'Afrique Centrale (Strengthening and institutionalizing the Central Africa Forest Observatory)

RNA	Ribonucleic acid
ROAM	Restoration Opportunities Assessment Methodology
RoC	Republic of the Congo
RPP	Readiness Preparation Proposal
RRI	Rights and Ressources Initiative
RSPO	Roundtable for Sustainable Palm Oil
RTA	Rwandan Tourism Agency
RTRS	Round Table on Responsible Soy
rVSV-ZEBOV	Recombinant vesicular stomatitis virus–Zaire Ebola virus
RWA	Rwandan Conservation Agency
RWE	Round Wood Equivalent
SA	South Africa
SAFACAM	Société Africaine Forestière et Agricole du Cameroun
SAILD	Service d’Appui aux Initiatives Locales de Développement (Local Development Initiatives Support Service)
SAR	Synthetic Aperture Radar
SARS-CoV	Severe Acute Respiratory Syndrome Coronavirus
SCCF	Special Climate Change Fund
SDC	Série de développement communautaire (Community Development area)
SDG	Sustainable Development Goal
SEZ	Special Economic Zones
SFV	Simian Foamy Virus
SIDS	Small Island Developing States
SIGIF	Cameroon’s VPA traceability system
SIS	Safeguards information system
SIV	Simian immunodeficiency virus
SME	Small and medium enterprise
SNADDT	Schéma National d’Aménagement et de Développement Durable du Territoire (National Programme for Sustainable Territorial Development, Cameroon)
SNAT	Schéma National d’Aménagement du Territoire (National Spatial Management Scheme in the Republic of Congo)
SNDI	Stratégie Nationale de lutte Contre la Déforestation Importée (French Strategy to combat imported deforestation)
SNPA/DB	Stratégie nationale et plan d’action en matière de diversité biologique (National Biodiversity Strategy and Action Plan)
SNR	Service National du Reboisement (National Reforestation Service)
SNR-i	Sustainable Natural Rubber Initiative
SOCAPALM	Société Camerounaise de Palmeraies (Cameroonian Palm Company)
SODEFOR	Société de Développement des Forêts (Forest Development Company)
SoF	State of Forests
SOS NDD	Name of Moroccan company
SP	Spatial Planning
SPF	Société de Plantation Forestière (Forest Plantation company)
SPGS	Sawlog Production Grant Scheme
SPOTT	Sustainability Policy Transparency Toolkit
STP	Sao Tome and Principe
STUDI	STUDI International (an African engineering firm)

SUDV	Sudan ebolavirus
SWAMP	Sustainable Wetlands Adaptation and Mitigation Program
SWM	Sustainable Wildlife Management
TA	Technical assistance
TAFV	Tai Forest ebolavirus
TCD	Tree cover density
TFA	Tropical Forest Alliance
TFCA	Tropical Forest Conservation Reauthorization Act
TLAS	Timber traceability and legality assurance systems
TLTV	Timber Legality & Traceability Verification
TLV	Timber Legality Verification
TMF	Tropical Moist Forest
TNA	Technology Needs Assessment
TNBS	Total Nature-based Solution
UAIC	Congo Industrial Afforestation Unit (Unité d'Afforestation Industrielle du Congo)
UCS	Union of Concerned Scientists
UE	European Union
UMD	University of Maryland
UN	United Nations
UNCCD	United Nations Convention to combat desertification
UN-DESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UNEA	United Nations Environment Assembly
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forests
UNGA	United Nations General Assembly
UNHCR	United Nations High Commissioner for Refugees
UNIDO	United Nations Industrial Development Organization
UNIKIS	University of Kisangani
UNREDD	United Nations agencies for REDD+
UNSPF	United Nations Strategic Plan for Forests
USAID	U.S. Agency for International Development
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
UTZ	Certification body for cocoa, coffee, tea and hazelnut
VCS	Verified Carbon Standard
VCU	Verified Carbon Unit
VLC	Verification of Legal Compliance
VLO	Verification of Legal Origin
VNR	Voluntary National Review
VPA	Voluntary partnership agreement
VSE	Very small enterprise
VSS	Voluntary Sustainability Standard

WB	World Bank
WCC	World Conservation Congress
WCS	Wildlife Conservation Society
WDPA	World Database of Protected Areas
WHO	World Health Organization
WMO	World Meteorological Organization
WRI	World Resources Institute
WWF	World Wildlife Fund
WWI	First World War
WWII	Second World War
XAF	Central African currency
ZEBOV	Zaire ebolavirus
ZND	Zero Net Deforestation
ZSL	Zoological Society of London

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Foreword

After a hiatus of several years, the time was ripe to produce a 7th edition of the State of the Forests report: SOF 2021. The first edition of 2005 was a preliminary assessment of the state of biodiversity, while SOF 2006 focused on developing a clear vision – essential for policy orientation and strategy development – of the state of the forest areas. SOF 2008 took stock of forest types in six countries: Gabon, Republic of the Congo, Democratic Republic of the Congo, Equatorial Guinea, Cameroon and Central African Republic. Two years later, the 2010 edition provided information on regional synthesis of monitoring indicators, forest landscape management and related challenges. SOF 2013 was more comprehensive in terms of the themes that were addressed (climate change, forest management, biodiversity conservation and land use). The most recent edition, SOF 2015, was published prior to the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) in Paris; it dealt with climate change, with a focus on forest and climate dynamics, adaptation, vulnerability and mitigation.

This 2021 edition is therefore a welcome addition in view of the emerging new themes which are stirring up increasing interest among stakeholders, against a backdrop influenced by the COVID-19 pandemic. SOF 2021 is made up of 4 parts and 13 chapters.

Part 1 is entitled “Central Africa’s Forests: resource status and management” and is made up of five chapters. Chapter 1 covers the distribution of forest types and Chapter 2 the evolution of the timber sectors in the Congo Basin. Chapter 3 examines plantations in Central Africa, and Chapter 4 analyses the balance between international financial flows and the implementation of the COMIFAC Convergence Plan. The final chapter of Part 1 (Chapter 5) addresses the implementation of REDD+ activities in Central African countries.

Three chapters make up Part 2 that is entitled, “Congo Basin Forests in International Discussions.” The first chapter (Chapter 6) of this part deals with mainstreaming the Sustainable Development Goals into forest management in Central Africa, the second (Chapter 7) deals with international commitments by Central African countries in response to climate change, and the third and last chapter (Chapter 8) of Part 2 focuses on fighting imported deforestation and making commitments to zero deforestation.

Part 3 analyses emerging themes for Central African forests, including Central Congo Basin peatlands (Chapter 9) and the emergence/re-emergence of infectious agents and risks (Chapter 10).

The fourth and final part deals with the issues and challenges facing Congo Basin forests and is made up of three chapters. The first chapter (Chapter 11) analyses spatial planning and impacts on the sustainable management of forest ecosystems in Central Africa. Chapter 12 focuses on the restoration of forest landscapes, and the final chapter (Chapter 13) examines the rights of local and indigenous peoples in the light of forest and conservation policies.

The SOF 2021 report was produced with financial support from the European Union, through the Strengthening and Institutionalization of the Central African Forest Observatory (RIOFAC) project, which is implemented by a consortium of scientific and technical organizations (CIFOR-ICRAF, CIRAD, FRMi and UCL). The German technical cooperation agency (GIZ), via the Congo Basin Forest Partnership (CBFP), provided additional financial support for translation of the report.

Some 152 authors, recruited from among experts on forestry issues in the Congo Basin, were involved in writing SOF 2021. These authors come from research institutions, technical and financial partners, international organizations, civil society organizations, development organizations, State bodies and independent researchers.

We wish to thank these authors for the great effort they put into the publication, under the supervision of the chapter coordinators. Thanks to them, reference documents that will be widely consulted in the coming years have been produced.

This report is intended for all stakeholders involved in the conservation and governance of tropical forests in general and those interested in the forests of Central Africa in particular. It will be valuable reference for policy makers, research institutions, civil society organizations, technical and financial partners, and all other stakeholders interested in forest management. It is a scientific publication, as the data and information contained in it are accurate and up to date.

The production of SOF 2021 has given rise to many interactions and meetings between all stakeholders, both in person and online. The death of Dr. Hiol Hiol François, a member of the editorial board, was a great loss to the team and created an immeasurable void. We pay heartfelt tribute to his memory and to the work he accomplished not only in SOF 2021, but also previous editions, in particular those of 2010 and 2013.

Richard Sufo Kankeu

Introduction

The report on the State of the Forests (SOF) of the Congo Basin is published by the Central African Forest Commission (COMIFAC) through its technical unit, the Central African Forest Observatory (OFAC). Over the years, it has become a reference document at regional and international levels, for all those who are interested in the management of Central African forest ecosystems, their role in the planet's equilibrium and the issues that guide their future.

This 2021 edition, the seventh in a series published since 2005, comes at a time when the forests of Central Africa and of the whole world are attracting attention for several reasons. The first is the Covid-19 pandemic, which saw its peak during the writing of this report and affected its production process. The pandemic, yet another zoonosis, is a reminder of humanity's fragility and of our common destiny. It has highlighted the fact that the relationship between humans and their natural environment must be given the utmost importance and be paid special attention to by decision-makers and resource managers.

Second, there is growing awareness of the need to adopt nature-based solutions in which the management of natural or plantation forests plays a prominent role. This renewed interest in nature-based solutions is gradually making the Congo Basin forests once again the focus of researchers' work, policy priorities and the commitments of technical and financial partners. An example could be seen at the 26th Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC), held in Glasgow, United Kingdom, in November 2021. This COP was an opportunity for international donors to make statements in favour of protecting not only the world's tropical forests in general, but also those of the Congo Basin in particular, and above all their local and indigenous populations.

For their part, COMIFAC member states, which hold rights over the Congo Basin forests, have taken a further step in their commitment to the sustainable management of those forests – good news considering that they are a common good for humanity because of the goods and services they provide through global climate regulation.

The renewed and very formal commitments of COMIFAC member countries are illustrated by the "Declaration of ECCAS/COMIFAC countries on Congo Basin forests and their vicinity," which was presented to the entire world at the Berlin symposium of September 2021.

It is up to the international community to find compromises with Central African countries in order to develop just and equitable solutions to promote the sustainable management of the basin's forests, within the context of a legitimate quest for economic and social development.

SOF 2021 is rich in the most recent scientific and technical data on Central Africa's forest resources and their management. It addresses all the issues faced by these ecosystems and opens up perspectives for their improved contribution to human well-being.

The quality of the information and reflections presented in this SOF 2021 is backed up by the reputation of its experts, who come from some of the most renowned institutions in the world, under the unprecedented auspices of African specialists.

Christian RUCK

Facilitator to the Congo Basin Forests

Jules Doret NDONGO

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Central African forests: The state of forest resources and their management

PART 1

CHAPTER 1

Distribution of forest types and changes in their classification

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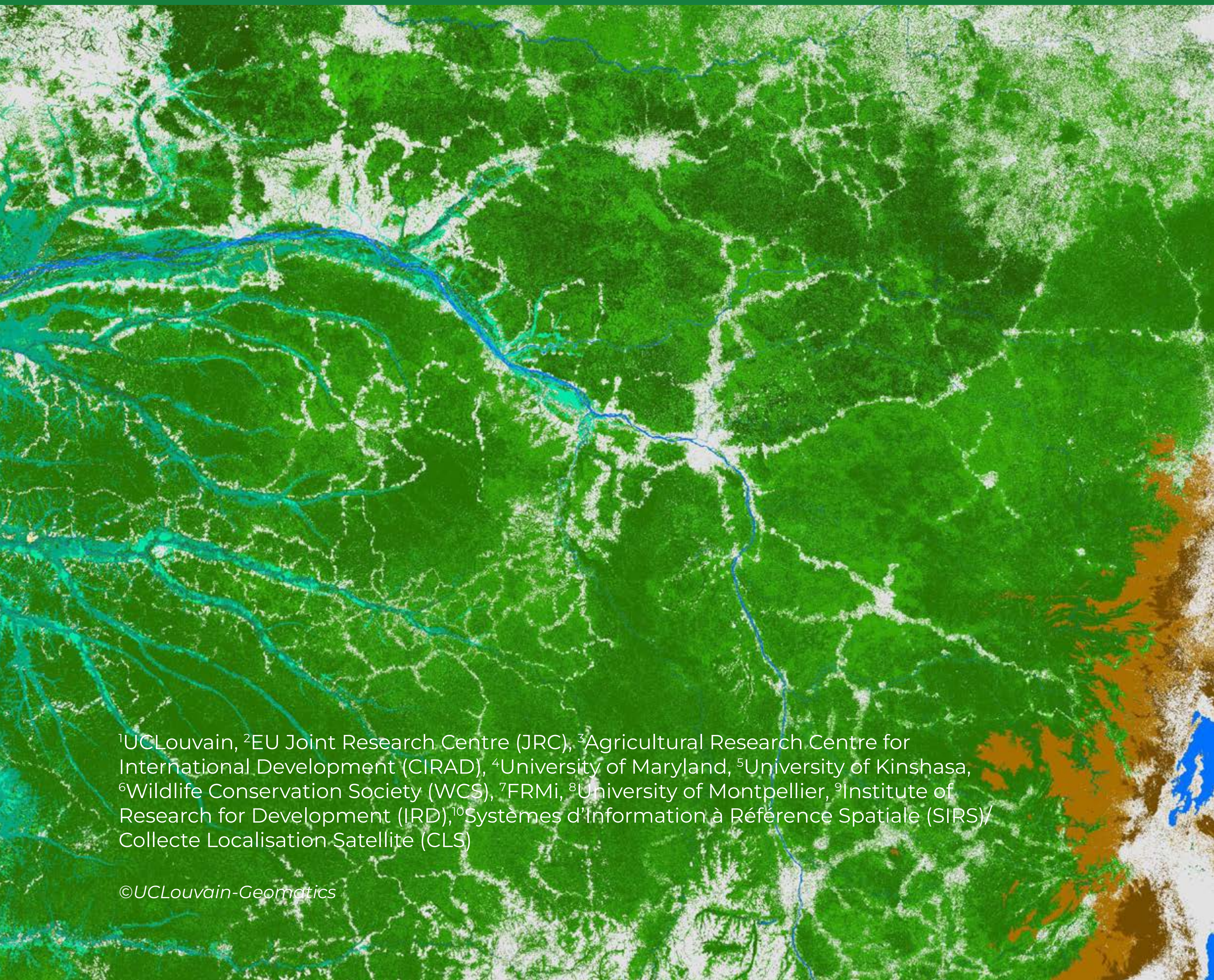

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Introduction

> The second largest block of dense moist forest after the Amazon, Central Africa's forests are an exceptional reservoir of carbon and biodiversity for the countries they cover and the planet as a whole. These forests provide a livelihood to 60 million people and help to feed 40 million more in nearby towns and cities. They play an essential social and cultural role in the lives of indigenous peoples and local communities. The ecological, economic, social and cultural importance of Central Africa's forests places them at the heart of international discussions aimed at preserving these unique ecosystems, which are vital to the health of the planet.

Forests are dynamic reservoirs of forest resources, carbon and biodiversity that grow as they expand and mature or shrink as a result of deforestation and forest degradation. To draw up effective forest management and ecosystem conservation policies, we must define the precise nature of these tropical moist forests and how they change over time. Doing so will also allow us to quantify their contribution to global carbon flows and respond to future climate challenges. National and international efforts to protect these forest ecosystems are based primarily on sustainable land use planning for both forestry and nature conservation. The international mechanism for reducing emissions from deforestation and forest degradation (REDD+) provides a framework for national efforts to reduce greenhouse gas emissions and increase the removal and long-term storage of these gases. The results of REDD+ activities are assessed on the basis of national forest reference emission levels.

The new generation of satellite imagery is a valuable source of data for the large-scale monitoring of tropical forests, which are often hard to reach. Inventory data from a large number of forestry concessions have very recently provided an overview of the functional diversity of forests, while the operationalization of the first carbon flow monitoring tower in a natural forest is a positive step forward for our understanding of forest carbon flows. However, mapping the spatial distribution of forest carbon stocks at the basin level remains a challenge due to the scarcity of field observations.

This chapter summarizes current knowledge on forest mapping in relation to their floristic composition, physiognomic features and carbon levels. It takes stock of changes in forest dynamics and analyses the impact of land use on the preservation of forest ecosystems. The last section reports on countries' engagement with the REDD+ process following the introduction of forest reference emission level mechanisms and their operational implementation at the provincial level.

1.1 Forest mapping

For decades, scientists have sought to establish a typology of forest formations that reflects the full diversity of Central African forests. Some typologies have categorized vegetation by phytogeographical zones, such as Lebrun and Gilbert (1954), Monod (1957), Letouzey (1968) and

Troupin (1966). Others, such as White (1986), are based on large chorological zones. These typologies often reflect endemic divergence in the floristic composition of the forests. Other typologies, such as the "Yangambi" typology (Aubréville 1957), differentiate between the different classes of vegetation on the basis of physiognomic features. Today, the proliferation of data sources and the diversity of environmental challenges drive the characterization of forest ecosystems according to floristic, physiognomic and carbon stock approaches to map forests' functional and structural variety, to delineate endangered natural habitats and to determine their carbon balance.

The phytogeographical study of forests focuses on their floristic composition, based on the individuals inventoried in the field. This is the case with the exceptional overview by Réjou-Méchain et al. (2021) which describes the floristic and functional composition of Central African forests. In complement to this, high spatial resolution observation data from new satellites have made it possible to understand the structure of the canopy at the forest stand level. This has, in turn, enabled the production of new maps as part of a close collaboration between national experts and Université catholique de Louvain (UCLouvain). Finally, a critical analysis of the cartographic data available on carbon stocks has allowed us to assess the state of current knowledge.

1.1.1 Floristic and functional composition of tropical forests in Central Africa

Forest management inventories carried out by 105 forestry concessions throughout Central Africa (excluding hydromorphic soil and highland areas) provided valuable information on their floristic and functional composition. Based on more than 180,000 inventory plots (about 90,000 ha total), 6 million trees over 30 cm in diameter were analysed. These trees belong to 193 well identified taxa and are representative of the majority of the individuals present in these plots.

The abundance distribution of all these taxa, averaged over 10 x 10 km grid areas, was modelled on the basis of 24 climatic variables, information on soil types (sandy or clay) and a human pressure index, over an area covering 85% of the dense terra firme forest in Central Africa.

Three major floristic gradients were identified via a factorial correspondence analysis of the predicted abundances of taxa on a regional scale: (1) the most pronounced floristic gradient strongly correlates with climate, separating areas with a cool dry season and low light (Atlantic area) from areas with a high rate of evapotranspiration (northern limit of Central African forests); (2) the second floristic gradient strongly correlates with seasonality and maximum temperature, contrasting equatorial areas with a low water deficit and areas with a high water deficit towards the tropical limits; (3) the third floristic gradient shows more local floristic variation, mainly due to human impacts.

By replacing the floristic composition of the stands taking into account the average values of three major functional traits – wood density, deciduousness and maximum potential height of the tree species (voir la figure 1.1) – several trends appear. Average wood density (voir la figure 1.1A) is highest on sandy soils, on the borders of Cameroon, the Republic of the Congo and the Central African Republic – an area known for Carnot/Bambio sandstone – where tree species subject to conservative resource-use strategies predominate. This average value is lower in areas with higher human pressure, because stands are mainly composed of fast-growing taxa. These disturbed areas also have a high proportion of trees that can reach a large diameter. These two findings indicate that forests affected by human activity are dominated by long-lived pioneer taxa, characterized by low wood density, but high potential volume. Moreover, a marked deciduous gradient extends from the

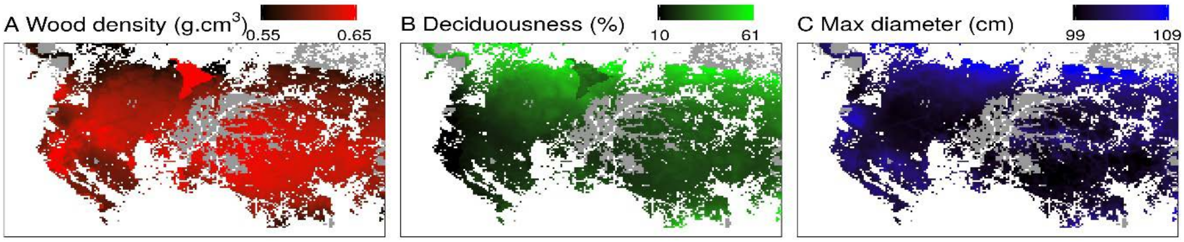


Figure 1.1: Predicted functional composition of Central African forests. A-C, predicted values of community-weighted functional traits. The grey areas represent forested areas outside of the calibration range.

evergreen forests of the Gabonese coast to the northern limit of the Central African forests (voir la figure 1.1B), except on sandy soils.

By combining these findings, we identified 10 major floristic types present in the region (see Figure 1.2). The strongest floristic dissimilarity emerged between Atlantic forests (types 1-3) and other forest types (types 4-10), within which semi-deciduous forests were clearly distinguished (types 4-6). Functional convergence was observed between forest types with significant floristic dissimilarity, as was divergence between those with floristic similarity. For example, although they have a regional species pool similar to that of semi-deciduous forests (types 4 and 6), Carnot/Bambio sandstone forests (type 5) have a functional composition closer to remote forest groups (e.g. types 2, 3, 7 and 8), with high wood density and low deciduousness. The type of soil changes the relative species abundance, with poor sandy soils favouring certain functional traits. Conversely, although Atlantic forests (types 1-3) have little taxonomic affinity with forests in the east-central and southern regions (types 7 and 8), they have a similar functional composition due to more similar climatic conditions. This confirms that, while the taxonomic composition of stands is linked to biogeography, their functional composition can converge under similar environmental conditions.

The floristic and functional characteristics of the stands make them more or less vulnerable to possible future changes in climate and human activity over the coming decades. Modelled to 2085, the ecological vulnerability of the stands – taking account of their sensitivity, exposure and capacity to adapt to climate change – appeared to vary independently of human pressure. This means that Central African stands are subject independently to the dual threats of climate and human activity. The findings show that this combined vulnerability will be high for the forests of the Gabonese coast, in large areas of DRC and on the northern frontier of the forest domain. The forests of Cameroon and the south of the Republic of the Congo appear to be vulnerable mainly due to the high level of human pressure expected by 2085. On the other hand, the Sangha trinational forest complex and the north-eastern part of Gabon seem to be the least vulnerable areas in the region. Predictions suggest that the majority of forests in DRC, comprising the majority of Central African forests, appear to be vulnerable to climate change, human pressure or both factors combined.

1.1.2 Detailed mapping of forest types

The large-scale mapping of forest types aims to inform a number of national and provincial applications related to the sustainable management and conservation of forest ecosystems in the Congo Basin. From 1999 to 2012, several vegetation maps were published based on satellite observations; their resolution gradually increased from 1 km to 300 m (Mayaux et al. 1999; Mayaux

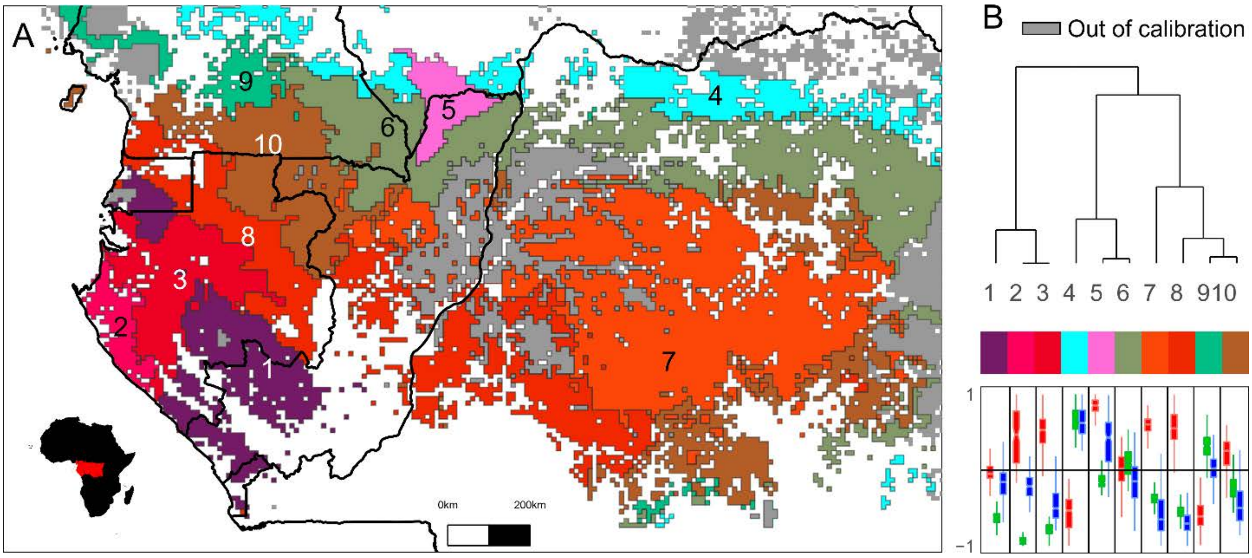


Figure 1.2: Main types of forest in Central Africa based on functional composition. A, Classification of forest types obtained via hierarchical clustering of predicted floristic gradients. The colours represent the averages of the three functional traits of the species in each type of forest, namely wood density (red), deciduousness (green) and maximum diameter (blue). Similar colours therefore indicate a similar functional composition. B, Taxonomic relationships between forest types illustrated by a dendrogram (top) and a boxplot of standardized predicted functional composition (bottom), with wood density in red, deciduousness in green and maximum diameter in blue. Names of forest types: (1) evergreen Atlantic highland, (2) evergreen Atlantic coastal, (3) evergreen Atlantic inland, (4) semi-deciduous marginal, (5) evergreen/semi-deciduous on sandstone, (6) semi-deciduous, (7) central evergreen, (8) mixed evergreen, (9) degraded evergreen, (10) transitional semi-deciduous/evergreen. Deciduousness (simultaneous loss of all leaves in one year) is an individual-level botanical characteristic. Country boundaries are shown in black and forests outside the calibration range are shown in grey.

Source: Réjou-Méchain et al. (2021)

et al. 2004; Vancutsem et al. 2006; Verhegghen et al. 2012; Gond et al. 2015), providing a preliminary synoptic overview of the forest on a regional scale. The new mapping techniques, which are detailed both spatially and semantically, improve our spatial knowledge of forests. This has been made possible by the new Earth observation capabilities available since the launch of the European Copernicus programme. Unlike previous satellite missions, the Copernicus programme will run over the long term, ensuring the redundancy of the technology (several satellites) and open access. Using a continuous acquisition strategy with spatial resolutions of 10-20 m and temporal resolutions of 5-12 days, Sentinel satellites 1 and 2 are the new go-to instruments for regular long-term monitoring of forest ecosystems. In parallel, the increasing availability of Planet mosaics with very high spatial resolution, but of more variable quality, also constitutes a new source of data that is particularly well suited to the visual interpretation of samples distributed across the entire basin.

Within the framework of the Central African Forest Observatory (OFAC), a harmonized regional typology of forest types covering the 10 Central Africa Forest Commission (COMIFAC) countries was developed in 2018 through several regional workshops bringing together national experts. The 13 forest categories under this typology are defined using the ISO 19144-1 Land Cover Classification System (LCCS), as illustrated in Figure 1.4.

This regional mapping was undertaken as part of a collaboration between national experts and UCLouvain. It shows the spatial distribution of the different types of forest described on a physiognomic basis, based on variables such as the percentage of vegetation cover of the different vegetation strata, cover seasonality, the flood regime and altitude.

Thanks to the development of a new image correction method and an algorithm that improved cloud detection (see Figure 1.3), a coherent annual composite was produced using Sentinel-2 satellite data acquired in 2020 in the different spectral bands. The data on cloud zones were complemented by observations from 2018 and 2019. Observations from the Sentinel-1 radar satellites, which are not affected by atmospheric disturbance, were also used to classify forest types where the Sentinel-2 image time series was very cloudy.

At the classification stage, the classification algorithms are trained using data collected by the national experts applied to the spectro-temporal metrics from Sentinel-1 and Sentinel-2 data. The forest type map produced at a resolution of 20 m provides information on forest types at a level of spatial detail never before attained at this geographic scale. Figure 1.4 shows the regional map generated with the full range of forest classes identified and three zoomed in images of the Republic of the Congo.

The Congo Basin has three major moist forest complexes; the most typical is made up of edaphic forests and covers the centre of the basin. The maps show that edaphic forests include permanently flooded swamp forests (flooding > 9 months) (see Figure 1.5), periodically flooded swamp forests (4–9 months flooding) and riparian forests (see Figure 1.6). The tree layer covers more than 60% of periodically or permanently flooded swamp forests and 30%-60% of riparian forests. Riparian forests are found at the bottom of valleys or on shallow slopes along riverbanks. A large majority of the basin is covered by dense moist forests with an irregular age distribution (see Figure 1.7). This forest type is defined by a dense tree layer (> 60%), that is rich in species and markedly deciduous, with many emerging trees with imposing canopy. In the eastern half of the basin, dense moist forests with a regular age distribution (see Figure 1.8) – with fewer large crowns than forests with an irregular age distribution – seem to be gaining ground. Groves of monospecific evergreen dense

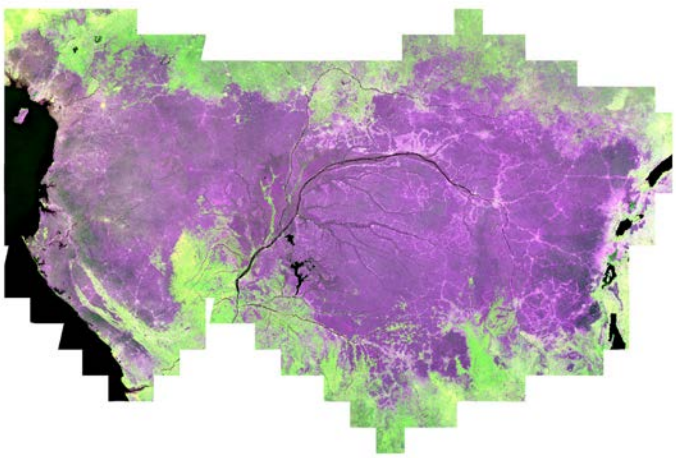


Figure 1.3: Cloudless Sentinel-2 mosaic of the Central African moist forest area, 2020. The innovative colour composite makes it possible to identify the functional types of the forest, which was not previously possible using satellite imagery.

moist forests (see Figure 1.10), most often of the species *Gilbertiodendron dewevrei*, punctuate these large blocks. Finally, mountane and sub-mountane forests border the great lakes region, where altitudes exceed 1100 m. Across the basin, open forests (see Figure 1.9), characterized by a density of 30% to 60%, are also identified, often on the margins of a degradation gradient.

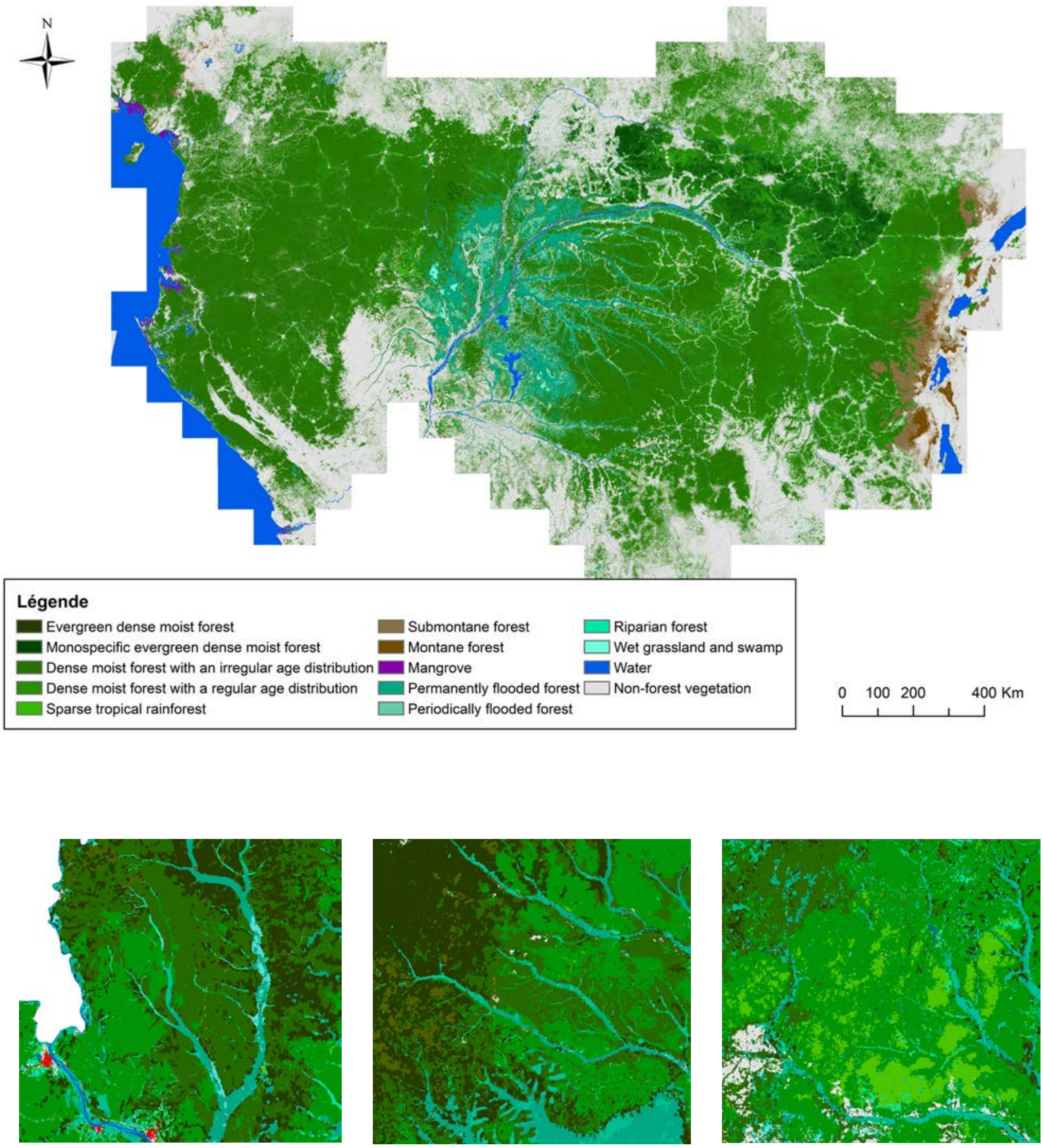


Figure 1.4: Map of forest types in the Congo Basin at 20 m resolution with the level of detail shown in three zoomed in images of the Republic of the Congo.

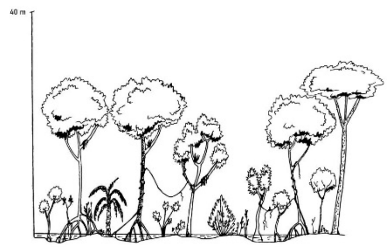


Figure 1.5: Permanently flooded forests.

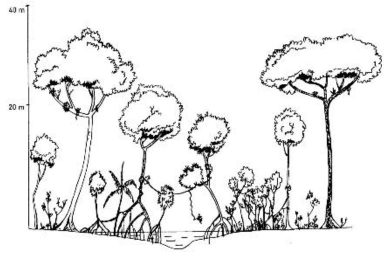


Figure 1.6: Riparian forests.

Figure 1.7: Dense moist forests with an irregular age distribution.

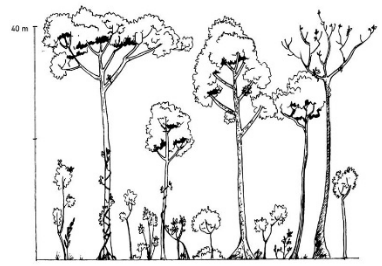


Figure 1.8: Dense moist forests with a regular age distribution.

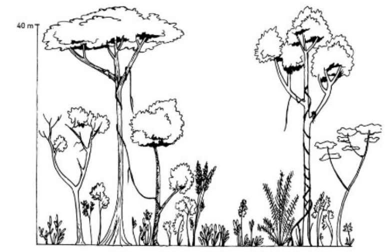


Figure 1.9: Open forests.

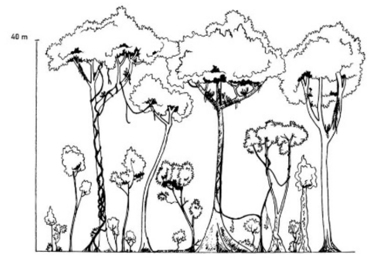


Figure 1.10: Evergreen dense moist forests.

1.1.3 Distribution of forest carbon stocks in Central Africa

Central African forests sequester about 40 Gt of carbon (Saatchi et al. 2011). These forests have structural characteristics that distinguish them from Amazonian forests: the density of trees per hectare is lower, but there are more large-diameter trees and trees at a similar diameter are larger. This results in a higher average level of carbon or biomass per hectare than that of Amazonian forests (Sullivan et al. 2017). Finally, while the atmospheric carbon absorption capacity of undisturbed Amazonian forests has been declining for around 30 years due to an increase in tree mortality attributed to climate change (Brienen et al. 2015), this trend has not yet been observed in Central Africa (Hubau et al. 2020). Currently, despite their comparatively smaller area, undisturbed forests in Africa are now absorbing more carbon than those in the Amazon. An increase in carbon loss after 2010 has however been observed (see 1.2.3 Estimation des taux de changements), which suggests the absorption capacity of intact forests in Central Africa will become saturated, despite the stability observed to date (Hubau et al. 2020).

However, the spatial distribution of forest carbon stocks across Central Africa remains largely unknown, mainly due to the lack of field observations – especially in the eastern half of the region (www.afritron.org) – and the difficulties of extrapolating carbon stocks using remote sensing.

There are no satellite sensors able to “measure” carbon or forest biomass directly. Maps produced using remote sensing are therefore generated based on the indirect relationships identified between what the sensors actually measure (for example, forest stand reflectance) and reference biomass estimates, often derived from forest inventories. However, the vast majority of satellite signals are currently very insensitive to variations in biomass if they exceed 100 to 200 t/ha^{-1} (called signal

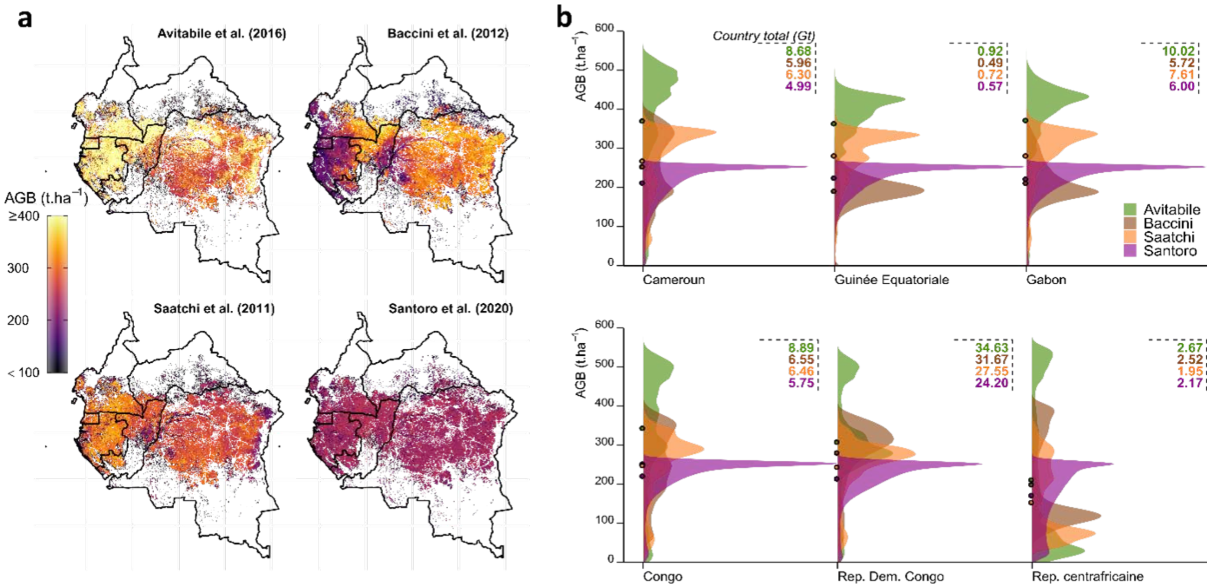


Figure 1.11: Comparison of above-ground biomass (t/ha-1) of Central African moist forests from maps produced by Avitabile et al. (2016), Baccini et al. (2012), Saatchi et al. (2011) et Santoro et al. (2020). a. Spatial distribution of biomass. b. Density histograms representing aerial biomass values per hectare by country (X axis) and map (colour code). The average of each distribution is represented by a coloured dot and the cumulative biomass (in Gt) across all the moist forests in each country is given (upper-right quadrant).

"saturation"), which characterizes a large majority of forests in Central Africa. Moreover, the Atlantic coast of Central Africa is characterized by high cloud cover that interferes with optical satellite signals and further complicates large-scale biomass mapping.

These difficulties have not been overcome by the studies currently available on the spatial distribution of forest biomass in the region. These studies use satellite remote sensing data to extrapolate reference biomass measurements estimated in the field, except for Santoro et al. (2020), which did not use reference measurements and instead used purely physical models. Despite taking similar approaches, the various maps produced show very different types of distribution (see Figure 1.11-a), which led to radically different country estimates (see Figure 1.11-b). In Gabon, for example, the average above-ground biomass per hectare for moist forests is about 375 t/ha^{-1} according to the map produced by Avitabile et al. (2016), compared with only 210 t/ha^{-1} according to Baccini et al. (2012), with estimates of total biomass ranging from single to double digits (10 Gt for one, 5.7 Gt for the other, see Figure 1.11-b). Highly accurate local biomass maps, based on aerial LiDAR, showed that all these maps provided only very poor predictions of observed biomass variations (Réjou-Méchain et al. 2019). These regional maps also fail to reflect changes in biomass obtained from forest inventory data (Ploton et al. 2020). These maps should therefore be regarded with an appropriate level of caution.

In the absence of adequate satellite data to extrapolate forest biomass, only approaches that rely on representative statistical sampling of different forest types are currently able to provide reliable estimates with the associated level of uncertainty. Aerial LiDAR can also provide reliable biomass estimates. Based on a large random sample, Xu et al. (2017) were able to use LiDAR data to map the distribution of carbon in DRC at the national level. They also used LiDAR data collected in DRC for the Central African area, in combination with other samples at the global level, from a range of studies, to monitor global above-ground biomass between 2000 and 2019. The quality of these different biomass estimates will likely increase through the use of large samples and LiDAR data. Together, these approaches, based on representative statistical sampling of different forest types and the use of LiDAR data, show that biomass maps based solely on optical data can, despite their large systemic errors, substantially improve the accuracy of average height and above-ground biomass estimates at the local level (for example, Næsset et al. 2020). Moreover, a global map of forest canopy heights was produced at 30 m resolution using the GEDI and Landsat satellites (Potapov et al. 2021).

The reliability of large-scale above-ground biomass maps should improve significantly with NASA's GEDI space mission (2020-2022) and the expected launch of the ESA's Biomass radar satellite (P-band) in 2022. Unlike previous satellite data, these new sensors were specifically designed to map forest biomass. They are particularly sensitive to biomass even in the highest values (Minh et al. 2016). GEDI LiDAR data, which are currently being collected and analysed, provide, among other things, measurements of canopy heights across the tropics, with a sampling density that should provide several measurements per square kilometre (Patterson et al. 2019). The strong relationship between forest height and biomass will make it possible to produce biomass mapping models that will very likely outperform regional models.

To make the best use of these new satellite data, Central African countries will face the major challenge of setting up measurement "supersites", where highly accurate forest biomass estimations are made (Chave et al. 2019). This will make it easier to adjust and evaluate the maps produced at the local level.

1.1.4 Complementarity of the different approaches

The three approaches to characterizing forests, namely using floristic characteristics, currently at 10 x 10 km, physiognomic characteristics, at 20 x 20 m, and carbon characteristics, should be gradually combined given their clear complementarity.

For example, in the centre of the Republic of the Congo, floristic class 7 (central evergreen) corresponds to the class "open dense moist forest" on the detailed physiognomic map. Forests with a cover density of 30–60% appear to correspond to taxa with a low potential maximum diameter, but with a high wood density. By combining these two products we can identify a degraded forest, composed of species with high wood density suggestive of slow growth and high carbon stock in the remaining trees.

Similarly, in northern Congo, floristic class 6 (semi-deciduous) aligns with the classes "dense moist forest with a regular age distribution" and "dense moist forest with an irregular age distribution" on the detailed physiognomic map. Class 6 is defined by species with a medium wood density, an average maximum diameter and a mixture of deciduous and evergreen species. The constituent species of this class are split between fast-growing taxa with lower wood densities and high potential volumes, and slow-growing taxa with the opposite characteristics. The physiognomic approach is consistent with this description, but distinguishes between two classes in this region based on the higher presence of trees with large crowns in forests with an irregular age distribution compared with forests with a regular age distribution.

The wealth of information produced at the different scales demonstrates the importance and complementarity of using different approaches to manage local land use and forest conservation in the face of regional and global challenges. The vulnerability of forest communities to change can be predicted by combining climate change scenarios, human pressure projections and the detailed spatial distribution of the forest. Such predictions can then inform conservation strategies. In this way, by preserving the evolving functional potential of existing forests, or at least maintaining their connectivity, it might be possible to limit the regional and global impacts of expected changes.

1.2 Dynamics of dense moist forests

Beyond the characterization of each forest type, it is essential to regularly monitor forest cover to quantify and pinpoint the location of the change processes observed, including deforestation, degradation and reforestation. Below, we discuss the relative influence of the change factors affecting these different dynamics and analyse the impact of land use on them.

Through a comprehensive wall-to-wall mapping of tropical moist forest (TMF) covering the last three decades (from year 1990 to year 2020) at fine spatial resolution, new information on TMF are provided (see Figure 1.12). TMF extent and the related disturbances (deforestation and degradation), and post-disturbances recovery are documented on an annual basis (Vancutsem et al. 2021). TMF product and Global Forest Watch data (Hansen et al. 2013) available since 2013, are the only consistent and up to date products for monitoring deforestation of Central African forests from the year 2000. The consistency of the method is a key point for forest monitoring and the annual worldwide product is GFW and JRC's major advantage. The TMF product of Vancutsem et al. (2021) is very detailed on the thematic aspect; it documents deforestation in Central Africa in an unprecedented manner by including deforestation after degradation and deforestation followed by a regrowth, by identifying specific forest conversion to commodities or water, and by including changes within the mangroves. This has been achieved thanks to the analysis of each individual valid observation of the Landsat satellite archive allowing to capture short-term disturbances such as selective logging and severe weather events. Today, TMF products and GFW data are the main sources that alert us regarding deforestation activities and are used to stratify a sampling design in the field. The major advantage of a sampling approach is the opportunity to quantify uncertainties in estimates.

1.2.1 Stages of forest development in the Congo Basin

Although no ecosystem may be considered truly undisturbed, because some degree of human impact is present everywhere (Sanderson et al. 2002), the **undisturbed moist forests** in the TMF product are defined as undisturbed (degradation or deforestation) tropical moist forest coverage observed over the Landsat historical record since 1983.

A **deforested land** is defined as a permanent conversion from moist forest cover to another land cover whereas a **degraded forest** is defined as a moist forest cover where disturbances (canopy opening in a 0.9 ha Landsat pixel) were observed over a short period of time. Here the duration of the disturbance (and consequently the period over which the disturbance is detected with satellite imagery) is assumed as a proxy of the disturbance impact, i.e. the higher the duration of the detected disturbance, the higher the impact on the forest cover, and the higher the risk to have a permanent conversion of the TMF. All disturbances for which the impacts were observed over more than 2.5 years (or 900 days) were considered as deforestation processes. Short-term disturbances include logging activities, fires and natural damaging phenomena such as wind storms and extreme drought. This definition is close to the definition of forest degradation adopted by Thompson et al. (2013) that consider the following criteria: a loss of productivity, depletion of biodiversity, unusual disturbances (droughts, windfalls), and a reduction of carbon sinks.

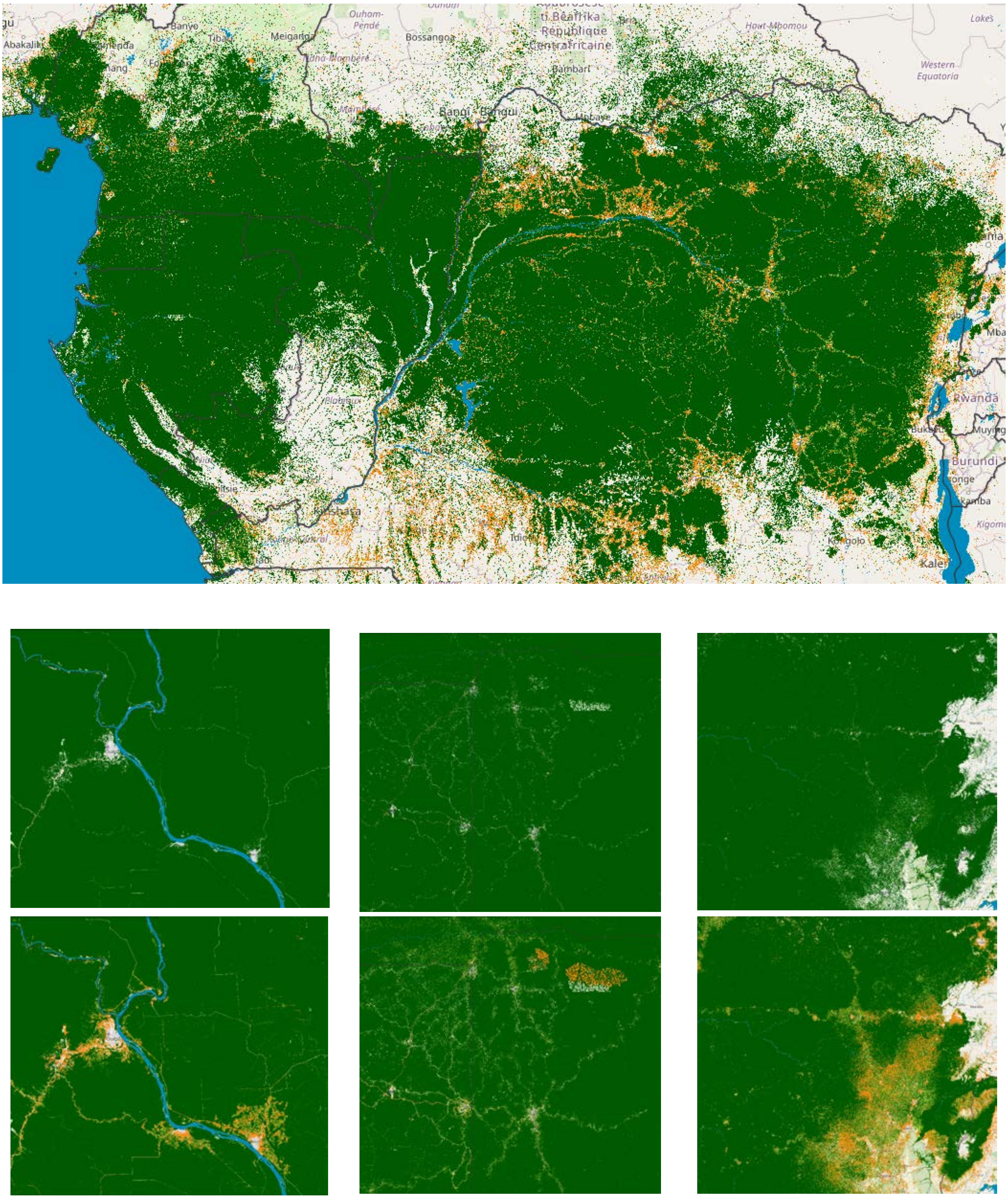


Figure 1.12: Map of undisturbed tropical moist forests in Central Africa (top) with three zoomed in images: northern Republic of the Congo (left), Equatorial Guinea/Gabon (middle) and eastern DRC (right), for 1990 (top) and 2019 (bottom).

Two levels of degradation were empirically identified: **degradation with short-term impacts** (observed within a 1-year maximum duration), which includes the majority of logging activities, and **degradation with long-term impacts** (between one and 2.5 years) which mainly corresponds to strong fires (forest fires). 50 percent of the degradation are observed over less than six-months. For disturbances for which the impacts were observed over more than 2.5 years and that were therefore considered as deforestation processes, 68 percent of such deforestations were observed over more than five years.

A **forest regeneration** is a two-phase transition from moist forest to (i) deforested land and then (ii) vegetative regrowth. A minimum 3-years duration of permanent moist forest cover presence is needed to classify a pixel as forest regeneration (to avoid confusion with farms).

The collection of 30 maps derived from Landsat data provides the surface area of the TMF and disturbance categories fo each year, from 1990 to 2020 (Figure 1.12). These maps are used to document annual disturbances over the whole period, with ten transition categories for each annual statistic: (i) degradation that occurs before deforestation, (ii) short-term degradation not followed by deforestation, (iii) short-term degradation not followed by deforestation, (iv) long-term degradation not followed by deforestation, (v) direct deforestation (without prior degradation) not followed by forest regeneration, (vi) direct deforestation followed by forest regeneration, (vii) deforestation after degradation followed by forest regeneration, (viii) deforestation after degradation not followed by regrowth, (ix) forest conversion to water bodies and (x) forest conversion to tree plantations.

1.2.2 Method for monitoring forest dynamics

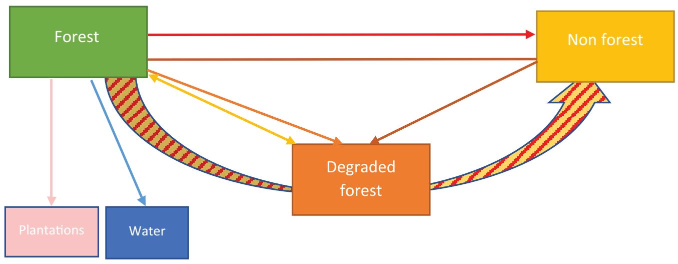
In order to deal with geographic and temporal breaks of the Landsat archive and the persistent presence of clouds in some areas like the Gulf of Guinea, (i) a reference initial period (baseline) for mapping the initial TMF surface area and (ii) a monitoring period for detecting the changes are determined at the pixel level. In addition, thanks to additional datasets, commission errors in the baseline map of tropical moist forests are reduced by taking into account possible confusion with commodities, wetlands, bamboos, and deciduous forest.

The disturbances are monitored on a single-date basis with a classification on each image of the Landsat archive. This allows (i) to capture the disturbances that are visible from space only over a short period, such as logging activities, and (ii) to record the time and number of disturbances observed. A disturbance observed refers to lack of tree foliage cover within a Landsat pixel. The number of disturbances observed constitutes an indicator of disturbance intensity.

Finally, in order to produce a more conservative map of undisturbed forests by excluding areas impacted by logging activities and possibly undetected, disturbance buffer zones using a threshold distance of 120 m around disturbed pixels are created. This distance corresponds to the average observed distance between two lumber yards and is consistent with the distances used in previous studies for assessing intact forests (Qie et al. 2017).

1.2.3 Estimating rates of change

The surface area of evergreen and semi-deciduous forests of Central Africa is estimated at about 200 million ha in January 2020 including 184.7 million ha with no visible sign of disturbances (Vancutsem et al. 2020). Overall close to 9 percent of the tropical moist forest area of Central Africa have disappeared since 2000, i.e. 18 million ha.



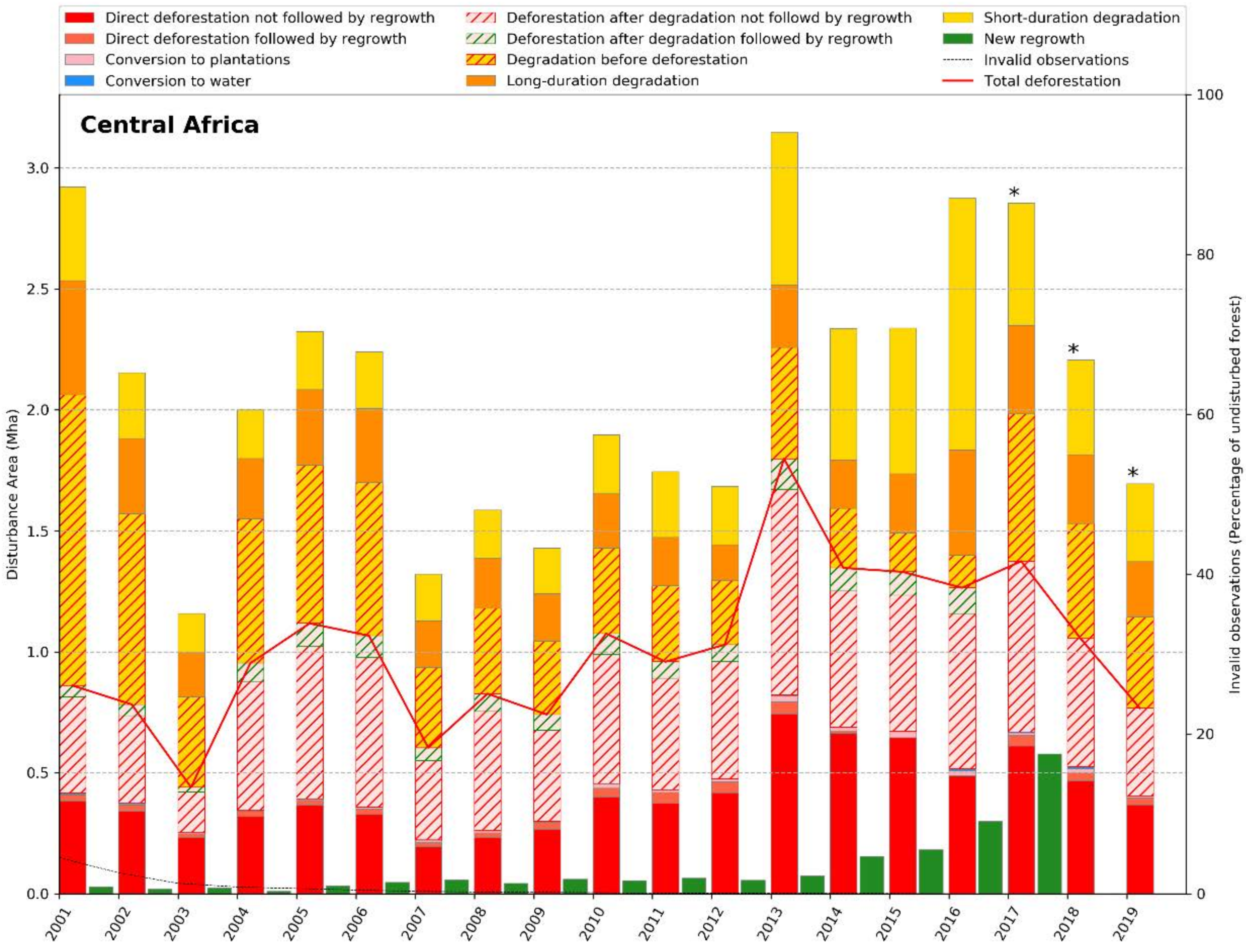


Figure 1.13: Annual change in deforestation (red bar) and degradation (yellow bar) in Central African tropical moist forests, 2001–2019.

Source: Vancutsem et al. 2020

The results underline the importance of the degradation process in these ecosystems with two key outcomes: degraded forests represent in Central Africa about 7 percent of the remaining surface area of TMFs (up to 30 percent when considering disturbance-edge-affected forests), and about 40 percent of all forest disturbances (deforestation, regeneration and degradation).

The analysis of changes shows a considerable increase of the annual disturbance rate in tropical moist forests of Central Africa during the last 5 years (2015-2020) that has reached 1.79 million ha per year compared to 1.36 million ha per year during the previous decade (2005-2015) (see Figure 1.13).

Table 1.1: Annual rates of undisturbed forest loss over 5 year timeframes by country, according to the TMF product, 2000–2020 (annual rates in %). Rates from other countries are not available in the study.

Study	Timeframe	Cameroon	CAR	Republic of the Congo	DRC	Gabon
TMF Vancutsem et al. 2021 (undisturbed tropical moist forests)	2000–2005	-0.25	-1.63	-0.25	-1.05	-0.12
	2005–2010	-0.08	-0.93	-0.25	-1	-0.08
	2010–2015	-0.12	-0.98	-0.56	-1.3	-0.13
	2015–2020	-0.21	-2.1	-0.71	-1.46	-0.21

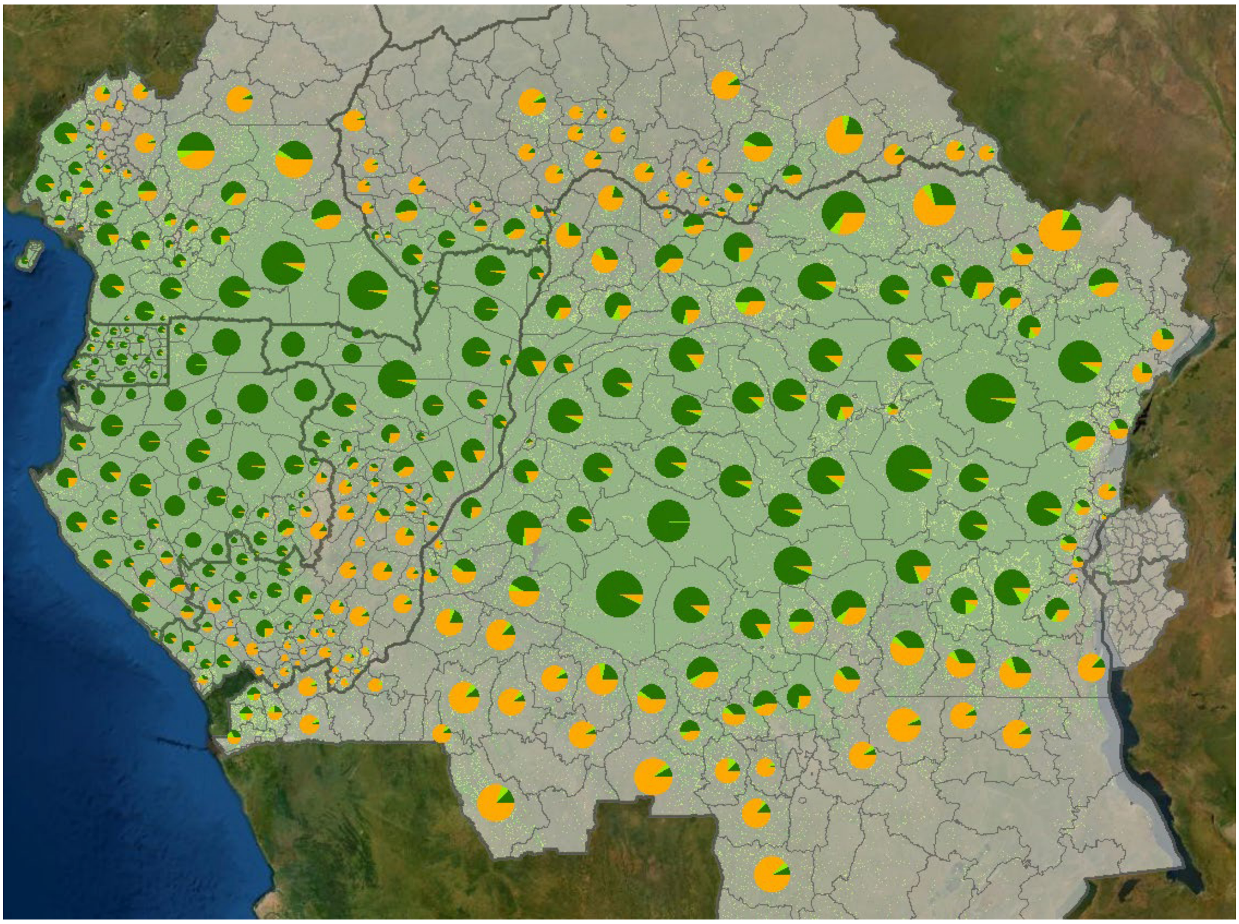


Figure 1.14: Proportion of intact forests (dark green), degraded forests (light green) and non-forests (orange) at the second administrative level (districts, sub-prefectures, departments or communes), according to the TMF product for 2019. In the figure, areas deforested before 2019 are classed as non-forest.

The Democratic Republic of the Congo is the African country with the largest remaining expanse of undisturbed moist forest with 105.8 million ha, and it is the second largest in the tropical world behind Brazil and before Indonesia. Gabon, Cameroon and the Republic of Congo have similar areas of remaining intact forests (between 19.8 and 23.4 million ha in 2019). The Republic of Congo and Gabon show very low rates of decline for the period 2000–2019 (0.03-0.1 million ha/year) compared to the DRC (1.4 million ha/year) (Vancutsem et al. 2020). In all Central African countries, there has been an increase in annual rates of disturbances since 2009. Without a slowdown in the present

Table 1.2: Annual rates of forest loss by country according to different sources (annual rates in % and confidence interval in brackets).

Study	Timeframe	Burundi	Cameroon	CAR	Chad	Republic of the Congo	DRC	Equ. Guinea	Gabon	Rwanda	Sao Tome and Principe
GFC by Hansen et al 2013 (forest cover)	2001–2019	-0.27	-0.22	-0.089	-0.6	-0.16	-0.38	-0.23	-0.093	-0.36	-0.029
(primary forest)		/	-0.17	-0.11	/	-0.079	-0.24	-0.14	-0.058	-0.032	/
FAO. (2015). FAO Forestry Paper No. 1. Global forest resources assessment 2015.	2000–2005	-1.78	-1.02	-0.07	-0.59	-0.08	-0.2	-0.67	0	2.28	0
	2005–2010	6.93	-1.07	-0.07	-2.15	-0.05	-0.2	-0.71	0	2.99	-0.87
	2010–2015	1.76	-1.13	-0.07	-2.41	-0.07	-0.2	-0.72	-0.89	1.48	0
National studies (Tritsch et al. 2020)	2000–2010		-0.176	-0.273		-0.082			-0.022		
National studies (de Wasseige et al. 2014)	2000–2005			-0.175		-0.052			-0.01		
	2005–2010			-0.175		-0.096			-0.01		
de Wasseige et al. 2014 (Tropical moist forest)	2000–2010		-0.06 (±0.04)	-0.05 (±0.02)		-0.07 (±0.02)	-0.19 (±0.04)	0.01 (±0.02)	-0.01 (±0.01)		
Tyukavina et al. 2018 (All forest types)	2000–2014		-0.53	-0.39		-0.43	-0.52	-0.46	-0.25		
Potapov et al., 2012. (HTP+HTS**)	2000–2005						-0.25				
	2005–2010						-0.272				
Tyukavina et al. 2013 (HTP+HTS**)	2000–2010						-0.47 (±0.4)				

HTP**: Humid Tropical Primary Forest
HTS**: Humid Tropical Secondary Forest

(last 10 years) disturbance rates, the Democratic Republic of the Congo would lose 22 percent of its moist forests by year 2050 (from 116.9 million ha in 2020 to 91 million ha in 2050) and 33 percent of its undisturbed moist forests by same year (from 105.8 to 71.4 million ha).

For all major sources, annual deforestation rates vary significantly from one study to another (Table 1.2). TMF is chosen as the reference because it is the only consistent and up-to-date study that differentiates deforestation and degradation since the year 2000 (Table 1.1). On the one hand, country data reported for the FAO-FRA corresponds to official national statistics. On the other hand, the GFC and TMF are sources of global data based on a standardized method. GFC and TMF publish annual rates from remote-sensing approaches, while FRA collects national statistic evaluating forest surface areas every 5 years and then gets forest loss surfaces at national scale. Table 1.1 provides information on annual loss rate of undisturbed tropical moist forest from 2000 to 2020 per country. Other national remote sensing studies provide results of forest loss assessment. However, because of disparaging methods, unrepeatable measurements, different forest cover considered and different forest definitions, a careful strategy is required for comparing results over time and between countries.

Figure 1.14 presents the proportion of undisturbed forest, degraded forest and non-forest area at the sub-national level. Administrative territories with a smaller proportion of undisturbed forests usually have a larger proportion of degraded forests, highlighting the fragility of these areas.

Finally, most of the forest area converted to tree plantations over the last 30 years in Africa are located in DRC, Cameroon and Gabon (80,000 ha, 70,000 ha and 40,000 ha respectively).

1.2.4 Drivers of deforestation

Unlike other tropical regions, small-scale processes rather than large-scale agriculture mainly cause deforestation and forest degradation in Africa. Deforestation here is more closely related to subsistence agriculture, small-scale charcoal production and gathering of wood for fuel. According to Curtis et al. (2018), shifting cultivation is a widespread driver of forest disturbance in sub-Saharan Africa. About 60 percent of new farmlands came from intact forests in the 1980s and 1990s, and was mainly used for small-scale and subsistence farming and breeding (Gibbs et al. 2010). Forest degradation is not always a precursor of deforestation, in particular in many woodland areas of Africa where the main drivers of forest degradation are wood gathering for fuel and charcoal production (Brink et al. 2014).

The expansion of farmland areas, a growing population and the expansion of urban infrastructure bring African moist forest areas closer to urban areas, which increases human pressure on them – in fact, all three factors are key drivers of deforestation (Mayaux et al. 2013). Deforestation increases dramatically when rural population density exceeds 8.5 people per km2, and declines as time to get to cities increase.

1.2.5 Analysis of changes in forest cover by land use, at the country and regional level.

Land-use policies are a valuable tool for managing human pressure on forest resources. They can be used to create protected areas, establish forestry concessions, convert such concessions into conservation concessions and designate community forests. Given the limited resources available and the importance of Central African forests to biodiversity conservation, there is an urgent need to prioritize the protection of the most important areas and to focus conservation efforts by studying landscapes locally and analysing their strengths and weaknesses. In their study, Grantham et al. (2020) applied a method for identifying priority conservation areas to maximize the biodiversity return on investment. Despite the greater resilience of intact forests compared with degraded forests, it is important to consider factors other than the "intactness" of the forests when identifying priority conservation areas to avoid overlooking vital ecosystems. The biodiversity present in an ecosystem should also be considered where determining how an ecosystem is prioritized for conservation, as should patch size and connectivity. According to their findings, DRC has the highest number of priority areas in the region, followed by Gabon, the Republic of the Congo and Cameroon. Community participation in conservation efforts is a necessary condition for success, not just for joint efforts to combat illegal logging, the expansion of subsistence agriculture and forest clearing for housing, but also for raising awareness of the need for forest conservation. The expansion of conservation areas will, moreover, reduce the resources available to local populations. It is therefore essential to ensure they benefit from the introduction of conservation measures. Ensuring local people are invested in the management of the forests around their villages, that they receive funds from the sale of carbon credits and that they have exclusive use of forests and access to non-timber forest products is one way to achieve a win-win for forest conservation and the economic development of remote villages (Djomo et al. 2018).

Community forests have existed in Central Africa since the late 1990s and were first introduced in Cameroon. Recognising the customary rights of forest communities, including their land rights, is considered one of the best ways to effectively protect forests while reducing poverty (Rainforest Foundation UK 2019). Unfortunately, the results in Cameroon are not very convincing, in particular due to the level of bureaucracy and the difficulty of organizing collective action within Cameroonian villages. Gabon, which authorized the assignment of community forests a few years ago, has faced similar challenges. DRC passed its own legislation on community forests in 2016 to allow communities to manage their forests according to their ancestral customs in perpetuity, which, according to Ewango et al. (2019), ensured better forest management. In CAR, the first community forest was created in 2019 and covered an area of about 15,000 ha. Equatorial Guinea has its own specific tenure categories, but because they do not grant the holder the right to use specific resources, they are not considered community forests. The Republic of the Congo, for its part, has still not authorized community forests. However, "Community Development Areas" have been set up around remote villages in concession areas to allow local people to farm, hunt and collect timber for local needs (Karsenty and Vermeulen 2016). Companies can still log in these areas if they pay the communities for the privilege.

Many protected areas have been created in Central Africa over the past two decades in an effort to reduce pressure on forests, preserve ecosystems rich in fauna and flora and benefit local communities (Bowker et al. 2016). However, a lack of financial, technical and human resources, alongside the political instability, corruption and conflicts present in many countries in the region, make it difficult to properly manage these protected areas. The question of whether protected areas effectively reduce deforestation is at the heart discourse in this area (Aubréville 1957; Troupin 1966; White 1986; Bowker et al. 2016; Vancutsem et al. 2020). It is difficult to make firm conclusions about the role protected areas play in forest conservation. Some studies (Joppa and Pfaff 2011; Bowker et al. 2016; Bruggeman et al. 2018) show that they are generally located in areas at low risk of conversion to another land use and that they are therefore at low risk of deforestation due to their characteristics. Bowker et al. (2016) argue that the effectiveness of forest protection measures differs enormously between protected areas in the same country. While good governance does play an important role in the management of these protected areas, it is not the only factor that determines the effectiveness of forest protection measures. Size and accessibility are other decisive features. Larger parks are more effective than smaller ones, likely due to their lower perimeter-to-area ratio. Indeed, the likelihood of the perimeter being breached is lower than for a protected area the same size. In DRC in particular, more remote parks have greater conservation potential. Some protected areas perform well mainly because of their difficult terrain, while others are particularly threatened and hard to protect because they are easy to access and closer to inhabited areas (Joppa and Pfaff 2011). These findings underscore the need to optimize which areas are subject to protection, taking into account the risk of degradation and the cost of protecting them (Joppa and Pfaff 2011).

Designating certified or uncertified forestry concessions makes it possible to delineate logging areas and curb illegal logging. If they are sustainably managed and established outside the boundaries of high conservation value areas, production forests can play a crucial role in biodiversity conservation (Duveiller et al. 2008). Selective logging has also been shown to have a low impact on biodiversity loss and, at an FSC-certified harvesting intensity, the majority of taxonomic groups have shown resilience (Lhoest et al. 2020). However, local disturbances (logging, hunting, poaching), made easier by the increased accessibility of remote areas, can impact conservation.

Mining, the last land use type we discuss here does not seek to conserve biodiversity or protect forest resources at all; to the contrary, mining concessions – prone to radically transform the landscape – are a major threat to forests.

The total area figures for the different land use classifications at the national level (see Figure 1.15) were calculated based on data from the 2020 IUCN World Database on Protected Areas (WDPA) for protected areas and from the 2019 survey for forestry concessions. The data on Cameroon's

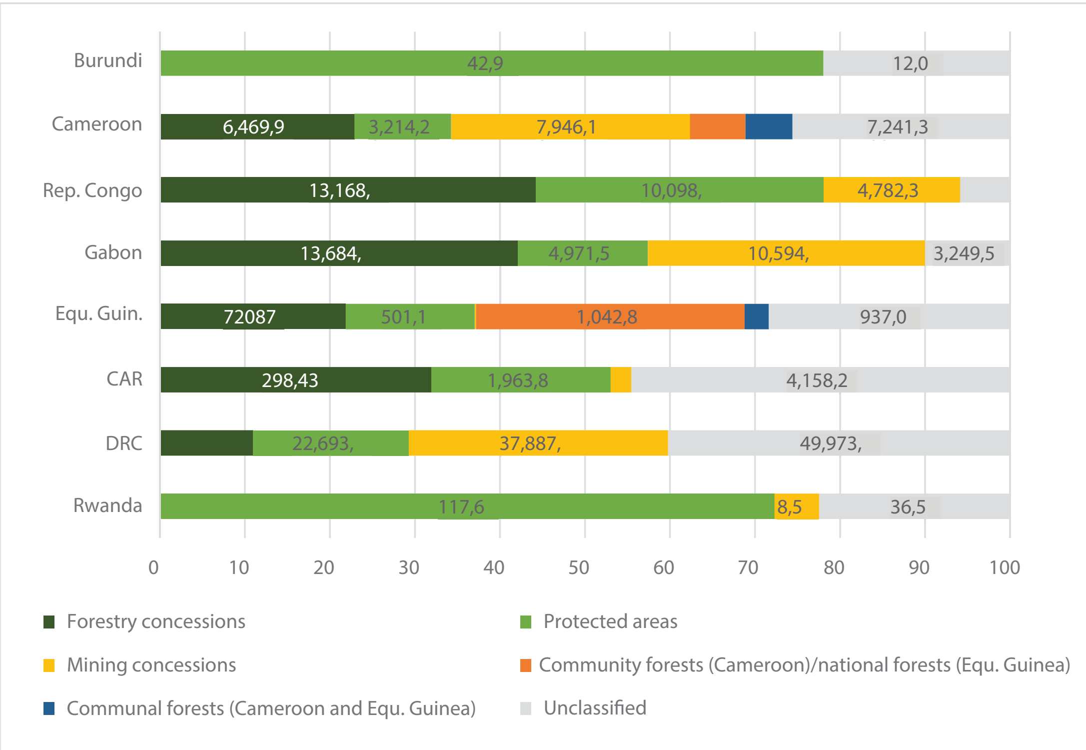


Figure 1.15: Forest cover (intact and degraded) by land-use classification by country (ha).

NB: Some countries have a total forest cover higher than 100 percent because there was forest regrowth between some land uses.

community and communal forests and that on Equatorial Guinea's national and communal forests come from the World Resources Institute (WRI). Mining permit data come from the SNL Metals & Mining database (accessed 2 December 2020). The level of forest disturbance in the different land-use classifications was calculated using the Joint Research Centre's TMF product (Vancutsem et al. 2021), which maps intact tropical moist forests, forests that have never been degraded over the observation period (2000–2019), degraded tropical moist forests and forests that have suffered visible degradation for up to 2.5 consecutive years over the timeframe studied.

The figures on forest disturbances by type of land use and by country (see Tables 1.3 to 1.6) highlight the magnitude of forest degradation and deforestation in forestry concessions in DRC and CAR compared with those observed in Cameroon or Gabon. Differences between countries are partly explained by different demographic contexts. In DRC, for instance, high population density near concessions leads to the blurring of the boundaries between the industrial and informal logging areas in a concession (Karsenty 2016). Concessions in DRC are usually very large, making them difficult to manage and leading to the gradual encroachment of smallholder farmers, illegal loggers and charcoal producers into the forest (Karsenty 2016). How areas are delimited may, in some cases, be another reason for differences between countries. For example, unlike DRC, Cameroon has a policy of excluding areas close to settlements from concessions. The most recent findings presented

Table 1.3: National annual rates of deforestation, degradation and regrowth in forestry concessions in dense forest areas in Central Africa, 2000–2010 and 2010–2020.

Country	2000–2010			2010–2020		
	Deforestation rate (%)	Degradation rate (%)	Regrowth rate (%)	Deforestation rate (%)	Degradation rate (%)	Regrowth rate (%)
Cameroon	0.02	0.05	0.00	0.04	0.16	0.01
Congo	0.04	0.11	0.00	0.13	0.30	0.01
Gabon	0.01	0.06	0.00	0.02	0.07	0.00
Equ. Guinea	0.01	0.10	0.00	0.06	0.24	0.01
CAR	0.25	0.17	0.00	0.27	0.33	0.03
DRC	0.19	0.32	0.00	0.46	0.54	0.05

Table 1.4: National annual rates of deforestation, degradation and regrowth in protected dense forest areas in Central Africa, 2000–2010 and 2010–2020.

Country	2000–2010			2010–2020		
	Deforestation rate (%)	Degradation rate (%)	Regrowth rate (%)	Deforestation rate (%)	Degradation rate (%)	Regrowth rate (%)
Cameroon	0.01	0.03	0.00	0.04	0.08	0.01
Congo	0.04	0.06	0.00	0.08	0.00	0.13
Gabon	0.01	0.04	0.00	0.01	0.06	0.00
Equ. Guinea	0.02	0.06	0.00	0.03	0.08	0.01
CAR	0.27	0.22	0.02	0.28	0.43	0.06
DRC	0.17	0.13	0.03	0.18	0.25	0.07

Table 1.5: National annual rates of deforestation, degradation and regrowth in mining concessions in dense forest areas in Central Africa, 2000–2010 and 2010–2020.

Country	2000–2010			2010–2020		
	Deforestation rate (%)	Degradation rate (%)	Regrowth rate (%)	Deforestation rate (%)	Degradation rate (%)	Regrowth rate (%)
Cameroon	0.11	0.22	0.00	0.19	0.45	0.03
Congo	0.04	0.20	0.00	0.19	0.44	0.01
Gabon	0.01	0.09	0.00	0.03	0.12	0.00
Equ. Guinea	0.02	0.25	0.00	0.14	0.74	0.02
CAR	0.39	0.46	0.02	0.32	0.65	0.08
DRC	0.65	0.60	0.04	0.70	0.93	0.23

Table 1.6: National annual rates of deforestation, degradation and regrowth in unclassified dense forest areas in Central Africa, 2000–2010 and 2010–2020.

Country	2000–2010			2010–2020		
	Deforestation rate (%)	Degradation rate (%)	Regrowth rate (%)	Deforestation rate (%)	Degradation rate (%)	Regrowth rate (%)
Cameroon	0.23	0.34	0.01	0.53	0.95	0.05
Congo	0.22	0.00	0.00	0.35	0.48	0.04
Gabon	0.05	0.00	0.00	0.12	0.00	0.27
Equ. Guinea	0.05	0.28	0.00	0.16	0.49	0.01
CAR	0.64	0.61	0.06	0.65	0.13	1.22
DRC	0.51	0.42	0.02	0.61	0.65	0.15

here are based on a 30 m resolution and are consistent with the study by Davis et al. (2020). This study concludes that forestry concessions benefit forest conservation in the majority of Central African countries with forests, with the possible exception of CAR and the Republic of the Congo (Davis et al. 2020). Panlasigui et al. (2018) have shown how the presence of forest concessions has significantly reduced forest loss on the Cameroonian coast where forests are under high pressure due to their proximity to the port city of Douala. Conversely, Karsenty and Hardin (2017) note that in regions where population pressure on forests is already high, the presence of forestry concessions can worsen forest loss. Moreover, when access to forests is improved as part of industrial activities, it becomes easier for subsistence farming, poaching or hunting to reach previously inaccessible areas (Karsenty and Hardin 2017; Tyukavina et al. 2018). It is therefore likely that hidden local factors influence whether forestry concessions have a positive or negative effect.

Deforestation and degradation rates in protected areas (see tableau 1.4) follow the same trends as rates in forestry concessions, i.e. there are more forest disturbances in CAR and DRC than in other forested countries. While deforestation rates in both types of area tended to increase between 2010 and 2020, deforestation rates in Equatorial Guinea and DRC are over twice as high in forestry concessions as in protected areas. In CAR deforestation rates remain very slightly higher in protected areas than in forestry concessions. Nevertheless, degradation rates are lower in protected areas than in forestry concessions (except in CAR) for the two timeframes studied.

The similarity of deforestation rates between protected areas and forestry concessions in some countries is surprising given that protected areas do not have logging routes, which are the main source of forest disturbances within the concessions. This suggests that some of the forests in protected areas have been degraded by illegal activities. In an effort to capture the diverse realities of protected areas, the Central Africa Forest Observatory (OFAC) analytical platform provides more detailed analyses of each protected area (https://www.observatoire-comifac.net/analytical_platform).

Across the whole Congo Basin, 5% of protected areas are overlapped by mining titles, of which 65% are occupied by forests (intact or degraded). Although currently prohibited in Cameroon, it was previously permitted for mining titles and conservation areas to overlap, which partly explains why mining concessions are found in 24% of the country's protected areas. In the Republic of the Congo, 7% of protected areas are overlapped by mining titles, with figures of 6% in Gabon and 3% in DRC.

For the two timeframes covered, the rates calculated here show that forest degradation and deforestation are greater in unclassified areas than in mining concessions for all forested countries, except in DRC, where the opposite is true. Forest regrowth rates follow an inverse trend and are higher in unclassified areas for all countries over both timeframes, except in DRC. In DRC, forest growth has been observed in mining concessions. However, in the absence of information on the mining activity carried out under the permits, it is difficult to quantify the impact of mining on forest disturbance. According to the 2018 WWF report, very few sites have entered the production stage. Therefore, the discovery of significant reserves could lead to major environmental damage (Grantham and Tibaldeschi 2018).

DRC and CAR have the highest rates of forest degradation and deforestation related to the mining sector (see Table 1.5). Excluding artisanal operations, 11.6% of DRC is covered by mining titles, of which 35% – almost 10 billion ha – cover forests. The impact of artisanal and small-scale mining is difficult to measure and monitor. Individual operations generally cause only minor damage, as they are short-term and affect very small local areas, but the cumulative effect of these negative impacts on the local area significantly increases the pressure on the forests. In addition to its impact on deforestation, artisanal mining also fuels conflicts in eastern DRC and feeds into the insecurity in that part of the country (Hund et al. 2017).

A 2017 WWF study on Cameroon, DRC, Gabon and the Republic of the Congo analysed the current state of mining and its impact on biodiversity conservation in the Congo Basin (Noiraud et al. 2017). Mining is more widespread in the forest region than oil and gas extraction (Hund et al. 2017). Countries in the subregion see mining as a key driver of their economic development. The direct and indirect risks of mining for the environment include deforestation – mainly due to the construction of the infrastructure required –, biodiversity loss and the pollution of aquatic environments. Large-scale mining operations tend to encourage the movement of large numbers of people seeking to benefit from the economic assets generated by mining. This situation leads, in turn, to a rise in poaching and subsistence agriculture (Hund et al. 2017; Noiraud et al. 2017). In Cameroon, the industrial mining sector is still in its infancy and mainly causes degradation through its exploration activities. Non-industrial operations, which also cause degradation, are however widespread.

Countries would benefit from drawing up national land use plans to enable different sectors to coordinate. This would help to avoid conflict over the use of the forest for production and conservation activities, mining and forestry concessions, the development of agribusiness and the protection of local populations' livelihoods.

1.3 Forest reference emission level of countries in the subregion

1.3.1 What is a forest reference emission level?

Context

The United Nations Framework Convention on Climate Change (UNFCCC) encourages countries to mitigate climate change by taking voluntary steps to reduce greenhouse gas emissions and increase the removal and long-term storage of greenhouse gases. The mechanism for reducing emissions from deforestation and forest degradation (REDD+) guides these efforts in the forest sector, targeting five activities in particular: (1) reducing emissions from deforestation, (2) reducing emissions from forest degradation, (3) conserving forest carbon stocks, (4) managing forests sustainably and (5) enhancing forest carbon stocks. Countries participating in REDD+ are also eligible to receive payments if they can demonstrate the effectiveness (or "results") of the REDD+ activities implemented.

Box 1.1: REDD+ and the Copernicus land monitoring service

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The REDDCopernicus project (https://www.reddcopernicus.info) was launched in 2019 to incorporate forest monitoring into the European Copernicus programme. It formed part of the EU Horizon 2020 programme. With a view to supporting REDD+ processes, this research and development project aims to coordinate and consolidate the EU's existing forest monitoring capacity, which relies on the Copernicus earth observation services.

The team has prepared a preliminary design for the planned Copernicus REDD+ services that incorporates the main technical and organizational components. A list of potential products, methods and data that might be suited to forest monitoring were subject to comparative assessment and nine products were selected covering four components: (1) analysis-ready satellite data (Sentinel-2 Global Mosaic 2 (S2GM-2) and JRC-L1C-S2 composites); (2) forest/tree cover status maps (tree cover density (TCD), Forest Type (FTY) and TMF products); (3) forest cover change maps((TMF) and Breaks for Additive Season and Trend (BFAST) products) and (4) forest disturbance and alert maps (Forest Canopy Disturbance Monitoring (FCDM) and BAYTS products). In addition to the above data components, the project also incorporates platform and service solutions for processing, downloading and analysing data.

Two online workshops were organized for users from the Congo Basin in September and October 2020 to further develop the initial design of the Copernicus REDD+ component and to collect feedback from users. Initially planned as face-to-face meetings, the workshops were successfully reorganized as webinars with interactive sessions using specialist online tools combining a geoportal and expert surveys. Participants included several national

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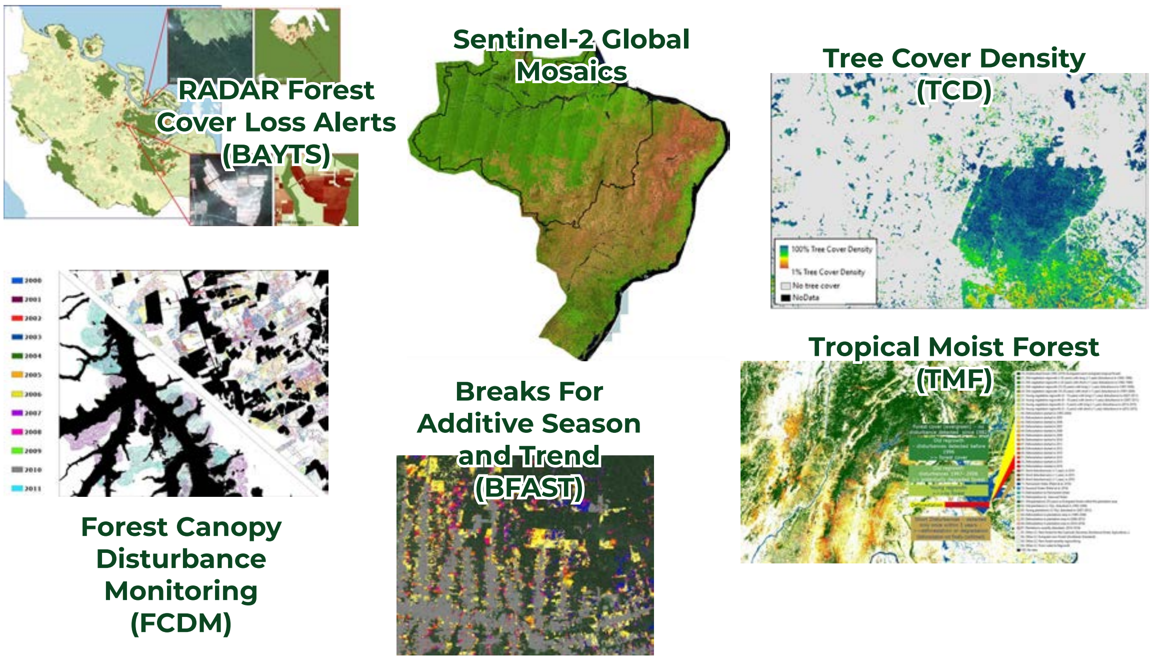
Box 1.1: continued



Data and products selected for the preliminary design and presented at REDDCopernicus workshops.

actors working in the field of forest monitoring and management (National Climate Change Observatory (ONACC), STREDD+, CNC, Gabonese Studies and Space Observations Agency (AGEOS), National Centre for Forest and Fauna Inventory (CNIAF), Marien Ngouabi University/Geomatic and Applied Tropical Ecology Laboratory (UMNG/LGETA), Directorate of Forest Inventories and Management (DIAF), Regional Post-Graduate Training School on Integrated Management of Tropical Forests and Lands (ERAIFT)) and regional or international institutions (OFAC/COMIFAC, FAO, WRI).

Case studies on example sites were presented at these workshops using a geoportal, developed specifically for the REDDCopernicus project. To evaluate how useful these products would be for monitoring and reporting on national REDD+ forests, feedback was collected from users using an online questionnaire.

Using the positive feedback collected from users during these online workshops, the products and services designed for the potential REDD+ component of the Copernicus land monitoring services will be refined to better meet national reporting needs.

Objectives

The performance of REDD+ activities is assessed using a baseline called the forest reference emission level, which only takes account of greenhouse gas emissions, or the forest reference level, which takes account of both greenhouse gas emissions and removals. To conduct a REDD+ performance assessment it is therefore necessary to measure the difference between the forest carbon flows observed after the implementation of measures to reduce greenhouse gas emissions and the flows that would have occurred without these interventions (business-as-usual or status quo scenario). The forest reference emission level is used for this purpose and is therefore a key pillar of the REDD+ mechanism. Establishing its forest reference emission level enables a country to (1) measure its contribution to climate change mitigation through its interventions to limit the negative impact of human activity on forest resources, (2) present this contribution in the context of the UNFCCC, (3) evaluate the effectiveness of the policies and measures implemented, and (4) receive payments based on its greenhouse gas emissions reduction results (CO_2, CH_4, N_2O).

Technical overview

There are a number of technical aspects to consider when establishing forest reference emission levels. They vary in complexity and are often interrelated. Some very general aspects will be covered below (readers can refer to the literature on the subject for more detail, e.g. Sandker et al. 2016). Countries may decide how to establish their forest reference emission levels, but the method used must meet certain criteria: **transparency** (concerning, for example, the methods and data used); **accuracy** and **precision** (following Intergovernmental Panel on Climate Change (IPCC) good practices: IPCC 2003; IPCC 2006; GFOI 2016)); and **completeness** (to allow independent assessors to re-construct the reference level (see Sandker et al. 2016)). It is also imperative that the method used to construct the forest reference (emission) level includes information on its parameters, for example, on **how forests are defined**, **the scope** (e.g. which REDD+ activities or which carbon and gas reservoirs are considered), **the scale** (e.g. national, provincial or biome level), **the reference period** (or historical period) and the **accounting period**. This information provides a framework for developing a method for monitoring greenhouse gas flows (often limited to measuring CO_2 emissions). The method chosen is used to quantify "historical" emissions over the reference period (2000–2014 in the illustrative forest reference emission level in Figure 1.16), i.e. before interventions began to be implemented to reduce greenhouse gas emissions from the forest sector. Historical emissions are used as a benchmark to estimate what the level of emissions would have been over the accounting period – i.e. the period following the implementation of interventions – if these interventions had not occurred (the business-as-usual scenario). The level of emissions over the accounting period can be projected using the average of the historical emissions (as shown in Figure 1.16). If a country considers past greenhouse gas emissions to be a poor predictor of its future emissions from the forest sector, especially where emissions have been planned before the national forest reference level is established (e.g. forestry concessions, national and local development plans, etc.), an "adjustment" to the national reference level may be considered. National reference levels are deemed to have been "adjusted" when criteria other than historical emissions are taken into account.

The performance of REDD+ activities can then be assessed by comparing current emissions with the national forest reference level established for the accounting period, expressed in tonnes of CO_2 equivalent (tCO2e) per year.

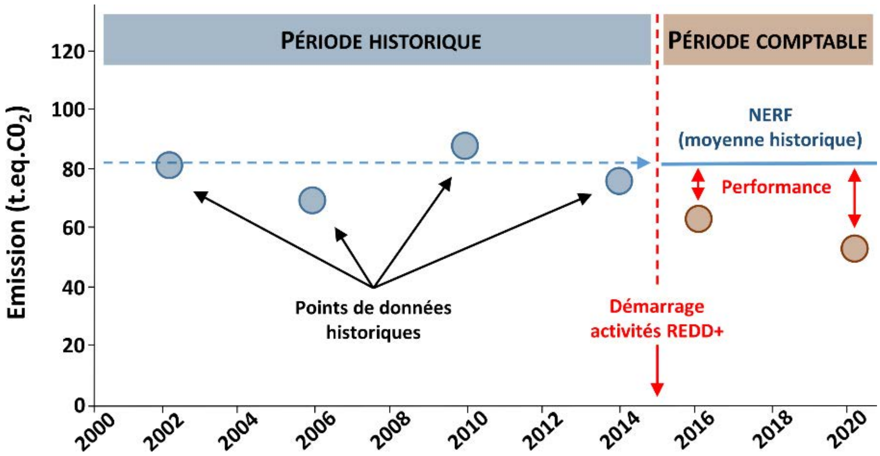


Figure 1.16: Example forest reference emission level

Calculating activity data and emission factors

How emissions are calculated to determine each historical data point (blue points in Figure 1.16) is a direct determinant of the reliability of national reference level estimates. The number of historical data points corresponds to the number of times a change was observed over the period studied. The calculation of emissions generally consists of two components: **activity data** and **emission factors**. Activity data relate to the spatial extent of a change in land use over a given time interval (for example, conversion from moist forest to cropland). Activity data are usually obtained by analysing satellite images to detect these changes and categorize them (e.g. from moist forest to cropland, in the example above) according to specified land use classes. Emission factors are an estimate of the difference between the carbon stock in forest biomass and the carbon stock in the land as used after conversion, and are typically estimated from inventory data (Sandker et al 2016). Multiplying activity data by the associated emission factor provides an estimate of the carbon flow over the time interval considered, which can be converted directly into CO_2 equivalent. A major challenge when establishing forest reference levels is minimizing uncertainties about activity data and emission factors, which together determine the accuracy of emission estimates.

1.3.2 Submission status of forest reference emission levels for Central Africa

At the time of writing, four Central African countries have submitted a forest reference emission level to the UNFCCC: the Republic of the Congo (2016), DRC (2018), Gabon (2021) and Equatorial Guinea (2020). CAR finalized its forest reference emission level in 2020, but has not yet submitted it to the UNFCCC. As the two most recent drafts have not yet undergone a technical evaluation, they are not commented on here, but do appear, for information, in Table 1.3. The forest reference emission levels of the Republic of the Congo, Gabon and DRC offer points of comparison, but also have salient differences in terms of the definitions, methods and data used.

Parameters of forest reference emission level submissions

While all three countries' forest reference emission levels cover their entire national territory, DRC's reference level is unique in that it is calculated by aggregating the estimated activity data for each of the country's 26 provinces. The calculation of activity data by province is justified in DRC by the country's large size and by the desire to be able to assess the impact of the various emission

Table 1.7: Overview of forest reference emission levels in Central Africa.

Country		Republic of the Congo	Gabon	Equatorial Guinea		Democratic Republic of the Congo		Central African Republic
Definition of forest		*Official & Technical*	*Official & Technical*	*Official*	*Technical*	*Official*	*Technical*	*Official & Technical*
	Area	0.5 ha	1 ha	0.5 ha	1 ha	0.5 ha	0.09 ha	0.81 ha
	Height	3 m	5 m	5 m	5 m	3 m	-	5 m
	Canopy cover	30%	30%	10%	30%	30%	50%	10%
Scope	**Activities**	Deforestation	Deforestation	Deforestation		Deforestation		Deforestation
		Degradation	Degradation	Degradation		-		Degradation
	Reservoirs	Above-ground biomass	Above-ground biomass	Above-ground biomass		Above-ground biomass		Above-ground biomass
		Below-ground biomass	Below-ground biomass	Below-ground biomass		Below-ground biomass		Below-ground biomass
		Deadwood biomass	Deadwood biomass	Deadwood biomass		-		Deadwood biomass
			Litter and soil organic carbon					Litter and soil organic carbon
								Harvested wood products
	Gases	CO_2	CO_2	CO_2		CO_2		CO_2, CH_4, N_2O
Scale		National	National	National		National		National
Periods	**Reference period**	2000–2012	2000–2009	2014–2018		2000–2014		2011–2018
	Accounting period	2015–2020	2010–2018	-		2015–2019		-
Activity Data	**Methodology**	*Sample-based (870 points)* *& Bookkeeping (pixel archiving)*	*Sample-based (665 points (primary sampling unit))*	*Sample-based (1,832 points)*		*Sample-based (21 323 points)*		*Sample-based (1,200 points)*
	Data points	1	1	1		2		4
Emission Factors	**Source:**	National forest inventory	National forest inventory	IPCC (2006)		Pre-dating the national forest inventory		National forest inventory
	Number of strata	5	7	7		6		4
Forest reference emission levels	**Approach used**	Historical average	Historical average	Historical average		Linear projection		Historical average
	Adjustment	Yes	Yes	-		Yes		-

reduction policies and interventions implemented at the provincial level, in view of the local context. However, this choice has serious implications in terms of the work required to calculate activity data. Similarly, the Republic of the Congo and Gabon use the same official and technical definitions of forest, but DRC has introduced an “operational” definition that differs from the official definition of forest for technical reasons (see Table 1.3). This operational definition allows for the area of the reference samples to be adjusted to the spatial resolution of the map showing land use change (i.e. 30 x 30 m), given that this method uses the reference sample areas to describe the extent of the forest. Unlike the Republic of the Congo and Gabon, DRC does not consider forest degradation. However, the operational definition of forest in DRC means that emissions associated with tree cover loss that is much lower than that considered in the Republic of the Congo or Gabon will be taken into account. This should make it possible to more accurately quantify the country's forest-related emissions, which are often linked to small-scale land use changes (in particular, slash-and-burn agriculture). In addition to above-ground and below-ground biomass, the Republic of the Congo and Gabon include dead wood as a carbon reservoir when calculating their forest reference emission levels. Moreover, the Republic of the Congo and Gabon use the historical average to determine their forest reference emission levels, while DRC uses a linear projection. In line with the Forest Carbon Partnership Facility (FCPF) methodological framework, existing carbon stocks may be adjusted upward by up to 0.1% per year. The Republic of the Congo, Gabon and DRC all take advantage of this possibility.

Calculation of activity data

Two main methodological approaches can be used to calculate activity data. For the first method, considered state of the art, random reference samples from the whole territory are interpreted and stratified using the pixel change map (Olofsson et al. 2014). This sample-based approach was used to calculate the forest reference emission levels of the Republic of the Congo, Gabon, and DRC, with a respective 870, 665 and 21,323 samples interpreted using satellite images. The very high number of samples used in DRC is a direct result of the decision to quantify the activity data for each of the country’s 26 provinces.

An alternative method, not adopted at the time, involves mapping changes in land use using satellite images to produce a map of changes. Activity data are then obtained by adding together the area of the pixels showing the transitions (from dense moist forest to cropland, for example). This *pixel-based* approach, based on data from Global Forest Watch, leads to seriously flawed results that underestimate cover loss in tropical moist forests in Africa by around 90% (Tyukavina et al. 2015).

Calculation of emission factors

All three countries use inventory data to calculate their forest reference emission levels. The Republic of the Congo uses data taken from the National Forest Inventory (NFI). This inventory, carried out between 2007 and 2015, covers the entire country, except the swamp areas in the east of the country. These data are converted to biomass estimates using a pan-tropical allometric equation that fails to account for variations in height-diameter allometry. This weakness is noted as a possible point of improvement in the forest reference emission level documentation. Gabon began collecting new inventory data in 2017 and in 2020 covered 104 non-mangrove forest sites. The pan-tropical allometric equation used converts tree diameter into above-ground biomass and takes account of variables like wood density and tree height. In DRC, the inventory data predate the national forest inventory, given that the first national inventory only started in 2018. While the country’s emission factors were calculated using an allometric equation for estimating biomass that takes account of tree height, and therefore of variations in height-diameter allometry, using data from the first national forest inventory would significantly improve these estimates.

1.3.3 Forest reference emission levels at the provincial level: Case study of Maï-Ndombe province in the Democratic Republic of the Congo

Activity data and the associated emissions were estimated for Mai-Ndombe province in DRC for a 2005–2014 reference period and for an initial 2018–2019 accounting period in line with DRC's Programme Document and the Emission Reductions Payment Agreement (ERPA). The end date of the reference period aligns with that of the national forest reference emission level, but the start date is set at 2005 because the Carbon Facility's methodological framework requires a duration of around 10 years. The method used was based on good practices recommended by the IPCC. Such approaches use statistically unbiased estimators with known uncertainty. Strata were established using maps produced from remote-sensing data, making it possible to take a stratified random sample for the probabilistic analysis of Landsat and Google Earth time series reference data. The maps produced showed relevant forest cover transitions, in particular the dynamics of dense moist forest loss and the dynamics of secondary forest loss and gain. Landsat imagery was used to map the province. The reference data interpreted were used to calculate net activity data in relation to forest change with a target margin of error of ± 20 percentage points at the 90% confidence level for each activity class, which was achieved using 2,000 reference samples. The resulting area estimates were combined with national emission and removal factors to estimate emissions and removals at the province level. A reference level was calculated for emissions and another for removals to account for the inherent effects of removals.

The reference emission level was derived from the averages for shorter periods, 2005–2009 and 2010–2014, and was calculated based on annual emissions of 28,917,393 tCO_2/year and annual removals of -1,680,533 tCO_2/year, resulting in an average of 27,236,859 tCO_2/year. To this total, 5,788,886 tCO_2/year were added following the 0.1% adjustment (see *Contours des soumissions NERF*) giving a total of 33,025,746 tCO_2/year (see Tables 1.4 to 1.7 and Figure 17 for all figures). Over the reference period, there was a significant upward trend in emissions, with the 2005–2009 emission level of 18,092,216 tCO_2/year doubling to 36,971,610 tCO_2/year in 2010–2014. This situation justifies the inclusion of an alternative reference emission level based on a business-as-usual scenario. Although many business-as-usual adjustments are possible, a scenario that is conservative compared with other options was established by projecting a straight line between the first and last years of the reference period using the average emissions in the sub-period. Any other line between the two periods would be less conservative.

Estimated net emissions for the first two years of the accounting period, 2018–2019, were calculated based on emissions of 42,854,387 tCO_2/year and removals of -2,855,028 tCO_2/year, the latter calculated on the basis of projected rates of forest gain. This calculation results in net emissions of 39,999,359 tCO_2/year, well above the FCPF reference level, but below the conservative business-as-usual adjustment of 44,523,368 tCO_2/year for the same period. The business-as-usual scenario therefore shows an emission reduction of more than 4 million tCO_2/year over the 2018–2019 accounting period. This suggests that an upward trend in emissions over the reference period could justify a business-as-usual adjustment when assessing the performance of the emission reduction programme in Mayi-Ndombe province in DRC.

Table 1.8: Revised activity data from the University of Maryland for the reference period (2005–2014).

Land use change	Activity data (ha)	90% confidence interval (+/- ha)	Uncertainty
Deforestation, primary forest	154,643	18,685	12.1%
Deforestation, secondary forest	381,344	47,602	12.5%
Degradation	144,756	23,176	16.0%
Regrowth, primary forest	N/A	N/A	N/A
Regrowth, secondary forest	239,234	31,151	13.0%

Table 1.9: National emission factors (submission to UNFCCC).

Land use change	Emission factors (tCO_2/ha) Removal factors (tCO_2/ha/year)	90% confidence interval (+/- tCO_2/ha)	Uncertainty
Deforestation, primary forest	688.30	58.74	8.5%
Deforestation, secondary forest	351.23	104.14	29.6%
Degradation	337.07	61.64	18.3%
Regrowth, primary forest	N/A	N/A	N/A
Regrowth, secondary forest	-17.56	5.21	29.6%

Table 1.10: Revised reference emission level based on University of Maryland activity data and national emission factors.

Land-use change	Emissions / Removals (tCO_2/year)	90% confidence interval (+/- tCO_2/year)	Uncertainty
Deforestation, primary forest	10,644,095	1,574,557	14.8%
Deforestation, secondary forest	13,394,055	4,308,914	32.2%
Degradation	4,879,243	1,185,873	24.3%
Regrowth, primary forest	N/A	N/A	N/A
Regrowth, secondary forest	-1,680,533	524,297	-31.2%
Forest reference level	**27,236,859**	4,767,300	17.5%
Adjustment	**5,788,886**	569,825	9.84%
Adjusted forest reference level	**33,025,746**	4,801,234	14.54%

Table 1.11: Results of the emission reduction programme for the first reporting period.

Forest reference (emission) levels and emissions, 1st reporting period	Emissions / Removals (tCO_2/year)	90% confidence interval (+/- tCO_2/year)	Uncertainty
FCPF forest reference level - emissions	34,706,279	4,801,234	14.5%
FCPF - Baseline removals, 1st accounting period (2018–2019)	-1,680,533	524,297	31.2%
FCPF forest reference level	33,025,746	4,829,776	14.6%
Emissions, 1st accounting period (2018–2019)	42,854,387	18,814,673	43.9%
Removals 1st accounting period (2018–2019)	-2,855,028	738,285	-25.9%
Net emissions, 1st accounting period (2018–2019)	**39,999,359**	18,829,152	47.1%
Business-as-usual (BAU) emissions (2018–2019)	**44,523,368**		
Emission reductions, 1st accounting period (2018–2019) with FCPF adjustment	**-6,973,613**		
Emission reductions, 1st accounting period (21 Sep 2018 - 30 Jul 2019) with FCPF adjustment	**-5,977,382**		
Emission reductions, 1st accounting period (2018–2019) with BAU adjustment	**4,524,009**		
Emission reductions, 1st accounting period (21 Sep 2018 - 30 Jul 2019) with BAU adjustment	**3,877,723**		

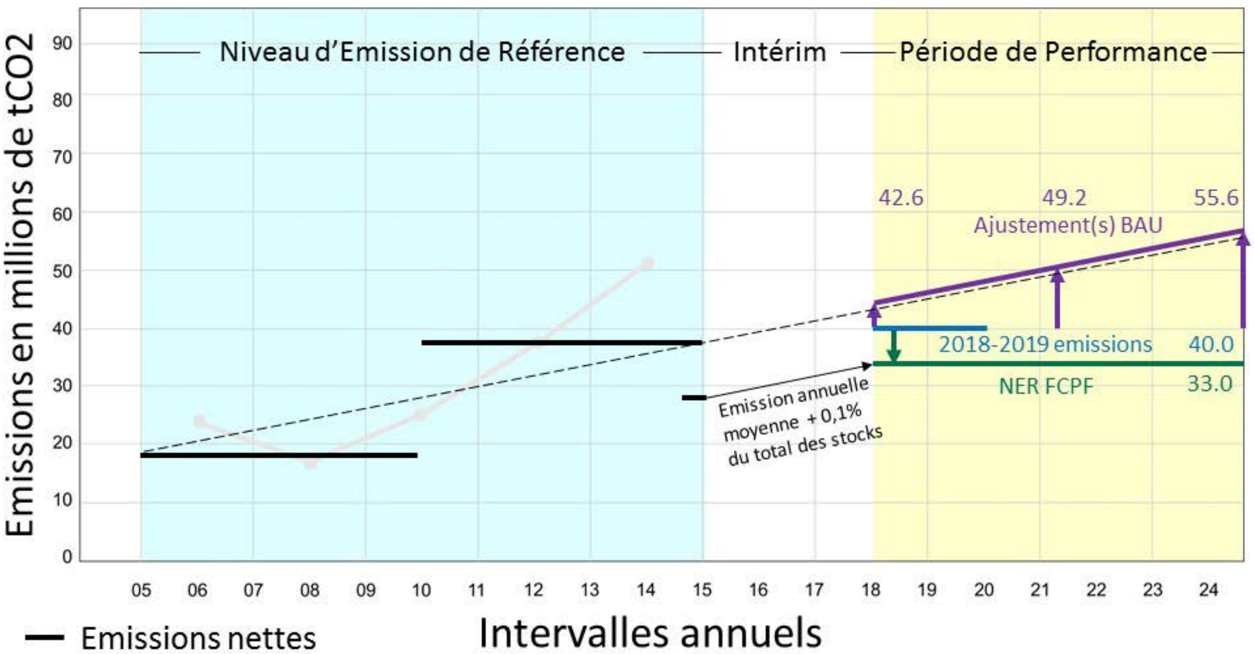


Figure 1.17: Graph showing the reference emission levels and accounting period for Mai-Ndombe province, DRC. Reference emission levels are shown as black lines, estimated emissions in the accounting period are shown in blue, and FCPF and business-as-usual adjusted reference emission levels are shown in green and purple, respectively. Gross annual emissions are shown in grey in two-year intervals and mirror the increasing emissions rate over the reference period.

Conclusions and outlook for forest monitoring in the Congo Basin

Since 2000, the loss of intact forests has accelerated in all Central African countries, with deforestation rates reaching highs over the past five years. If the current pace of deforestation and forest degradation continues, 27% of the undisturbed moist forest in Central Africa (including Angola and Uganda) that existed in 2020 will have disappeared by 2050.

Land-use policies are a valuable tool in the fight against deforestation and forest degradation. Protected areas, forestry concessions and community forests can significantly reduce forest loss and engage local people in the conservation of forests, while securing their livelihoods.

When it comes to monitoring deforestation and degradation at the national or sub-national level, methods for monitoring forest cover and the associated biodiversity will undoubtedly improve. New opportunities for monitoring forest ecosystems have opened up thanks to the launch of the Sentinel-1 and Sentinel-2 satellites in recent years and the availability of free Planet data through Norway's International Climate and Forest Initiative (NICFI). The spatial and temporal resolution of these data makes it possible to accurately monitor Central Africa’s tropical forests. The redundancy of the observation system and the long-term nature of the Sentinel satellite mission mean that remote sensing is likely to be the main operational source of information for monitoring forest change in the coming decades.

The GEDI and Biomass satellites will improve the quality of biomass mapping, which still has many weaknesses. The development of networks for the collection of field data will continue to be essential for the adjustment and evaluation of the relationships between sensor measurements and biomass reference estimates made on the ground.

Finally, it is important to significantly increase the transparency and traceability of monitoring systems and to ensure the independence of national authorities when they produce their reports. The disconnect between the people monitoring the forests and the countries conserving them negatively affects the legitimacy, effectiveness and dissemination the information generated. It is therefore important to hand over the leadership of forest monitoring efforts in the Congo Basin to national experts from COMIFAC member countries, while also harmonizing the methods and forest type definitions used in the region.

CHAPTER 2

The evolution of the wood subsector in the Congo Basin

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Photo by Mokhamad Edliadi/CIFOR

2.1 State of the knowledge: Figures and trends

2.1.1 The management of production forests in Central Africa

Areas and concessions

Forest area

Of the 200 million hectares of dense moist forest in Central Africa (Vancutsem et al. 2020), just under 30 million hectares are classified as protected area and nearly 54 million hectares (27 percent) are classified as production forest of various types, mainly in the form of forestry concessions.[1]

It follows that more than 100 million hectares of forest in Central Africa have not been assigned any specific classification. Such forests are located mainly in the Democratic Republic of the Congo (DRC), as well as in Cameroon. Land-use policies must classify these vast areas to reconcile, as far as possible, the conservation of forest ecosystems, the sustainable use of their resources, differing local demands and economic development.

In DRC in recent years, many conservation concessions have been created, either by converting production forest concessions (reducing the area presented in Table 2.1) or by creating new concessions. There are no comprehensive public data on these concessions, which were thought to cover several million hectares at the end of 2021 (more than 6 million hectares according to an estimate by FRMi). These concessions aim to help reduce greenhouse gas emissions.

Table 2.1: Classification of dense moist forest in the Congo Basin

Country	Total area of dense moist forest (ha)[1]	Area of forest cover used for production[2]	Area of forest cover used for conservation[3]	Area of unclassified forest cover
Cameroon	21,500,000	8,740,404	2,938,825	9,820,771
Congo	23,300,000	13,411,074	2,995,833	6,893,093
Gabon	23,900,000	15,722,201	3,570,894	4,606,905
Equatorial Guinea	3,300,000	1,035,921	502,030	1,762,049
CAR	8,700,000	3,084,409	1,687,578	3,928,013
DRC	116,900,000	11,743,873	15,760,600	89,395,527
Total region	197,600,000	53,737,883	27,455,760	116,406,358

1 Vancutsem et al. 2020
2 Estimate based on Central African Forest Observatory (OFAC) data
3 World Database on Protected Areas (WDPA) – IUCN 2020

1 https://www.iucn.org/theme/protected-areas

Forestry concessions

In the Congo Basin, except in Equatorial Guinea, natural forests used for the industrial production of timber are managed according to a single model, founded on five basic principles:

- Natural forests are public property;
- The government grants private operators the right to harvest wood within forest areas covering tens of thousands to a million hectares (averaging 116,000 hectares) over 20 to 35 years;[2]
- The holder of a forestry concession is obliged to manage the forest and preserve the integrity of the concession in line with certain standards, following a management plan that specifies the rules for logging in the forest and how it will be managed;
- Concessionaires are required to draw up forest management plans on the basis of (multi-resource) forest management inventories and socioeconomic studies; The government must approve the documents and monitor their implementation;
- Concessionaires are required to contribute to the local development of the region where they operate.

The forest management standards that flow from this model are therefore substantially the same. They were conceived in the 1990s with the support of projects financed by international assistance:

- Forestry activities are planned based on field surveys and studies;
- Concessions are divided into sub-divisions called 'series';
- Logging activities extend across the entire area over a 20-to-35-year harvest cycle;
- Minimum cutting diameters are set for each species, subject to the satisfactory renewal of the resource between two cutting cycles;
- In addition to sustainable wood production, social and environmental sustainability must also be considered.

This forest management process, which is now mandatory, has become more widespread since the 2000s. This pattern is set to continue considering that almost 70% of forestry concessions are equipped with a management plan. Beyond finalizing the management process in the outstanding 30 percent, we now face the challenge of ensuring that the resulting plans are implemented properly in all forestry concessions. Indeed, proper implementation is not guaranteed given the governance situation in the region, where states fail to monitor compliance with management documents.

The forest management model used in Central Africa has proven able to respond effectively to the need for sustainable resource management. It has in part compensated for the lack of comprehensive classification and weak government capacity around forest management. Nevertheless, it is governments that are responsible for establishing the rules for forest management and for verifying that management plans comply with those rules.

In parallel, certification standards have been developed that enable producers, on a voluntary basis, to have their operations certified and guarantee compliance with government-defined forest management principles.

2 Only CAR's legislation grants logging and forest management permits for the lifetime of the beneficiary company.

Table 2.2: Summary of concession areas in the Congo Basin

	All forestry concessions			Assigned forestry concessions					Managed concessions		Certified concessions	
	Area (ha)	Number	Average area (ha)	Area (ha)	Number	Percentage of productive area	Productive area	Average area (ha)	Area (ha)	Percentage	Area (ha)	Percentage
Cameroon	8,354,856	192	43,515	8,017,016	169	90%	7,220,957	47,438	7,647,610	95%	3,163,340	39%
UFA	6,732,048	120	56,100	6,620,388	117	90%	5,963,992	56,585	6,250,982	94%	3,163,340	48%
Communal forests	1,622,808	72	22,539	1,396,628	52	90%	1,256,965	26,858	1,396,628	100%	0	0%
Rep. Congo	14,800,000	59	250,847	14,471,917	56	65%	9,377,387	258,427	8,597,046	59%	3,380,692	23%
North/central Rep. Congo	9,523,777	21	453,513	9,523,777	21	71%	5,724,725	453,513	6,145,321	65%	2,989,168	31%
South Rep.Congo	5,264,497	38	138,539	4,948,140	35	74%	3,652,662	141,375	2,451,725	50%	391,524	8%
Gabon	15,999,498	116	137,927	14,688,311	108	92%	13,513,246	136,003	13,800,000	94%	3,023,140	21%
Equatorial Guinea	1,064,900	98	10,866	1,064,900	98	90%	958,410	10,866	0	0%	0	0%
CAR	3,706,106	14	264,722	3,249,505	12	68%	2,201,449	270,792	3,249,505	100%	0	0%
DRC	17,410,017	182	209,952	14,124,506	132	55%	7,809,267	225,336	8,500,000	60%	749,753	5%
Forestry concessions	15,370,392	81	189,758	12,780,086	62	55%	7,065,954	206,130	8,500,000	67%	749,753	6%
Community forests	2,039,625	101	20,194	1,344,420	70	55%	743,313	19,206		0%	0	0%
Total	61,335,377	661	92,792	55,616,155	575	74%	41,080,716	96,724	40,397,533	73%	10,316,925	19%
Of which are long-term concessions	57,672,944	488	910,221	52,875,107	453	74%	39,080,438	116,722	40,397,533	76%	10,316,925	20%

Data sources:
- On certified concessions: ATIBT 2021
- Cameroon: WRI 2020
- Republic of the Congo: FRMi 2022
- Gabon: FRMi 2022
- Central African Republic: South-West Regional Development Project (PDRSO) 2020
- DRC: Support Project for Sustainable Forest Management in DRC (AGEDUFOR) 2018. Update FRMi 2021
- Equatorial Guinea: FRMi-African Development Bank (AfDB) 2018

The Central African forest management model is not at issue, though there is room for improvement, which will happen over time. It is a major asset for the preservation of these forests and their sustainable use. However, more than 15 years after the first management plans were approved, it remains crucial to assess how these documents have been implemented.

Box 2.1: Log production sharing contracts: New challenges for the forestry sector in the Republic of the Congo

The Republic of the Congo's new Forestry Act (No. 33-2020 of 8 July 2020) has revolutionized contracts between the government, which owns the forests, and forestry concessionaires.

The current concession regime is temporary and governs the transition, within three years, to a new "production sharing" system inspired by the contracts signed in the oil sector.

The Forestry Code states that "the procedures for establishing production sharing arrangements shall be laid down by law" and also provides for production sharing contracts to be negotiated by the Minister for Forests and then approved by the government (Council of Ministers and Parliament). The introduction of the production sharing system will be accompanied by certain forestry tax exemptions, which should be offset by the income the state generates from timber sales.

The main objectives of this production sharing system are to significantly increase the forestry sector's contribution to the country's GDP (currently 5-6 percent) and to increase government revenue streams. To achieve these objectives, the production sharing system will divide the logs produced between the state and the forestry operator. The state's log allocation will be used to supply new specialized industries. These new industries will be able to set up in Special Economic Zones (SEZs). SEZs are industrial hubs offering attractive conditions for new investments and are another pillar of the Republic of the Congo's forestry policy.

The legal provisions governing this production sharing system remain to be clarified.

During the transition to the production sharing system, care should be taken not to jeopardize industrial investments already made by concessionaires. This is particularly important where these investments are intended to increase the marketability of well-known species that, in some cases, already benefit from optimal mobilization.

The forest management role already entrusted to concessionaires should also be recognized and maintained.

If the challenges described above are overcome, this new contract type will offer an opportunity for the wood sector in the Republic of the Congo to progressively diversify its harvests, add more value to the sustainably managed resources available, better supply the legal timber market and, ultimately, increase the positive economic effects of this sector.

Other production forest management models: Community and communal forests

The majority of countries in the Congo Basin have adopted regulations governing the development of community forestry. Some frameworks have been introduced more recently, as is the case for DRC, which adopted its national community forestry strategy in 2018, and for the Republic of the Congo, which revised its forestry code in 2020, clarifying the definition of a community forest.

The specifics of the legislation adopted in each country do nevertheless have significant differences (see Box 2.3).

Box 2.2: The community forest management model implemented in Maniema with the support of GIZ

GIZ has been working in Maniema province, DRC, in the area of community forestry since 2011 within the framework of the national Forestry Code and the 2014 regulations on Local Community Forestry Concessions (LCFC), and as part of its biodiversity conservation and sustainable forest management programme. An LCFC covering 47,013 ha of natural forest was set up and formally established in the Bisemulu community area. It is co-managed with local people in the Lomami National Park.

To set up this LCFC it was necessary to undertake a number of preparatory activities: participatory mapping, forest inventories, completing the concession application documents, drawing up a simple management plan and establishing the bodies responsible for managing the concession. The community set up a cooperative, primarily responsible for managing the cutting, transport and sale of the trees. Two logging operations have been undertaken since 2019 and the income invested into a community development fund. These funds will be used to implement specific community projects as set out in the local development plan.

Based on this experience, there are plans to create nine additional LCFCs in 2021–2026. Four potential sites have already been identified through the analysis of satellite imagery. An awareness campaign will be conducted in the local communities to ensure that local people are interested in participating in the initiative and to explain the process of creating an LCFC. This campaign aims to obtain the formal agreement of local communities and to gather their initial opinions on how the concessions should be used. From this starting point, the boundaries of the local community's forest and the LCFC will be mapped with the participation of local people and the available resources inventoried (wood, non-timber products and wildlife). Finally, agreement will be sought among all major stakeholders concerning the purpose of the LCFC.

Experience to date has highlighted several important points:

- Involving local people in mapping reduces conflicts over territorial boundaries;
- Provincial, local and community governments need to be strengthened;
- Other actors should be kept in the loop to combat illegal logging and to upgrade roads.

Box 2.3: Regulatory framework for local authority forests in the Congo Basin

In Cameroon, Forestry Act No. 94/01 of 20 January 1994 lays down the arrangements for managing communal forestry, the bedrock of decentralized forest management. It is supplemented by Act No. 2004/019 laying down the rules at the regional level. These two acts are accompanied by a regulatory framework that specifies where these areas can be established and how they should be managed. Cameroon is the only country in the Congo Basin that has seen its communal forests grow in size since the 2000s, reaching nearly 2,356,807 ha in 2019.

In the Republic of the Congo, Act No. 33-2020, establishing the Forestry Code, provides for the creation of local authority forests in Articles 24 to 26. The implementing decrees have not yet been drawn up and the majority of forests have already been assigned, making the creation of these forests uncertain. These forests will be privately owned by local authorities.

The CAR's Forestry Code establishes a forest domain for public authorities, but the status of forests under this classification is poorly defined. Though they do not yet exist, the decrees on this classification are expected to assign these forests to public authorities' private domain and specify what management rules should be applied.

In September 2015, DRC introduced an "artisanal forestry unit" status allowing for an area of up to 500 ha to be assigned within the protected forest domain. These units are managed by a decentralized territorial entity (sector/chiefdom/municipality) and an agreement is entered into with the local community which has customary ownership rights. Part of the income from the logging activities is paid to decentralized territorial entities to fund local development.

In Rwanda, the forestry policy, laid down in Act No. 47/1988, stipulates that decentralized authorities must involve local communities in the management of forest resources. They are mandated, among other things, to partner with the private sector to facilitate investment. The Environment Code makes districts responsible for protection, reforestation and forest management (Article 61 of Framework Act No. 04/2005 of 8 April 2005).

In Chad, local authorities were first granted the right to create and manage departmental or communal forests within the framework of decentralization. The Forestry Act also provides for the decentralized management of natural resources. The forest domain is therefore comprised of state forests and those of the decentralized local authorities, as part of their respective private domains.

Local authority forestry in the Congo Basin mainly takes the form of ineffective legal statements (Republic of the Congo, CAR, Chad), a flawed legal framework (Rwanda, Burundi) or one that is only in its infancy (DRC). However, a number of countries are willing to reform or implement regulations in this area (Republic of the Congo, DRC). Cameroon, the most advanced country when it comes to the creation and management of local authority forests, has improved how the financial resources generated by logging are used to build infrastructure to promote local development, in particular through Order No. 76/2012 and its finance acts. It is hoped that these forests will make a more marked contribution to the local economy in the future and that all Central African countries will engage more proactively with this process.

While community forestry does seem to be gaining ground across the subregion, it was first introduced in Cameroon 20 years ago. This initial model faced challenges around implementation, resulting in a large volume of illegal timber being taken from community forests. It contributed little to the national economy and was linked to unsustainable forest management. These challenges, coupled with land grabbing and the misappropriation of funds, prevented the legislation from achieving its aim of improving local people's standard of living.

Community forestry does however remain an avenue for communities to guarantee access to the land, carry out customary activities, harvest timber for local needs and gather firewood and non-timber forest products. Some of these activities are also permitted in forestry concessions.

Experience has shown that, as in the case of Cameroon, logging in the context of community forestry faces a number of technical and organizational challenges. Forests can be used in other ways that may be conducive to sustainable development.

Conservation is one possibility, although it might only be accepted by communities as part of a wider rural development project. Other productive activities can also be identified within communities such as creating tree plantations, collecting non-timber forest products, and conducting agroforestry or REDD+ community projects. However, positioning these activities within viable economic models that can fund forest management and provide an income to the community remains a challenge.

Community-based artisanal logging could serve the local legal wood market and could facilitate the development of an artisanal wood value chain with the associated socioeconomic benefit of meeting local communities' basic needs (construction of housing, firewood, supplementary household income). Requiring significant technical capacity, such an initiative would involve equipping communities with the skills needed for forest management and logging, or developing partnerships with management or logging operators. It would primarily target the very local market, focusing on nearby towns, given the significant logistical barriers to supplying more distant markets. Tailored implementation approaches should be used, like that proposed by the Developing Community Alternatives to Illegal Logging Project (DACEFI2) in Gabon. Under this model, the forest is managed sustainably by rural people who are legally permitted to harvest forest resources and who will see their incomes rise. The classification of land in community forests is decided by the community with areas assigned to agriculture, logging and conservation.

While community forestry in the Congo Basin has had mixed results and the initial aim of allowing local communities to benefit directly from forest management has not yet been realized, this model is continuing to gain ground in the subregion. It has been heralded as a way to strengthen communities' livelihoods, to contribute to the protection of forests and to achieve climate objectives, though these benefits still remain to be seen in practice. All stakeholders have a role to play in ensuring that the community management of forests contributes to the health of forested areas and supports inclusive development (FERN 2019).

Legal timber production: Certification and inspection mechanisms (in particular, Forest Law Enforcement, Governance and Trade (FLEGT))

Initiatives to promote legal and responsible forest management

Following awareness campaigns and major international debates, distributors and some importing states are more alert to the issue of responsible forest management and take greater care to determine the origin of the wood they buy and the conditions under which it was produced. To ensure that producers follow legal and sustainable forest management practices, incentive schemes have been set up to encourage better adherence. Such schemes include private certifications and institutional mechanisms, such as FLEGT.[3]

Third-party forest certification

The idea of sustainable forest management certifications emerged in the early 1990s as an innovative way to promote sustainable forest management by bringing different stakeholders together.

Forest certification initiatives have faced a slow and difficult road in Africa, particularly Central Africa, despite the forests of the Congo Basin forming the second largest tropical forest block in the world.

Following Gabon's early efforts dating back to 1996, companies really began to take notice of forest certification in 2004. At first the focus was on legality (OLB, Timber Legality & Traceability Verification (TLTV), Verification of Legal Origin (VLO)/Verification of Legal Compliance (VLC)),[4] but later shifted to sustainable management, such as the Forest Stewardship Council (FSC) certification, first issued in 2005. In parallel to these advances, a certification system that more closely reflected the realities of logging in Central Africa was developed through national Pan-African Forest Certifications (PAFCs) (recognized by the Programme for the Endorsement of Forest Certification (PEFC) system), with the first certificate issued in Gabon in 2018.

Following steady growth between 2004 and 2010, forest certification initiatives encountered a number of difficulties, resulting in a slowdown in new requests for certification. These difficulties included high implementation costs, low-paying markets, pressure from stakeholders, flawed governance and difficulties complying with regulatory requirements. 2018 marked a turning point in the evolution of certification processes. Two leading certification groups ended their activities in Cameroon, terminating their FSC certificates, while – around the same time – PAFC Gabon issued its first certificate and various countries introduced incentives (see Table 2.3).

The situation then began to gradually improve, thanks in part to the support of the Programme for the Promotion of Certified Forests (PPECF) and its certification support programme. DRC joined the movement with two certificates of legality and the outlook is good for 2021, particularly in Gabon. This trend is further bolstered by measures and incentives adopted to promote certification.

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3 Forest Law Enforcement, Governance and Trade

4 OLB certification from Bureau Veritas; TLTV was proposed by SGS and subsequently withdrawn; the VLO (VLO/VLC) certification was replaced by the LegalSource certification from Preferred by Nature (formerly NEPCon).

Box 2.4: The Pan-African Forest Certification (PAFC) Congo Basin Initiative

Since 2019, ATIBT has been developing a Pan-African Forest Certification (PAFC) system for the Congo Basin recognized by the Board of the Programme for the Endorsement of Forest Certification (PEFC).[1]

By taking a regional approach, the costs of PEFC certification will be minimized in the three target countries, as they can pool their resources to pursue certification through their national PAFC bodies.[2] This will make it easier to implement and reduce the associated cost for businesses.

In the first phase, the application file was prepared and submitted to PEFC International requesting recognition of the PAFC scheme.

A key document included in the application file was the forest management standard approved by stakeholders in November 2020. This reference document, which has stimulated intense debate, proposes to introduce innovative requirements, such as a management system, social and wildlife management plans, greenhouse gas assessments and carbon stock estimations.

1 It is funded by the Programme for the Promotion of Certified Forests (PPECF), PEFC International and IDH The Sustainable Trade Initiative.

2 There are currently three national PAFC initiatives: PAFC Gabon, PAFC Cameroon and PAFC Congo.

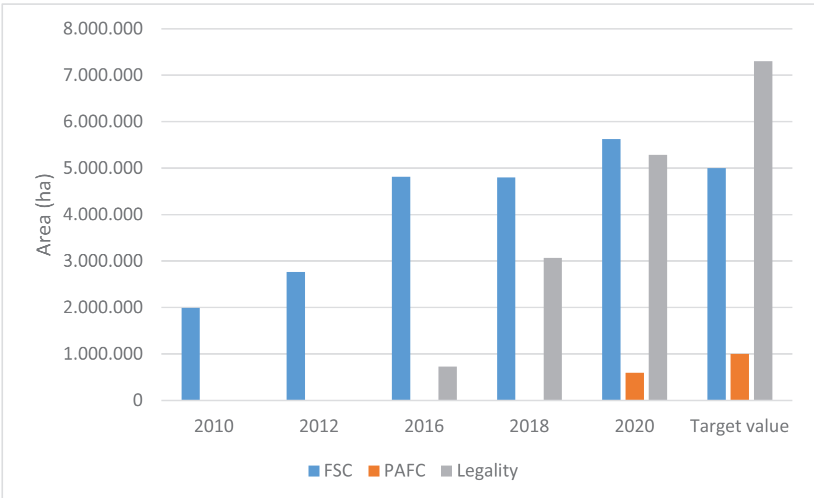

Figure 2.1: Change in area covered by FSC, PAFC and legal timber certifications in the Congo Basin[a]

a Legal timber certifications include OLB (Bureau Veritas), VLO/VLC then LegalSource (Preferred by Nature, formerly NEPCon), Timber Legality Verification (TLV) (Control Union), CW/FSC (Controlled Wood FSC Forest Management) certifications. Source: ATIBT 2021

Table 2.3: Change in area of FSC certified forests, in hectares

Country	2009	2010	2011	2012	2014	2015	2017	2018	2020
Cameroon	564241	705064	818726	639560	1013374	870647	1130301	341703	341708
Rep. Congo	1907843	1907843	2430996	2478943	2053205	2443186	2478943	2410693	2989168
Gabon	1873505	1873505	1873505	1873505	2053505	282494	204,2616	1,165,365	2061190

Source: https://fsc.org/en/facts-figures

Table 2.4: Incentives promoting third-party certification in the Congo Basin

	Cameroon	Republic of the Congo	CAR	Gabon	DRC
Type	FLEGT and fiscal	FLEGT and legal	FLEGT	Policy and fiscal	
Incentives	Certification-based FLEGT certificate of legality (operational, but not very effective)	Procedures for issuing certification-based FLEGT certificate of legality (undergoing approval, planned for 2021)	Recognition of certification provided for in the FLEGT Voluntary Partnership Agreements (VPA)	2018 Presidential Declaration: requirement to be FSC certified by 2022 (regulatory text pending)	Advocacy to incorporate recognition of certification into the VPA (under negotiation)
	Plan to introduce different export tax bands depending on the level of certification of the products exported (under discussion)	New Forestry Code: Article 72: Logging companies may seek certification of their forest management practices or of the legality of the products harvested and processed (+ Articles 65 and 257)		Amending Finance Act 2020: area-based tax with certification-based bands (uncertified, legality, FSC/PAFC)	
				Advocacy to incorporate recognition of certification into the VPA (under negotiation)	

The FLEGT process

The European Union published its FLEGT Action Plan in the early 2000s. It takes a pioneering approach to the issue and includes requirements for timber-consuming and timber-producing countries. It proposes political and regulatory tools, as well as innovative and experimental ways to encourage countries to improve governance in the forestry sector with a view to combating illegal logging and the trade in illegal timber. These measures aim to prevent illegal timber and timber products from entering the European market, to improve the supply of legal timber and to increase demand for legal products. The action plan has two main threads: the Voluntary Partnership Agreements (VPAs) and the European Union Timber Regulation (EUTR).

Three countries in the subregion have signed VPAs with the European Union (the Republic of the Congo and Cameroon in 2010 and CAR in 2011) and two are under negotiation (Gabon and DRC).

Given that few VPAs are in force a decade after implementation,[5] it is too early to judge to what extent VPAs have made forest management more sustainable. Nevertheless, efforts to align legislative frameworks with FLEGT are expected to have a significant positive impact.

5 In force here means that countries are able to guarantee that timber exported to the European Union is legal, by issuing a FLEGT licence

Table 2.5: VPAs in the Congo Basin

	Cameroon	Republic of the Congo	CAR	Gabon	DRC
Status	In force	In force	In force	Under negotiation	Under negotiation
Signed	6 October 2010	17 May 2010	28 November 2011	N/A	N/A
Ratification	09 August 2011	4 July 2012	1 July 2012	N/A	N/A
Implementation	1 December 2011	1 March 2013	1 July 2012	N/A	N/A
Status	Implementation	Active implementation	Resumption of implementation	Negotiation resumed in 2019	Negotiations resumed in 2016
Progress	Legality grids to be revised Two certification standards recognized	Legality grids to be revised Verification procedures approved (1st and 2nd level) Digital LAS (SVIL) deployed Certification recognition manual to be jointly approved	CAR VPA website Implementation of the collaborative database system (SGBDC)	Legality grid drafted National traceability system drafted	Draft legality grids tested and validated Legality verifiers manual Preparation of the instruments annexed to the Agreement.

It is however possible to assess the initial effects of the work undertaken, such as improved governance due to a clearer definition of legal timber based on stakeholder input, ongoing efforts to make regulatory reforms and adopt public policies in participating countries, and the engagement of stakeholders who had not previously been heard.

The implementation of these agreements varies and progress on VPA negotiations and implementation is slow in all countries. This is the case for several reasons, including weak political will, the tendency to underestimate the magnitude of the changes required by VPAs, technical difficulties related to the development of a legality assurance system (LAS) and delayed implementation of the different aspects of these systems.

2.1.2 Current status of production: data, developments, market positioning

Log production

Generally speaking, log production has been relatively stable in Congo Basin countries for the past 25 years. Production was not impacted by the Covid crisis and even grew in 2020 to over 8 million m^3. However, this overall trend obscures differences between countries.

In Gabon, production fell sharply between 2008, when log exports were banned, and 2012, when production began increasing again. By 2019, production in Gabon had returned to its average over 1991–1998. While the country's production statistics are unreliable, export data recorded by

Box 2.5: TraCer due diligence system for logs entering the Nkok Special Economic Zone

The Nkok TraCer agency was set up in October 2018, at the request of the Nkok Special Economic Zone management entity (GSEZ). It is an independent agency, run as part of a collaboration between FRM Gabon (subsidiary of the FRM group) and the Gabonese non-governmental organization (NGO) Brainforest. The Nkok TraCer agency aims, among other things, to ensure that all logs entering the Nkok Special Economic Zone have a low or negligible risk of illegality. All timber suppliers are subject to a due diligence mechanism based on evaluation grids developed by the Nkok TraCer agency and tailored to different types of suppliers (loggers, traders). Six main risk types have been identified and are assessed using documentary evidence. They relate to: the supplier's legal status, the payment of any applicable taxes and fees, access rights over the resource, traceability and social obligations. A field audit is also conducted to evaluate practices at production sites. If the evaluation grid requirements are met, the Nkok TraCer agency will issue a certificate to the supplier for a defined harvesting area. These certificates must be renewed every year.

customs and other data sources suggest that in 2020 production recovered to pre-ban levels, i.e. 3 million m^3.

In Cameroon, production trends can be broken down into three distinct periods. Over 1991–2009, production dropped to below 2 million m^3/year. From 2009 to 2015, production hit a peak of 3 million m^3 and has since fallen to stabilize at around 2.5 million m^3.

Official production figures for the DRC remain fairly low and stable (at around 300,000 m^3/year).

In the three remaining countries, production increased steadily during this period, by around 60 percent for Equatorial Guinea (800,000 m^3/year, with uncertainties in the data) and CAR (550,000 m^3/year) and by 85 percent for the Republic of the Congo (1.8 million m^3/year).

Production remains heavily concentrated on "flagship" species with seven species accounting for 50 percent of production in the Congo Basin. Production from hardwood species (tali, okan, Azobé) has grown and the range of species harvested has become slightly more diverse over recent years.

For the majority of countries, only the volumes of the ten highest production species are included. Production from a species could, therefore, be slightly underestimated at the regional level.

Industrial production

The processing rate, i.e. the share of the volume harvested that is processed domestically, varies greatly between countries. Gabon has banned the export of logs and therefore requires all logs harvested to be processed in the country. Cameroon has a processing rate of almost 70 percent. DRC, CAR and the Republic of the Congo have a processing rate of around 55 percent, even though their regulations stipulate that only 15–30 percent of production may be exported as logs. In Equatorial Guinea, less than 20 percent of production is processed. Cameroon and Gabon are the main commercial producers in the Congo Basin thanks to their high production levels and very good processing rate.

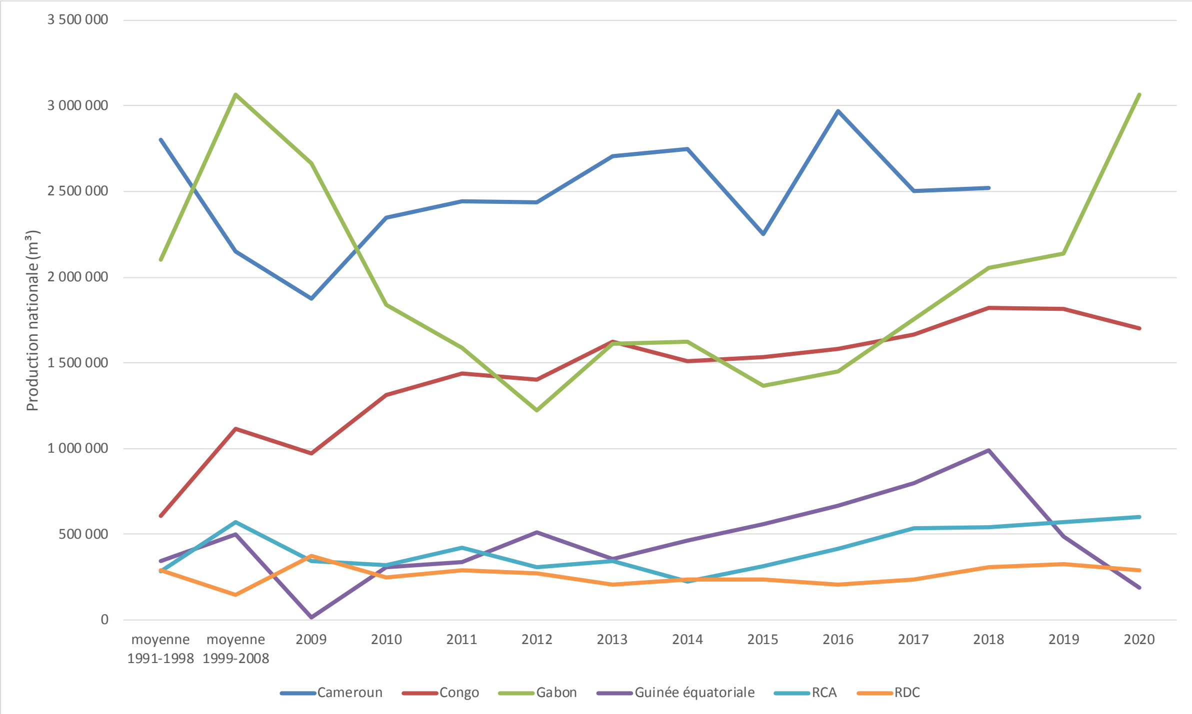

Figure 2.2: Change in wood production in Central Africa

Source: South-West Regional Development Project (OFAC) 2022

Table 2.6: Annual log production by country, 2009–2020

	Cameroon	Republic of the Congo	Gabon	Equatorial Guinea	CAR	DRC	Total
average 1991–1998	2,800,125	608,559	2,099,875	344,156	283,807	289,564	6,426,086
Average 1999–2008	2,150,015	1,113,814	3,064,607	500,936	570,753	149,140	7,549,265
2009	1,875,460	973,277	2,665,946	13,760	347,559	373,284	6,249,286
2010	2,348,150	1,314,281	1,841,396	309,849	323,308	249,539	6,386,523
2011	2,440,605	1,437,529	1,590,152	337,223	424,447	293,096	6,523,052
2012	2,437,300	1,405,421	1,221,804	514,052	309,089	275,000	6,162,666
2013	2,708,242	1,623,374	1,613,990	354,799	341,978	208,503	6,850,886
2014	2,747,380	1,509,727	1,625,044	463,524	226,260	238,986	6,810,921
2015	2,249,255	1,536,840	1,364,815	561,261	315,154	234,811	6,262,136
2016	2,966,971	1,581,653	1,451,050	665,747	418,250	206,706	7,290,377
2017	2,500,484	1,663,213	1,756,975	799,285	536,599	237,597	7,494,152
2018	2,521,373	1,819,613	2,052,590	990,000	543,394	306,327	8,233,297
2019		1,812,000	2,139,802	490,000	572,757	326,693	
2020		1,703,195	3,064,221	190,000	602,224	288,292	

Sources: The majority of the production data come from the OFAC website.
For CAR, data for 2020 are from the Forest Data Centre.
For Equatorial Guinea, data from 2018 to 2020 have been extrapolated from data uploaded to the website: resourcetrade.earth.

Table 2.7: Log production by species, 2017/2018 (top 10 species in each country)

The species that appeared in the top 10 between 2017 and 2018 are shown in green.

Species	Cameroon	Republic of the Congo	Gabon	Equatorial Guinea	CAR	DRC	Total
Okoumé		431,268	1,179,587	345,379			1,956,234
Sapelli		536,780			249,944	27,313	814,036
Tali	206,767	59,557	72,585	24,065	37,373	32,061	432,407
Okan	160,109	63,942	5,434	36,811			266,296
Azobé	57,554		163,909	12,680	7,064		241,207
Beli (Awoura)	110,541		85,672				196,213
Padouk		32,069	47,951	6,700	18,605	16,303	121,628
Dabéma	48,758	8,998		24,768	232		82,756
Ayous	25,630				48,849		74,479
Kosipo		49,748			8,040	15,145	72,933
Wenge		22,329				44,643	66,972
Iroko		24,562			36,276		60,838
Bilinga	34,198	23,803			970		58,971
Naga	50,951						50,951
Mukulungu					46,509		46,509
Afrormosia						32,658	32,658
Mahogany (Acajou)					5,971	24,243	30,214
Doussié					26,698		26,698
Nieuk	26,394						26,394
Bossé					6,784	18,618	25,402
Wamba	20,193						20,193
Tiama					1,137	15,259	16,396
Andoung				16,006			16,006
Tola						15,267	15,267
Sipo					14,336		14,336
Dibétou					9,372		9,372
Aleppo				9,350			9,350
Kévazingo/ Bubinga					9,198		9,198
Essia				5,951			5,951
Ilomba				4,964			4,964

-

continued on next page

Table 2.7 : Continued

Species	Cameroon	Republic of the Congo	Gabon	Equatorial Guinea	CAR	DRC	Total
Fraké					5		5
Other	1,780,278	566,558	497,453	312,611	16,031	64,816	3,237,746
Total	2,521,373	1,819,613	2,052,590	799,285	543,394	306,327	8,042,582

Source: Cameroon, Republic of the Congo, Guinea, DRC: 10 highest production species, OFAC. CAR: All species produced, 2018 Annual Yearbook. Gabon: For okoumé, OFAC, for other species, estimates from 2017 data (same proportion of each species in the total production of Miscellaneous Wood)

Products that have undergone primary processing dominate exports, mainly in the form of sawnwood, as well as veneer in Gabon.

Following a decline in 2009, Gabon's production increased throughout the period studied to reach 1.1 million m³ of product/year. Production also increased in Cameroon, but fluctuated before settling at 0.9 million m³ of product/year. In the Republic of the Congo, production increased slightly until 2016 before falling below 200,000 m³ of product/year. Production in CAR and DRC was fairly stable over the period studied, with an average of 45,000 m³ and 36,000 m³ of product/year respectively.

Having tried implementing quota policies and restricting log exports, with little success, in 2020 countries in the region decided to ban the export of logs as of 1 January 2022 (postponed to 1 January 2023). The arrangements and timetable for the implementation of this measure in practice remain to be clarified, but this decision signals that there is a strong desire to cease all log exports in the medium term.

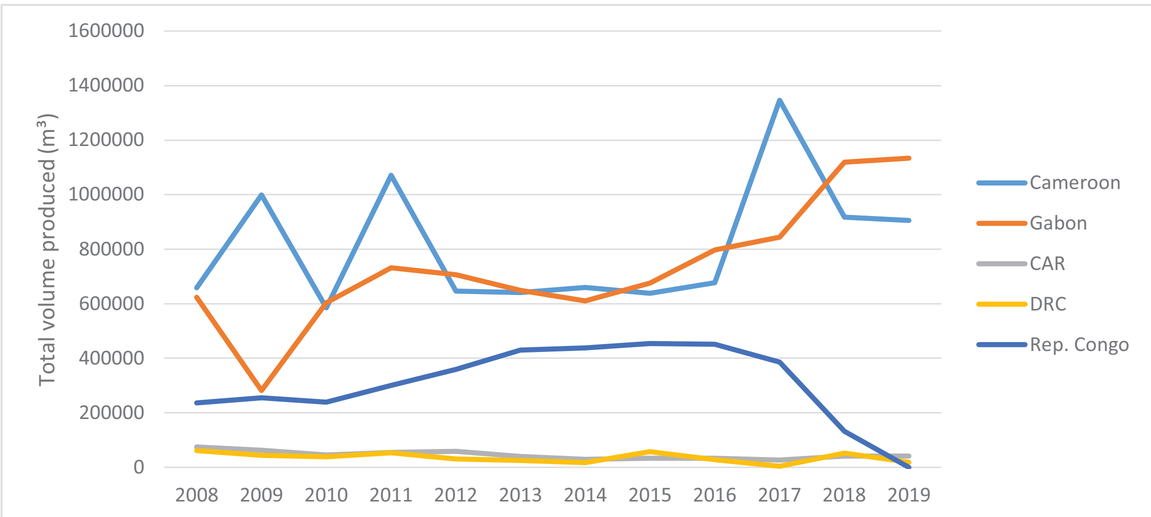

Figure 2.3: Change in product volumes in the Congo Basin (all product types), 2008–2019)
Source : OFAC

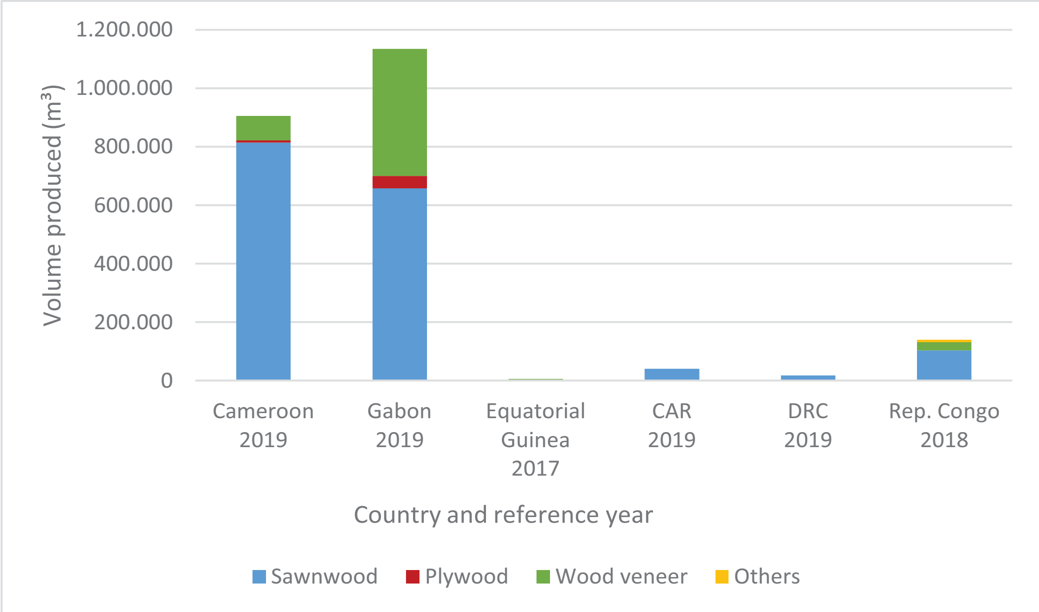

Figure 2.4: Breakdown of processed product volumes by type and country

Structure of the sector

Since the 1990s, governments in the region have sought to develop their timber industries to increase the volume of the raw material processed in its country of origin. In CAR, DRC and the Republic of the Congo, potential concessionaires must commit to process the logs they harvest to be awarded a concession.

This requirement has had knock-on effects for the entire sector:

- Concessionaires are obliged to source personnel with a wide range of skills (forest management, logging, primary processing), which requires significant financial resources and acts as a barrier to investment more generally.
- Specialized industries cannot develop because they cannot access sufficient resources and logging becomes more selective to meet the needs of the concessionaires' own processing plants, rather than those of third parties;
- Medium-sized companies fail to supply local markets, in which they are not present, encouraging illegal logging.

In Gabon, industrial operators are encouraged to specialize and focus on a single aspect of the supply chain. Consequently, half of the logs produced in Gabon are now sold on a national log market and processed by a different company from the company that harvested them. This shift is conducive to the development of highly specialized subsectors, which share the market with traditional integrated tree-to-timber companies and specialist loggers like Rougier Gabon, which split from its plywood plant in Owendo in 2021 to focus on logging.

Nevertheless, production throughout the Congo Basin is concentrated on a small number of concessionaires, often supported by foreign capital.

Table 2.8: Most productive enterprises

Country	Year referenced	Number of registered concessionaires	Most productive companies		
			Number of companies	Percentage of registered companies	Percentage of domestic production
Cameroon	2018	61	12	20%	48%
Rep. Congo	2017	15	4	27%	46%
Gabon	2017	82	7	9%	49%
CAR	2019	8	2	25%	59%
DRC	2019	14	2	14%	49%

Box 2.6: The Nkok Special Economic Zone management entity (GSEZ)

Ten years ago, GSEZ (the management entity for the Nkok Special Economic Zone) was born from a public-private partnership between Arise Integrated Industrial Platforms (IIP) and the Government of Gabon to create more value added and local jobs.

Located 27 km from Libreville, the Nkok Special Economic Zone is a 1,126 ha multisector industrial park. It is divided into three zones: industrial, commercial and residential. It hosts 164 sectors, from wood to health, steel and plastic recycling. Thanks to the development of the wood industry, in 2015 Gabon moved from being a log exporter to being the leading exporter of veneers in Africa, ranking second worldwide. In 2020, the Nkok Special Economic Zone was named the best global free zone for wood products by the Financial Times fDi Intelligence ranking.

GSEZ owes its success to the early construction of infrastructure (building plots, water supply and electricity), favourable taxation arrangements and an attractive administrative environment that brings together 23 government departments (customs, water and forests, immigration, social security, etc.). GSEZ aims to guarantee the continuous supply of responsibly-sourced roundwood through its FSC chain of custody (CoC) certified landing areas and the due diligence conducted by the independent Nkok TraCer agency.

While the economic benefits of sector-wide industrialization are indisputable, GSEZ is now working to improve the sustainability of its activities. To this end, GSEZ has committed to supporting companies to integrate environmental, social and governance (ESG) standards into their business strategies and models. It is working to make the Special Economic Zone the number one industrial area for providing safe, high-quality jobs and working conditions, and environmentally-friendly practices.

Table 2.9: The Nkok Special Economic Zone: Key figures

13,000	Direct jobs created in the Special Economic Zone
17	Industrial sectors represented
164	Companies in operation
19	Different countries represented among investors
775,000	m3 of roundwood processed in 2020
300,000	m3 of wood veneer exported to more than 50 countries
80,000	m3 of sawnwood exported to more than 25 countries
50%	Gabonese timber exported from the Special Economic Zone
1,767,000	m3 of roundwood inspected by the Nkok TraCer agency from October 2018 to February 2021

Private sector actors in the Congo Basin forestry and wood subsector

Case study of the Republic of the Congo, DRC, Cameroon and Gabon (summary of the situation analyses carried out in 2019–2020 by ATIBT)

Republic of the Congo. With around 30 companies operating in the country, the forestry sector is the Republic of the Congo's second largest employer. The country is divided into two large blocks. In the north, large concessions are held by highly industrialized companies that often have certifications (CIB and IFO have the FSC forest management certification and Thanry and Mokabi SA have an OLB or LegalSource certificate of legality). In the south, concessions are more fragmented and often in their second or third harvest cycle. There is more pressure from local populations and only one company, Taman, has a certificate of legality. Sustainable forest management provisions apply to 57 percent of concessions and the application of planning rules to small concessions was under development in 2018.

Efforts have been made to improve road infrastructure to facilitate the movement of wood (upgrading the RN1 road, upgrading and extending the RN2 road to the north of the country).

A new Forestry Code was adopted in 2020, introducing new elements, such as the production sharing system (see Box 2.1), the ban on the export of logs (except hardwoods that are difficult to process) and the requirement to obtain a certification with the creation of a national certification.

DRC. In 2019, there were 27 industrial companies, of which about 15 were active. Sodefor, Maniema Union, Forabola and Booming Green account for 50 percent of the area logged.

There has been significant progress in relation to forest management compared with previous years. Management plans are in place for more than 58 percent of forest titles, of which 40 percent have been approved and 18 percent are in the process of being approved, with a large majority of production now coming from managed concessions. The holders of the rest of the titles, which have been assigned more recently, do not seem to be participating in any forest management processes. Two companies, CFT and IFCO, have a LegalSource certificate of legality issued by NEPCON, and some progress has been observed in respect of other companies.

Artisanal chainsaw loggers are different in that they tend to operate informally and illegally and use rudimentary logging equipment. Informal production, although difficult to measure, is estimated at 4 million m^3, with artisanal loggers playing a major role in supplying local and regional timber markets (Uganda, Kenya, Rwanda and Sudan).

Formal timber production has never exceeded 400,000 m^3, and has been stagnating for several years between 200,000 m^3 and 300,000 m^3, barely 5% of regional production. More than 60 percent of DRC's dense moist forest is not yet classified; classifying these forests could increase the legal production of logs. Formalizing existing artisanal activities presents a genuine opportunity to reduce poverty among local populations.

In DRC, the wood industry is underdeveloped due to significant constraints, related in particular to the need for energy and investment. Companies limit themselves to primary processing with little added value.

Gabon. Gabon's wood sector is composed of three key stakeholder groups: industrialized concessionaires, concessionaires without industrial equipment and processing units not tied to a concession. This is a peculiarity of Gabon's wood subsector. Traders can sell their wood to processors without needing to have industrial equipment and operators specialize in one activity.

With the market set up in this way, managing supply and demand is key. Existing logging areas are located in the interior of the country, while 47 percent of processing units are located in the province of Estuaire. Defective road and rail networks make it difficult to move the logs produced, leading to higher prices. Under these conditions, some traders scale their production to meet the needs of their own facilities and some harvest tree species and those individuals with qualities that are more profitable. Processing units not tied to a concession therefore face enormous difficulties securing and maintaining their supply of logs. The ban on discretionary permits, which were a source of illegal wood, has exacerbated this phenomenon.

While this can cause major problems for large and medium capacity facilities, this barrier is insurmountable for small facilities supplying the local market, which regularly turn to the informal sector.

The creation of the Nkok Special Economic Zone and its log purchasing centre has made it possible to maintain the supply of logs to the companies located there (see Box 2.6). It does not, however, address the needs of small and medium enterprises (SMEs) outside the zone.

Processors bemoan the lack of training centres teaching primary and secondary processing skills, which negatively impacts the quality of the products on the local market. These processing units are often small, making it impossible for them to invest in the equipment and drying units needed to produce high-quality products. The country has very few splitting plants and no tertiary processing plants.

In 2018, the President of DRC announced that all concessions would have to be FSC certified by 2022. However, to date, no regulations have been adopted to implement this statement, and although a few companies have signed up to the process, many have declined to do so due to the cost involved.

Cameroon. The private forestry and wood subsector is made up of 21 large, 92 medium-sized and thousands of small and very small operators.

Upstream operators hold the titles granting access to the resource. In 2019, there were 93 forestry concessions, 65 percent of which were in the east of the country, with the remainder in the south. There were 38 communal forests, 142 sales standing volume and around 50 approved community forests. These titles are managed by large companies (59), medium-sized companies (46) and rural municipalities (38). There are 191 processing units distributed fairly evenly across the country, with 24 percent engaged in primary processing, 47 percent in secondary and 29 percent in tertiary.

One peculiarity of Cameroon's wood sector is its highly fragmented trade union network. There are 14 unions for large companies, over 20 for artisanal operators, and over 50 for very small enterprises (VSEs). Collective action is, therefore, not very effective and suffers from logistical difficulties.

2.1.3 International markets

Central African share of wood market and requirements of different markets

The global market for Central African wood is estimated at USD 178 billion for the 440 million tons produced. Central African countries only account for USD 2.2 billion for a volume of 4.2 million tons (i.e. 1 percent). The total value of exports has changed very little in the last 10 years despite volumes increasing by 35 percent. This suggests that the average price per ton has decreased for all products on aggregate.

Over the same period, European imports from Central Africa fell by more than half (to USD 600 million from USD 1.4 billion), as products were increasingly exported to China, which has become the region's largest trading partner. This growing trend can be explained by the introduction of stricter European controls, and more likely by the declining competitiveness of products from primary and secondary processing.

European importers of logs, square-edged timber and boules now prefer competing semi-finished products from South-East Asia or from plantations in South America. These ready-to-use products are very competitive (less manufacturing costs and material loss). They are also easily delivered by container throughout the year, limiting storage costs.

Despite the steps taken to encourage forestry operators to increase their production of higher added-value products, Central African countries are lagging far behind due to a lack of infrastructure, high transport costs and a failure to train people in processing trades. Many operators are seeking markets that are less demanding in terms of quality (Middle East, China) to tap into new income streams, explaining their relatively competitive prices.

Given the region's large reserves and growing global demand, pressure on Central African forests will undoubtedly intensify. Sustainable management models, which are essential for the sustainability of these resources, may not be able to withstand the increasingly competitive prices offered by plantations (e.g. eucalyptus, rubber, pine, teak).

Given that operating and logistical costs tend to be so high, operators mainly concentrate on the most profitable species, such as: high-density species for outdoor uses and flooring (azobé,

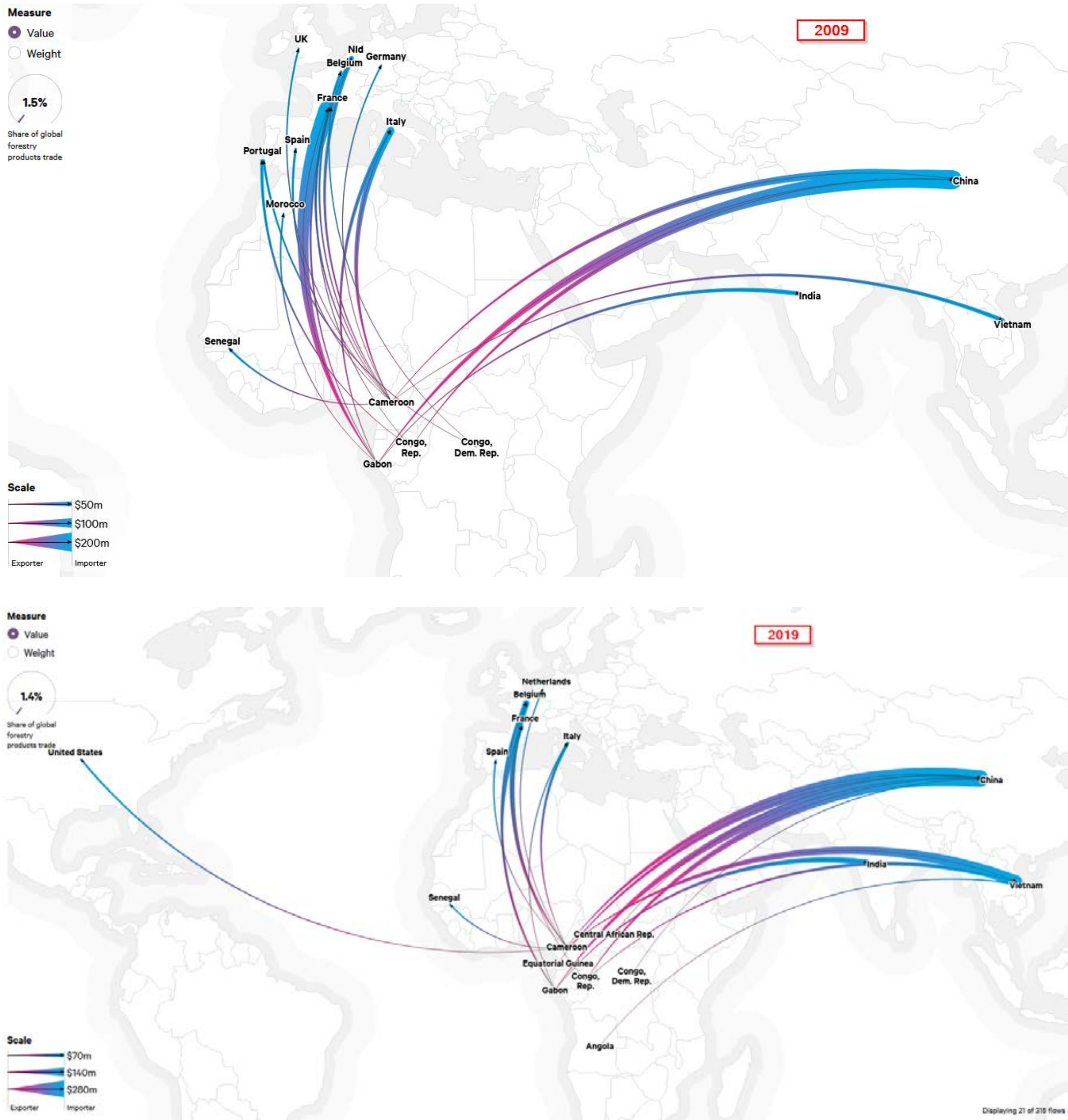

Figure 2.5: Illustration showing trade flows from Central African countries in 2009 and 2019

Source: https://resourcetrade.earth/

afrormosia, doussié, etc.), species with high added value for carpentry (sapelli or sipo), and veneer species (ayous or okoumé) which are present in large quantities and offer good yields.

Although there are about a hundred species that meet these criteria, limiting production to around fifteen has a major impact on the cost price of the volumes harvested, jeopardizing the sustainability of this economic model in the medium to long term.

Producers were likely impacted by sluggish markets in 2019 (due to the China-US trade war knocking Chinese importers' confidence) and by the Covid crisis in 2020. Nevertheless, markets recovered very well in 2021, with extremely high prices and sustained demand that the market cannot meet due to logistical constraints.

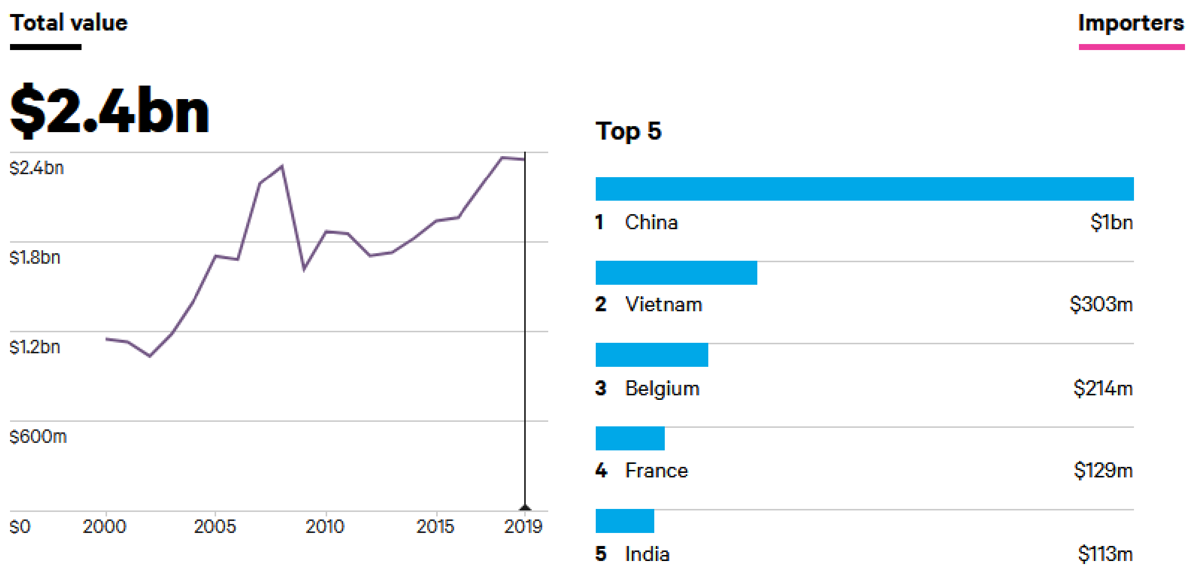

Figure 2.6: Change in wood product exports from Central African countries and value of imports to the five largest importers, 2019

Source: https://resourcetrade.earth/

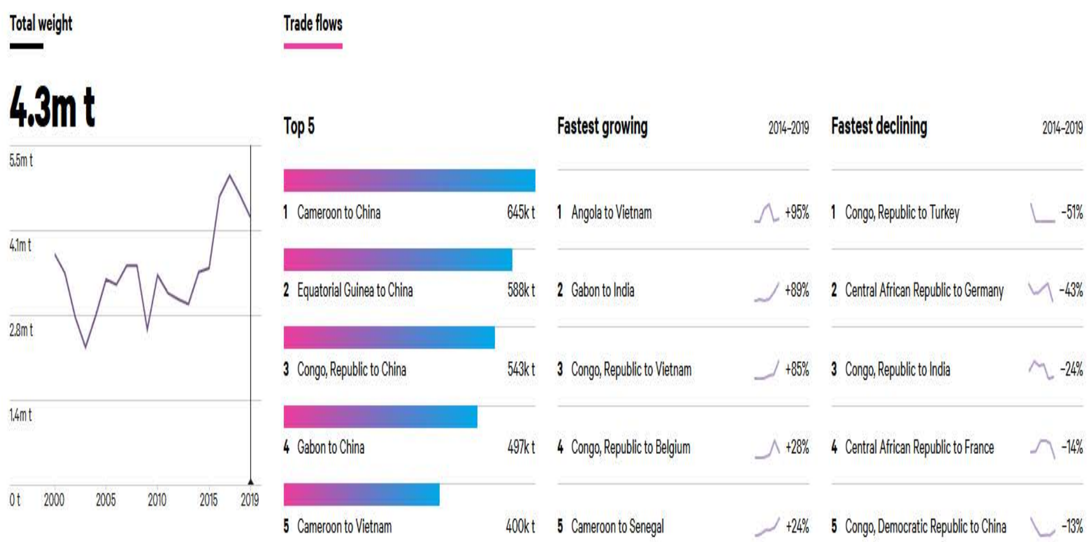

Figure 2.7: Change in wood product exports from Central African countries (tonnage), the five largest trade flows in 2019, and the five fastest growing and fastest declining flows between 2014 and 2019

Source: Resourcetrade.earth/Chatham House (https://resourcetrade.earth/?year=2019&exporter=eccas &category=3&units=value)

Although requirements are becoming increasingly demanding from a social and environmental standpoint, there is still strong competition on international markets from operators who do not comply with these standards and who therefore have price policies that severely undercut responsible forest managers.

A first line of defence comes in the form of partnerships between operators and experienced manufacturers, enabling them to optimize their processes or increase the added value of their products. However, to remain competitive, these operators will have to increase their harvesting rate. To do so while respecting sustainability standards, they will have to diversify the species they harvest and, without doubt, supplement their supply with plantation species to lower their materials costs.

Price changes

Average prices barely increased in the five years to 2020, before increasing significantly in 2021 in the post-Covid recovery. Several factors can explain this stagnation. An increase in the number of operators in Asia led to an increase in supply, often at lower cost prices than those of traditional operators. Buyers have also changed their behaviour and now prefer glue-laminated products, sourced mainly from Asia. More competitive and more reliable, they are produced from plantation wood, and therefore cheaper, thanks to ever more effective techniques. The quality of these products is able to satisfy a customer base that is increasingly aggressive on price.

The sector has so far been relatively unaffected by the Covid-19 pandemic. Prices even experienced strong growth in 2021, although this is less pronounced in other production regions and does not affect all species. Sapelli prices in particular have remained stable.

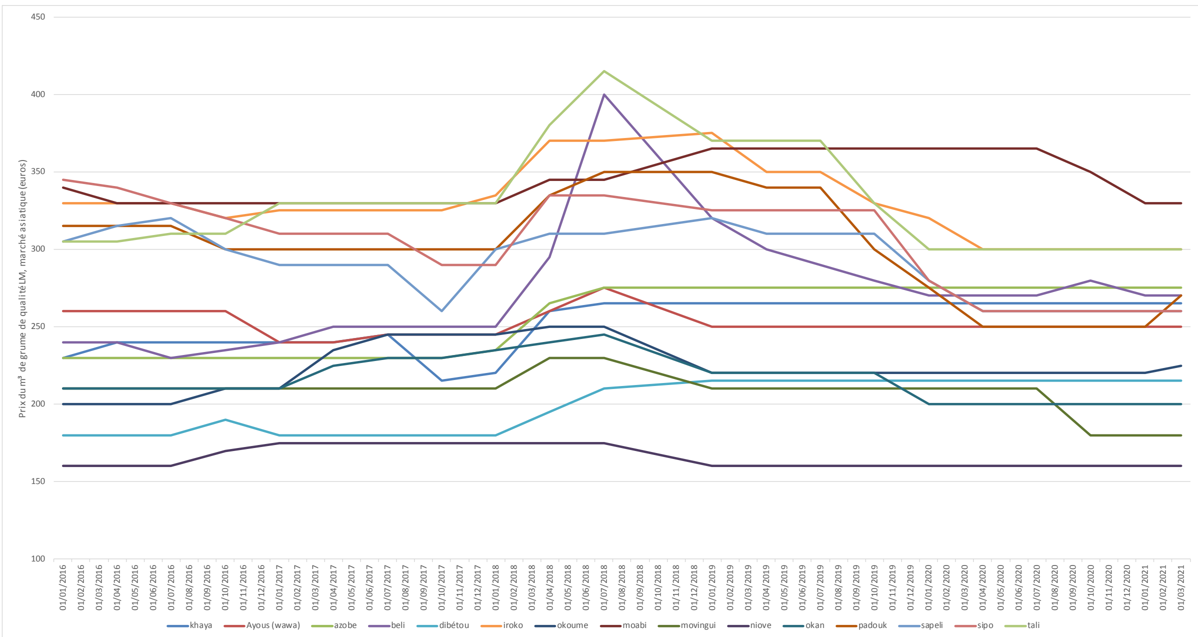

Figure 2.8: Change in the price of first and second GMM sawnwood, January 2016 to March 2021 (International Tropical Timber Organization)

Source: https://www.itto.int/fr/mis/

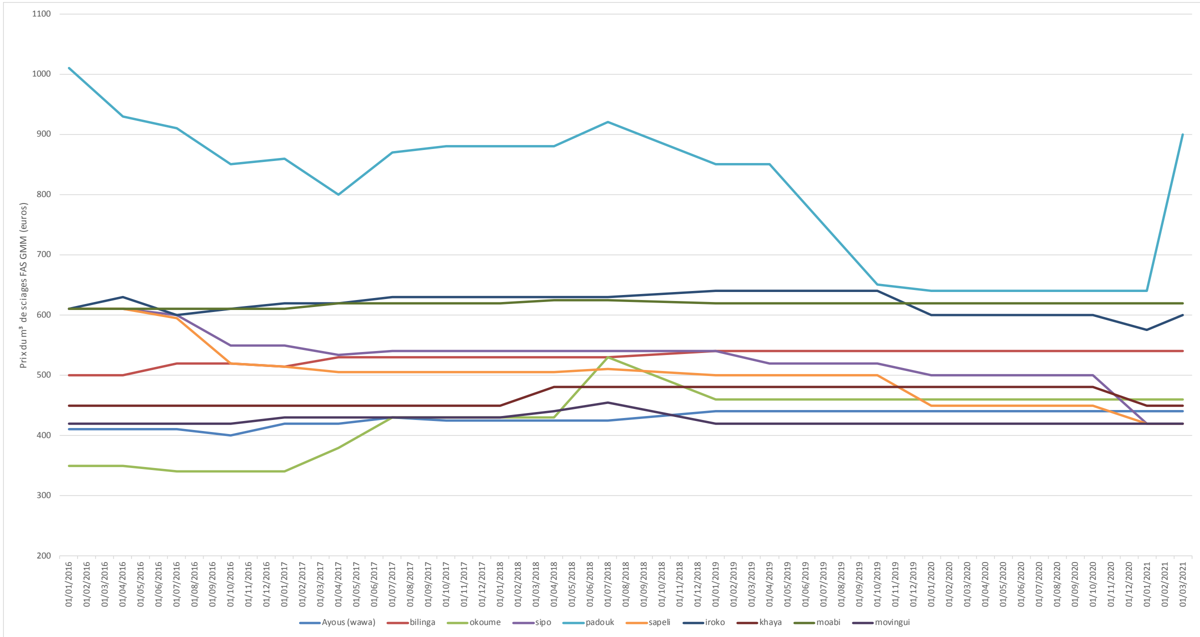

Figure 2.9: Change in the price of LM quality logs, January 2016 to March 2021 (International Tropical Timber Organization)

Source: https://www.itto.int/fr/mis/

The European market remains highly selective, with demand focused on around ten species, while the Asian market is more accessible if prices are attractive.

An African market is also emerging for low quality – and therefore cheap – products (South Africa, Morocco, Mauritania, Senegal).

Certified timber rarely demands a premium price, which holds back the growth of this segment. Only government procurement bodies in countries like the Netherlands, Belgium or the United Kingdom are willing to pay more for these certified products.

2.1.4 Informal production and local markets

Urban timber markets in Central Africa are primarily supplied by informal sources. As a result, the volume and value of these timber flows are not recorded by the government and are not reflected in national production statistics. It is not, therefore, possible to use such secondary data sources to evaluate the current situation of domestic sawnwood markets in the Congo Basin. The most recent comprehensive estimate of sawnwood sales to domestic and neighbouring markets dates back to 2013 (Lescuyer and Cerutti 2013) and is presented in Figure 2.10.

Several sources of more recent, though incomplete, data serve to both support and amend this overall assessment. On the one hand, an assessment by Lescuyer et al. (2016) shows that the volumes of sawnwood traded on the Yaoundé markets changed little between 2011 and 2016. This suggests that this economic activity will continue in the subregion in response to the unavoidable demand for timber that goes hand in hand with urban development. The sector is now firmly embedded in the economic landscape of Congo Basin countries. The fact that the overwhelming

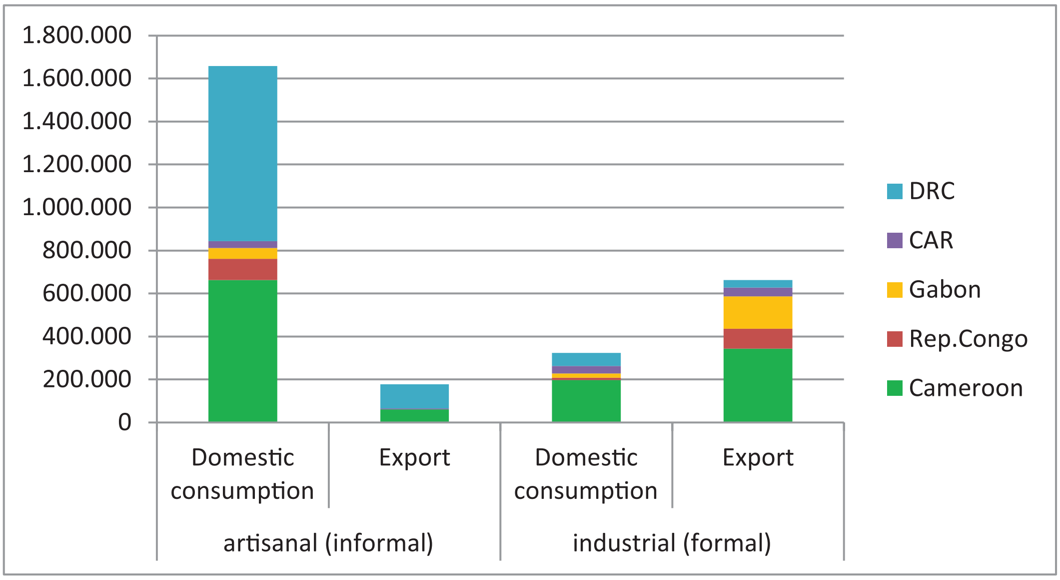

Figure 2.10: Breakdown of domestic consumption and exports of formal and informal production in the Congo Basin, 2013

Source: Lescuyer and Cerrutti 2013

majority of this sawnwood is sourced from the informal sector does not seem to be a pressing concern for policymakers. Indeed, informal sources successfully supply cities with competitively-priced building materials, supporting tens of thousands of people in rural areas.

While domestic timber markets appear to be relatively stable and their activity likely correlates with national economic growth rates,[6] exports of artisanal sawnwood to neighbouring countries have increased significantly over the past decade. This is especially true in DRC, where exports to East Africa are now estimated at around 120,000 m³ of sawnwood (Eba'a Atyi et al. 2016) and in Cameroon, wh In 2020, the Covid-19 pandemic impacted levels of economic activity, negatively affecting the volume of sales on wood markets, which decreased by around 30 percent according to an ongoing study for the FAO-EU FLEGT programme. ere exports of informal sawnwood to Nigeria reached 27,000 m³ per year in 2016. The most notable increase was observed between Cameroon and Chad: in 2015, around 210,000 m³ of sawnwood crossed this border (Lescuyer and Tal 2016), very often with falsified documents from community forests. This is more than double previous estimates made in 2009.

2.1.5 Benefits of the subsector

Contribution to local employment

The contribution of the wood sector to employment is not regularly monitored by countries, particularly with regard to the informal sector, which nevertheless has a significant impact on their economies. Data are therefore sorely lacking.

6 In 2020, the Covid-19 pandemic impacted levels of economic activity, negatively affecting the volume of sales on wood markets, which decreased by around 30 percent according to an ongoing study for the FAO-EU FLEGT programme.

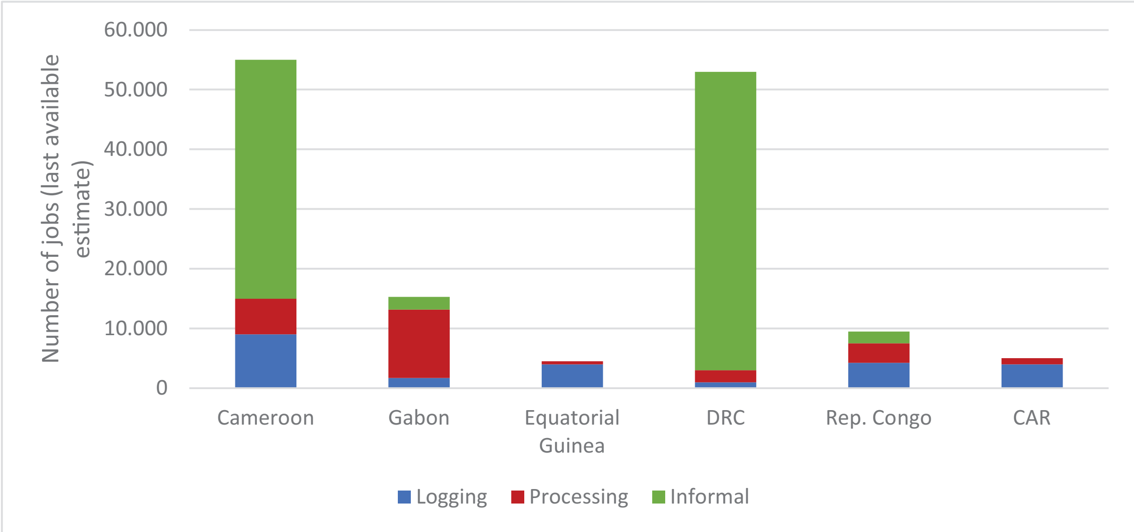

Figure 2.11: Estimated number of formal and informal jobs in the wood subsector, based on the latest available estimates[a]

a No data on the informal sector for CAR and Equatorial Guinea

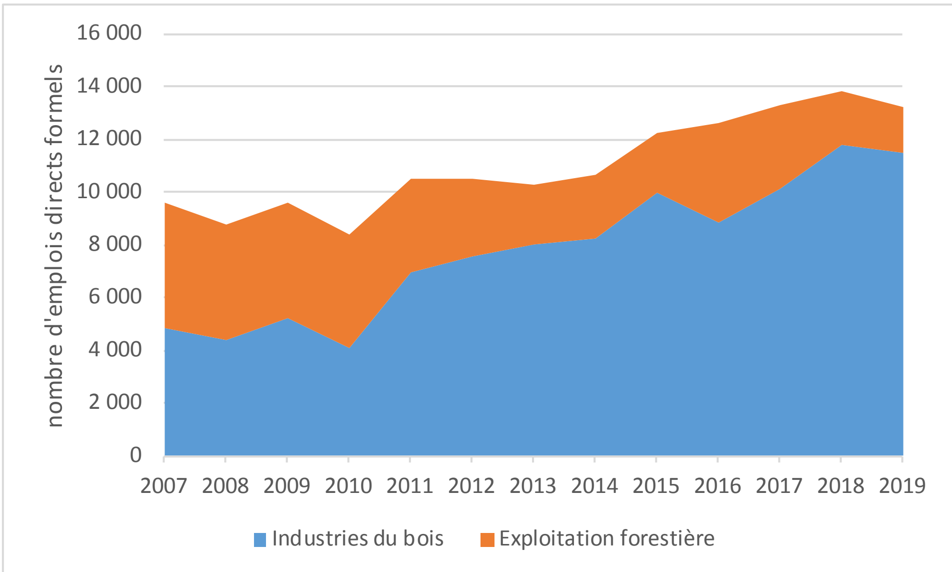

Figure 2.12: Change in the number of jobs in the wood subsector in Gabon, 2007–2019

Source: Economic dashboard, Minister of the Economy of Gabon

In Cameroon and DRC, a very high proportion of jobs are in the informal sector. These jobs do not contribute to government finances, but are essential for supplying growing local and regional markets.

Except in Gabon, jobs are mainly concentrated in the logging segment of the subsector due to the low rate of wood processing at the local level. This drives the export of logs and products resulting from primary processing. The more processing undertaken, the more jobs are needed to produce one cubic metre of product.

More regular data are available on Gabon. Following a significant decline in jobs in the wood sector when log exports were banned, numbers then increased, mainly in processing.

Contribution to the economy

Table 2.10: Contribution of the wood subsector to GDP at current prices, Gabon (XAF billion)

	2005	2006	2007	2008	2009	2010	2011	2012
Logging	72	79	96	89	79	54	51	51
Wood processing	33	37	46	44	43	62	79	93
Total	105	117	142	133	122	116	130	144

	2013	2014	2015	2016	2017	2018	2019	
Logging	51	65	75	91	107	119	123	
Wood processing	85	114	140	153	160	197	199	
Total	135	179	215	244	267	315	322	

Contribution to land-use planning: Agricultural management blocks and local development funds: two levers of land-use planning and local development

The Republic of the Congo's land-use plan designates 'community development areas or blocks' (SDC), earmarked for agriculture and focused on the forest-farm interface. These areas are characterized as "a set of village plots and areas, centred around the tree, forests and other natural resources that can support the development of rural economies and poverty reduction". Equivalent classifications exist in the land-use policies of DRC (but for areas outside concessions), Gabon, CAR and Cameroon (but zoning has already assigned most agricultural areas).

Their overarching aim is to meet the needs of local people for forest products and to improve their incomes.

The size of a community development area is calculated based on current and future requirements for agricultural land and timber, and may also constitute a reserve for community forests. The location of a community development area is identified on the ground with the local and indigenous communities, who approve it as part of a process ensuring free, prior and informed consent.

The designation of these areas could be seen as imposing limits on usage rights. However, their main aim is to avoid uncontrolled clearing along logging routes and to secure agricultural land around villages. Community development areas are a component of land-use planning that seeks to reconcile the need for land for environmental purposes (ecosystem protection), socioeconomic purposes (rural development) and economic purposes (forestry).

According to the rules on forest management, the benefits of forestry must be shared with the indigenous peoples and local communities as set out in the specifications defining companies' social obligations and through companies' contributions to the local development fund. Operators must contribute XAF 200 per m^3 logged, around 70 percent of which is used to directly fund projects. Similar mechanisms exist in Gabon and DRC.

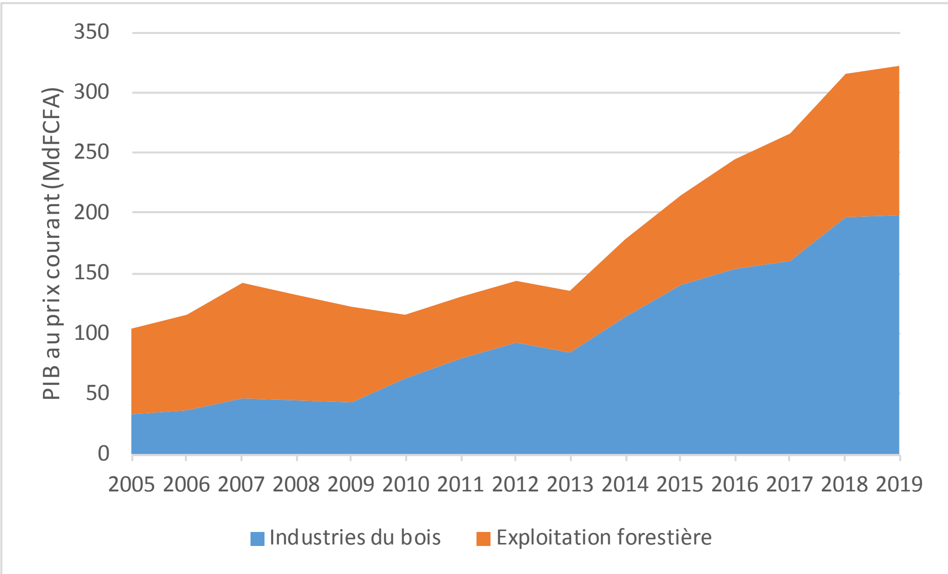

Figure 2.13: Change in contribution of the wood subsector to GDP at current prices, Gabon (XAF billion)

Community development areas and local development funds are managed by a consultation council that brings together the indigenous peoples and local communities, NGOs, the local government and the forestry company. Communities are given technical support to choose and implement projects, which are proposed and planned as part of a five-year management plan. Projects must be community-oriented, but may also be confined to a few families. While projects were initially agricultural in nature, they are now shifting more towards building individual houses or housing for teachers, reopening roads, supplying medicines and paying teachers not paid by the government.

Managing local development funds is not always straightforward. Conflicts can arise, fuelled by the funds at stake, and certified companies must invest heavily in conducting meetings and implementing projects with the indigenous peoples and local communities.

The need for rural development in the Congo Basin is enormous in proportion to the technical and financial support available. It would therefore be unrealistic and risky to shift the entire burden of development onto the shoulders of forestry concessionaires.

While donors do put forward support projects aimed at improving the management of local development funds, they often take a long time to materialize. The Northern Congo Landscapes Project funded by the French Development Agency (AFD), for example, was finally launched after 8 years of preparation.

Anti-poaching efforts

In the Republic of the Congo, agreements between a logging company and the government include a clause requiring the company to contribute to an anti-poaching unit.

This anti-poaching unit monitors hunting activities and works to combat poaching via fixed checkpoints, often at the entrance to logging routes, and patrols. The presence of these 'eco-guards' reduces poaching and makes it easier to monitor hunting activities. However, it is difficult to monitor the trade in game and there are still a number of barriers to doing so. In particular, local authorities oppose the enforcement of 'closed seasons' and legislation on hunting unprotected or partially protected species.

In the north of the Republic of the Congo, certified concessions have active anti-poaching units of 30 to 50 people (eco-guards and supervisory staff). Often, a tripartite cooperation arrangement is set up between the Ministry of the Forest Economy, a conservation NGO – such as the Wildlife Conservation Society (WCS) or the World Wildlife Fund (WWF) – and the concessionaire.

In uncertified forestry concessions, the anti-poaching units have few resources and are not very effective.

Role in maintaining ecosystem services, in particular carbon storage

In selectively managed forests in Central Africa, the reduction in carbon stock during harvest is low, on average less than 10% of the initial Carbon stock in the annual harvest area. With a 25 to 30 years rotation, this represents only about 0.3 to 0.4% of the total annual carbon stock and is well below the annual growth in tropical forests (about 1.5%).

The maintenance of forest biomass and forest cover will also ensure that the functions of regulation of the water regime, soil protection and regional and global climate are maintained.

Wetlands and peatland areas are protected in forest management plans and excluded from harvest. A recent publication (Dargie et al. 2017) finds that the central basin of the Congo river is the largest tropical peatland complex, representing an underground biomass equivalent to that of the entire Congo Basin. Concessionaires who exclude these areas from their operation are therefore excellent stewards of the integrity of these significant carbon stocks

Thus, Sustainable Forest Management can assure the production of a renewable product, wood, with a Carbon neutral or Carbon positive impact in the long term. Tropical wood produced from sustainably managed forests is the better option compared to alternative products (steel, plastic, concrete)!

2.2 Major forest management issues for the coming years

2.2.1 Forest management plans: How have they fared after 15–20 years of implementation? How can they be brought up to date?

The oldest managed forestry concessions still active in Central Africa are entering their last five-year cycle (forest management plans drawn up in the early 2000s). Generally speaking, first-generation management plans have proved to be an effective tool for planning harvests, with forecast harvests (in gross volume) aligning with the production volumes recorded. The difficulty here lies in creating demand for a range of species, which can be a challenge for companies (market orientation). Moreover, the range of species harvested remains fairly narrow, because few integrated companies have succeeded in commanding profitable prices for so-called 'secondary' or 'lesser-known' species.

The solution lies in further industrialization, with national strategies that can be tailored as needed (outsourcing to specialized industrial operators like in Gabon or the development of companies' existing processing operations).

The forest management system was introduced alongside specific measures to promote local development while respecting customary practices and involving local populations. Areas within forestry concessions are assigned to local communities to allow them to farm. Each country has a different name for these areas: agricultural blocks, community development blocks, etc. Under national legislation, development funds have been transferred to local communities in proportion to the volumes/areas harvested. Specific measures to preserve ecosystems during logging operations have also been implemented. Lessons must now be learned from the last 15 to 20 years of implementation to assess whether these measures are fit for purpose (does the size of the agricultural management blocks meet local needs in practice? Have the protection and conservation management blocks actually helped to preserve species and ecosystems?)

The first-generation of forest management plans were drawn up on the basis of technical procedures used across the subregion (harvest cycles, setting a minimum cutting diameter, parcels of similar volume, etc.). That they are simple to implement and monitor remains a substantial benefit. However, not all forest management plans are of the same quality or are implemented in full. The forest management model would therefore benefit from fine tuning. It is important to tailor forest management strategies to the specificities of the concession (in terms of stands, area, history of logging), the country and the economic operators involved (e.g. how engaged they are in sustainable management). That is not to say that forest management should take a "lowest-common-denominator approach". Alternatives could be considered, by pooling knowledge, to simplify technical procedures (e.g. by setting minimum cutting diameters for each ecological zone). When renewing these forest management plans, it will also be necessary to establish a normative framework for the arrangements proposed.

New legal and regulatory frameworks should be drawn up based on an assessment of the progress of the forest management plans, their implementation during the first rotation and the lessons learned. Proposals should then be made on the forest management rules and the procedures for drawing up the forest management plans for the second harvest cycle. These proposals will need to be discussed with the forestry administrations so they can be taken into account when regulations and standards are drafted.

2.2.2 Resource management and development

The natural forests of Central Africa are characterized by a very high diversity of species. There are approximately 150 species, able to provide at least 15,000 m^3 logs/year. However, some species are more abundant. Indeed, the top five most populous species account for 26 percent of the available volume and the top 15 for 50 percent.

However, due to current market conditions, the low level of industrialization and the state of transport infrastructure, which weighs heavily on government budgets, operators tend to focus on a few species and those individuals with the best qualities, leading to total harvesting rates far below potential yields from sustainably managed forests.

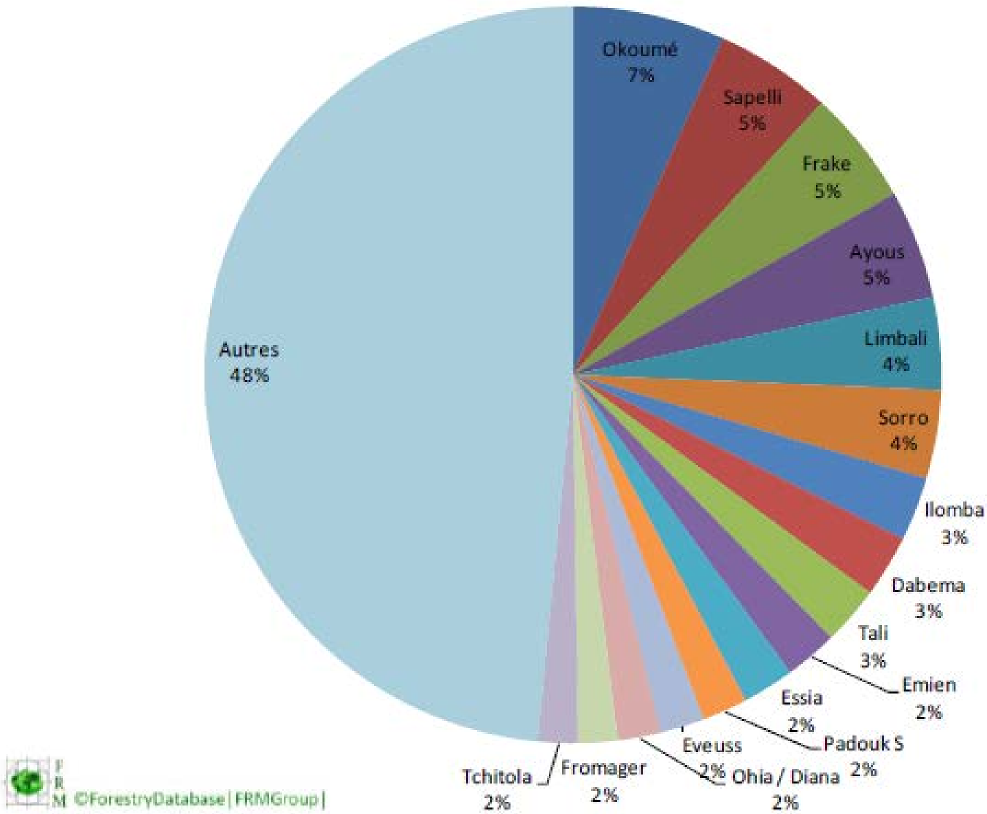

Figure 2.14 : Breakdown of net realizable volume by species in Central Africa (excluding Equatorial Guinea and the two Cuvette départements in the centre of the Republic of the Congo)

Table 2.11: Realizable volumes for the most abundant species (minimum net volumes over 250,000 m³/year)

Species group	Species	Gross volume m³/y	Min net vol m³/y	Max net vol m³/y
			("2018" baseline scenario)	("2030" high vol scenario)
A : Most logged species				
1a : Sawnwood	Sapelli	2.390.000	1.440.000	1.730.000
	Dabema	1.950.000	760.000	1.030.000
	Padouk S	1.420.000	560.000	750.000
	Beli	680.000	260.000	260.000
	Bahia	660.000	260.000	350.000
1b : Hard sawnwood	Tali	1.860.000	730.000	980.000
	Niove	1.080.000	420.000	560.000
	Azobe	1.000.000	390.000	520.000
	Okan	740.000	290.000	390.000
1c : Veneer	Frake	3.650.000	1.420.000	1.920.000
	Ayous	3.430.000	1.340.000	1.800.000
	Tchitola	1.100.000	490.000	610.000
	Aiele	700.000	270.000	370.000

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continued on next page

Table 2.11 : Continued

Species group	Species	Gross volume m³/y	Min net vol m³/y ("2018" baseline scenario)	Max net vol m³/y ("2030" high vol scenario)
1d : Veneer and Sawnwood	Okoumé	4.830.000	1.880.000	2.710.000
Total species most logged among most abundant species		**25.480.000**	**10.500.000**	**13.970.000**
B : Species with potential for development				
2a : Sawnwood	Limbali	2.930.000	1.140.000	1.540.000
	Essia	1.650.000	640.000	870.000
	Ohia / Diana	1.350.000	530.000	710.000
2b : Hard sawnwood	Eveuss	1.410.000	550.000	740.000
	Alep	1.000.000	400.000	460.000
	Manilkara	910.000	360.000	480.000
	Omvong	820.000	320.000	430.000
2c : Veneer	Ilomba	2.030.000	790.000	1.070.000
	Fromager	1.260.000	490.000	660.000
	Essessang	940.000	370.000	490.000
	Ozigo	760.000	290.000	290.000
Total species with potential for development among most abundant species		**15.060.000**	**5.880.000**	**7.740.000**
C : Species with little potential in the medium term				
3 : Hard-to-market species	Sorro	3.360.000	1.090.000	1.410.000
	Emien	1.670.000	650.000	880.000
Total species with little potential in the medium term among the most abundant species		**5.030.000**	**1.740.000**	**2.290.000**
Overall total (A + B + C)		**45.580.000**	**18.120.000**	**24.000.000**

Source: AfDB/FRMi 2018. Vision Stratégique et industrialization de la filière Bois dans les six pays du Bassin du Congo, Horizon 2030 – Rapport stratégique Régional.

In 2018,[7] FRMi sought to assess two harvest scenarios to determine what impact improving industrialization and establishing a larger market would have. Put simply, the 2018 scenario reflects current typical practices extended to all concession areas and the 2030 scenario presents diversified harvests – both in terms of quality and species diversity –, improved processing and the creation of more diverse international markets and a strong local market.

Moving from the 2018 scenario to the 2030 scenario would increase harvests by 3.5 m³/ha (i.e. more than 33 percent) from currently logged species and by 2.5 m³/ha from newly added species.

Harvests do not currently reach the very conservative 2018 scenario. Cameroon realizes more of its potential available volume than other countries, while CAR and DRC are extremely underexploited.

7 Vision Stratégique et industrialization de la filière Bois dans les six pays du Bassin du Congo, Horizon 2030 – Rapport stratégique Régional. 2018

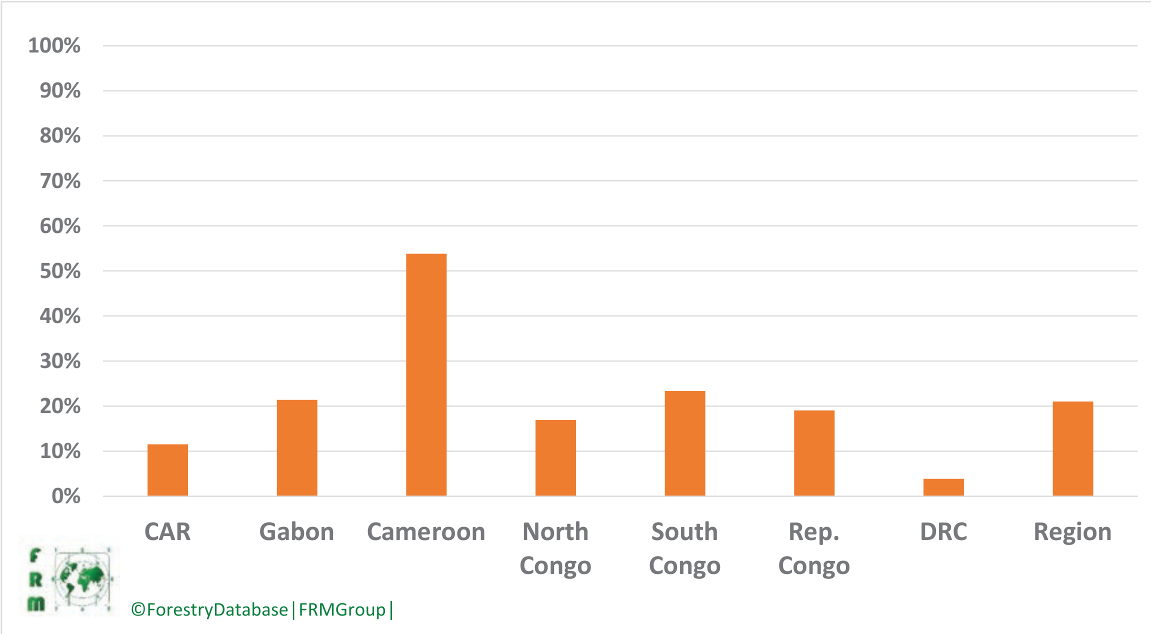

Figure 2.15: Current realization rate: Comparison of potential production (2018 scenario) and log production for all abundant species (groups 1 to 3)

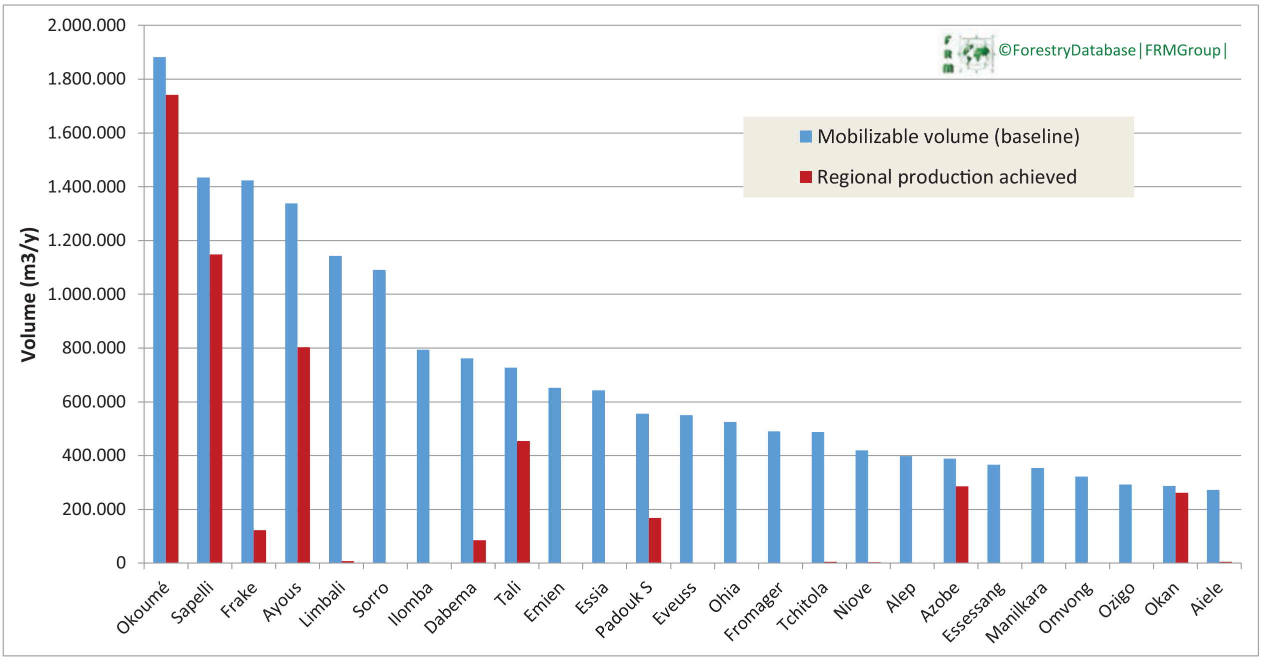

Figure 2.16: Current realization rate by species: Comparison of potential (2018 scenario) and realized log production for the 25 most abundant species (in m³/year)

At the regional level, harvest rates reach just over 40% of the potential available volume for the most commonly logged species and only 20% for the most abundant species.

Among the most abundant species, only sapelli and okoumé are harvested at levels close to the potential volumes laid down in the forest management plans.

To reach the 2018 scenario, it will be necessary to improve infrastructure and reduce the parafiscal burden.

To reach the 2030 scenario, it will be necessary to follow forest management plans more closely. Currently, only an estimated 70 percent of assigned forest are actually harvested annually. Higher levels of industrialization will be required to increase harvests and specialized operators will need to be set up. Formal supply chains will also require access to local and regional markets.

2.3 The future of the wood subsector

2.3.1 The challenge of industrialization

Sustainable industrialization of the wood subsector in the Congo Basin: Recommendations of a regional study by the African Development Bank

Despite the enormous potential offered by forests in the Congo Basin, over the past 60 years their wood has been harvested and exported in its raw form to countries outside Africa, while African countries have imported finished wood products. The missed economic opportunities are incalculable. The Congo Basin operates on the fringes of the global wood subsector, accounting for 1 percent of global sawnwood production, 6 percent of tropical sawnwood production, 5 percent of tropical logs, 7 percent of tropical veneers and 1 percent of tropical plywood and little to no secondary or tertiary wood processing.

The poor performance of countries in the Congo Basin can be attributed to the under-industrialization of the wood-processing sector. Indeed, most wood is still exported in the form of logs. Knowledge of what forest resources are available is also inadequate, there are few plantations, production fails to make the most of the diverse range of tree species available and operators are slow to remove standing and felled trees.

As a pillar of Africa's structural transformation, industrialization is a key priority for the African Development Bank (AfDB). The diversification of African economies for inclusive and green growth is a key objective for both countries and the Bank. Given that the majority of Central African economies depend on finite natural resources like oil, they have been advised to change their industrial structure to diversify their economies and take advantage of the opportunities offered by renewable natural resources like timber. Following this advice will put them on a trajectory of sustained growth and long-term human development.

The AfDB's regional study on the sustainable industrialization of the wood subsector recommends that countries take 10 key steps to establish an operational framework for the implementation of this vision by 2030. These steps are:

- Ban log exports;
- Increase the area of sustainably managed forests from 50 million to 75 million hectares;
- Intensify forestry concession harvests from the current 7 million m^3 to 15 million m^3;
- Transition to a new industrial model, in which all logs undergo primary processing and secondary and tertiary processing increases by 50 percent;
- Expand plantations outside forests;
- Strengthen the legal regime and management rules applicable to forestry concessions;
- Reduce tax distortions between countries and increase intra-African trade;
- Strengthen institutions and legislation;
- Invest heavily in logistics and energy infrastructure;
- Foster a new climate of trust between the banking sector, forestry investors and the wood subsector.

Box 2.7: Recent decisions taken by the Economic and Monetary Community of Central Africa (CEMAC)

While there are already various restrictions on logs exports in every country of the region, in September 2020, the Central African Economic and Monetary Community (CEMAC) decided to impose an export ban of logs by January 2023 (originally set for January 2022, the decision was postponed for a year). The Democratic Republic of Congo also joined this decision. While this decision needs to be ratified by the countries, it is certain that sooner rather than later, log exports will be banned in the region. Forest industries are not prepared to adapt in the short term to the implementation of this measure. The capacity is not available to transform the whole volume locally, like is the case today in Gabon and there are no government strategies to develop the sector in the short to medium term. Furthermore, with a log export ban, the importance to develop wood products and find new markets for lesser used species, also called "lesser known timber species", is becoming urgent, the logs will no longer be exportable to the Asian markets.

On the one hand, the private sector must be quite innovative in its business model, for example looking for new markets and investing in new wood processing units, to ensure its sustainability in the long term. Other options to consider may include: payment for environmental services, pharmaceutical industry, partnerships with medium and small-scale enterprises, collaboration with universities and research institutes and last but not least, training the local workforce, from machine operators to sector managers.

On the other hand, governments need to put in place a wide range of tools and measures to enable the processing industry to develop. Every country of the Congo Basin has its own characteristics, but there are common elements that require joint efforts involving all stakeholders.

Governments are urged to create an enabling environment to attract new investments in wood processing units, developing in the first place a solid strategy to further develop the forest and wood industry sector: policy makers have to create attractive fiscal incentives with a transparent structure and with efficient administrative processes to access those incentives; access to financing at affordable and competitive interest rates; fight against illegal logging and trade of wood products; invest in the development of skilled human resources at all levels; promote the use of legal and sustainable wood for public procurement; encourage the construction of wooden houses; implement necessary measures to participate in the African Continental Free Trade Area (AfCFTA); continue investments in infrastructures, such as in the road network, railway, seaports, but particularly for the interconnection of inter-African markets. Policy makers should also remember that it is not realistic to force investments in value added products, such as wooden furniture, because Asian markets will always be more competitive in the medium term.

Government and the forest industry should work together in the development of wood products standards for local and regional markets. National research institutes should invest in the design of furniture for the local small and medium scale enterprises and provide training opportunities for their production.

The above mentioned elements needed to further develop the wood industry in the Congo Basin are only achievable if the governments, the private sector, the civil society and the international donor community work together towards the same objective: to develop a sustainable, legal forest based industry.

If this vision is implemented successfully, jobs will be created in the primary processing sector, increasing from 40,000 today to over 100,000 by 2030, with more jobs in the secondary and tertiary processing sectors. The wood subsector's contribution to national GDP will also double. This will not however happen without substantial investment. It will be necessary to inject EUR 3 billion of private funds into the regional economy. The AfDB plans to invest USD 35 billion over 10 years as part of its industrialization strategy. This will help Africa to increase its GDP from industry from just over USD 700 billion to over USD 1,720 billion by 2030.

Box 2.8: The wooden eco-house and wood frame subsector

Zero log exports from CEMAC countries by 2022: Towards the development of the wooden eco-house and wood frame sector in the Republic of the Congo, for a more advanced and diverse approach to wood processing

In the Republic of the Congo, houses in poorer neighbourhoods are built using (often untreated) boards or sapwood. These houses therefore are quick to build and cheap, but fragile.

The construction of wooden houses dates back to colonial times, but it was in 2010 that the authorities first decided to make a sustained effort to promote this type of construction. There are three main reasons for this:

- To promote the use of local materials in response to the scarcity and rising price of cement;
- To undertake all stages of wood processing locally, an objective set out in the country's legislation;
- To help combat climate change.

Wood does not conduct heat well, so wooden dwellings remain liveable during increasingly frequent periods of intense heat and help to limit injuries and damage in the event of a fire.

When developing its wooden eco-house project, the Republic of the Congo drew inspiration from countries with a proven track record, such as Russia and Guyana, whose capital, Georgetown, has a similar climate to the Republic of the Congo and is constructed primarily from wood (80 percent). Representatives from the Ministry for Forests, and the companies CIB and IFO visited these countries in 2010 and 2011 to see what they could learn.

Thanks to the government's efforts, forestry companies have made significant investments in this sector. CIB is currently taking a leading role in this project, which has now built more than 150 eco-houses.

Prices vary depending on the type of house and on patterns of supply and demand. It should also be noted that the lifetime cost of construction largely tips the balance in favour of wooden eco-houses and, moreover, delivery times are short.

Promoting the production and consumption of legal sawnwood on national markets

While the economic and social importance of domestic wood consumption in Central Africa is now recognized, demand is mainly met by sawnwood from informal sources. This sector will continue to play an active role in Central African economies and will only grow with the implementation of policies that support them to flourish. Taking advantage of the growth of domestic markets to put these operations on the path to legality and sustainability is therefore a major challenge.

While suppliers are generally seen as the main drivers of better efficiency and sustainability, buyers also play a decisive role in the evolution of markets. It is necessary to analyse the practices of both suppliers and buyers to propose meaningful changes that will improve the performance of a market.

Among Central African countries, Cameroon has without doubt engaged most actively in comprehensive discussions about how its internal wood market operates and has analysed both wood consumption patterns and production methods (Lescuyer et al. 2016), which has allowed it to propose promising and sustainable solutions.

On the demand side, public and private demand can be split into four market segments:

1. Urban markets: 830,000 m^3 of sawnwood is sold per year, mainly in the form of planks, formwork boards, battens and rafters (Cerutti and Lescuyer 2011), of which 12–18 percent are thought to be from legal sources. The average price of one cubic metre on these markets is around XAF 80,000. Half of the buyers surveyed would agree to pay 10 percent more to buy sawnwood from legal sources. The buyers surveyed also stated that they could bear a 45 percent increase in the current price of sawnwood before turning to alternative products.
2. Carpentry workshops: Cabinets, beds and doors are the highest selling products. Almost all urban consumers are looking for the best value for money and there is little interest in sourcing legal or sustainable sawnwood.
3. Furniture shops: Beds are the main items of furniture sold by these shops. Buyers in Yaoundé and Douala are rarely concerned about the legality of the material used to make the furniture sold at retail.
4. Public procurement: Domestic and international public bodies are yet to develop an effective strategy to promote the procurement of legal sawnwood. However, the Cameroonian Government is the main buyer of sawnwood and furniture on the domestic market. Classrooms are the subject of the majority of its calls for tenders.

To meet demand from these segments, there are four supposedly legal sources of sawnwood and furniture on Cameroon's domestic market:

1. Community forests (CF): While these forests were a success in the 2000s, they have ultimately had little impact on the legal production of sawnwood and the multitude of requirements imposed by the administration have hindered the growth of this sector. The total production of community forests has languished below 10,000 m^3 of sawnwood per year, at a cost of at least XAF 150,000 per cubic metre of cut wood.
2. Timber Logging Permits: These permits allow operators to log around 160 m^3 of sawnwood each. Following a decade-long suspension, the Ministry of Forests approved 51 permits in 2012, covering a maximum volume of 8,000 m^3 of sawnwood. The use of timber logging permits is expensive, resulting in an estimated cost of XAF 280,000 for one cubic metre of sawnwood.

3. Industrial processors: Though this market segment is small, 145,000 m^3 of sawnwood was produced by industrial sawmills. While this sawnwood is low quality, it is priced 30–50 percent higher than other sawnwood. In addition to official sales, scrap from industrial sawmills can be found on urban markets and is not monitored.
4. Imports of wooden furniture: Imports have doubled since 2007, reaching a volume of around 10,000 m^3.

This analysis of the demand for and supply of sawnwood shows that there are two major obstacles to the emergence of a domestic market for legal sawnwood in Cameroon. On the one hand, buyers' willingness to accept higher prices for legal timber is not sufficient to cover the current cost of sawnwood from legal sources. On the other, the maximum production volumes of artisanal sawnwood from legal sources is currently only able to meet a small proportion of consumers' needs.

Reducing the cost of producing legal sawnwood is the most frequently cited solution and has to a certain extent been tried. It remains difficult to implement policies to boost the supply for many reasons (cost of implementing timber logging permits, poor community forest governance or weak interest from industrial processors). The government has, however, designed and trialled measures to force companies to increase their supply to urban markets, particularly from their managed concessions.

A complementary approach could be to boost private and public demand for legal sawnwood. Some consumers are already willing to pay more for legal products. Moreover, the Cameroonian Government has shown its support for requiring all public contracts to source legal sawnwood, which could have a symbolic impact on public perceptions and act as a catalyst for change in the wider economy.

In view of this, there are several measures that Congo Basin countries could consider implementing in the short term: (1) better identifying and publicizing the volumes of legal sawnwood available on the domestic market; (2) removing regulatory barriers that hinder the formalization of the sector and that reduce the volume of legal timber on the domestic market; (3) continuing to promote domestic demand for legal sawnwood; and (4) facilitating transactions between buyers and sellers of legal sawnwood.

Table 2.12: Summary of annual volumes, prices and turnover for sawnwood and furniture sold on Cameroon's domestic market

	Sawnwood				Furniture		
	Community forests (2012, maximum)	Logging permits (2012, maximum)	Industrial processors (2010)	Informal (2010)	Carpentry (sample in 2015)	Retail (sample in 2015)	Imports (Customs stats 2015)
Cut volume (m^3)	9,060	8,000	144,156	668,354	22,000	6,946	10,600
Cost price at market (XAF/ m^3)	150,000	281,250		80,993			
Turnover (XAF million)	1,359	2,250		49,647	8,000	3,992	5,300

Source: South-West Regional Development Project (CIFOR) 2021

Towards the development of intra-African trade in tropical timber: A case study on the Republic of the Congo

Exports of forest products from Central African Forest Commission (COMIFAC) countries to other African countries are low, coming in at less than 5 percent of the volume exported. Most exports to the continent are destined for North Africa. Exports mainly take the form of dry and green sawnwood as well as veneer, prepared logs, chips (mainly in the early 2010s) and finished products in lower quantities.

There are several reasons for the low volume of exports to African countries south of the Sahara:

- Purchasing power is low in the region;
- Asian and European markets are more attractive than African markets;
- Production and market structures are similar across COMIFAC countries and there is no need to import goods similar to those available locally;
- There is a lack of transport infrastructure between African countries (road, rail, maritime);
- Some countries are very high risk due to conflict and terrorism; There are administrative and tax barriers to exporting.

Several factors could improve the trade in wood products between African countries in the medium term:

- Establishing a free trade area and improving trading arrangements;
- The emergence of a middle class;
- The development of new products, both in terms of species and processing, making it possible to create niche markets;
- The development of long-distance communication infrastructure, which has proven effective in the case of the DRC-East Africa road and the increase in exports.

Increasing the popularity of ‘promotional’ species and increasing buyers willingness to accept products that have minor defects will reduce the pressure on flagship species and on the forest in general, which would be more conducive to sustainable management.

Conclusions

Production forests are, for the most part, managed on the basis of management plans, which have proven to be a valuable tool for planning harvests. This management model still needs to be refined and tailored to the specificities of each concession (ecological diversity, area, history of logging), while upholding management rules that ensure sustainability.

Despite the very high diversity of marketable species, demand from the wood subsector is focused on a fairly small range of species (50 percent of production in the Congo Basin is provided by around 15 species, while about 150 species could be utilized). This situation is linked to the fact that integrated companies (that both harvest and process the wood) have not succeeded in commanding profitable prices for these so-called ‘secondary’ species. One major challenge for the wood subsector is increasing the industrialization of the wood-processing segment (following the model in Gabon, which, after banning the export of logs, has set up a Special Economic Zone where around a third of Gabon’s logs are processed). Industrializing this subsector will however require better infrastructure and a more skilled workforce.

Managing and formalizing production for the domestic market is also a challenge because it is mainly served by illegal operations. Given that this segment accounts for a significant proportion of harvests, the sustainability of forests as a resource is therefore jeopardized without contributing to state coffers. To formalize this sector governments will have to amend national regulatory frameworks, increase demand for legal sawnwood and facilitate transactions between buyers and sellers.

CHAPTER 3

Forest Plantations in Central Africa

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Photo by Paul Bertaux

Introduction

Demand for wood is growing worldwide and this trend is set to accelerate through the remainder of the 21st century. This is the case not just for traditional markets, but for other sectors like construction (responsible for 36 percent of greenhouse gas emissions), bioenergy and green chemistry seeking to de-carbonize and go biobased in an effort to move into the emerging sustainable, green economy in which companies are located closer to their raw materials and local markets.

This landscape offers more opportunities than threats for the forestry sector and sustainably managed wood products, which are carbon neutral by nature. But to harness these opportunities, the sector must be prepared to adapt, to rise to the challenges it faces and to fundamentally change the way it operates.

Globally, the gap will widen between the production capacity of natural forests – whose size and productivity are inherently limited – and different types of forest plantations.

Countries will therefore only be able to maintain their status as forestry economies (i.e. the sector accounts for a significant share of GDP) if they take decisive steps to develop their plantation activities. Much more generally, it would be a grave strategic error to assume that any sector could continue with business as usual in the coming years.

This chapter of the latest edition of the State of the Forests of Central Africa focuses on forest plantations and agroforestry plantations intended for production. It does not discuss assisted natural regeneration, enrichment plantations or agro-industrial plantations (e.g. palm or rubber).

Forest plantations are human-made forests grown from seeds or saplings for the purpose of producing wood or non-timber forest products (production plantations) or for boosting various types of ecosystem services (protection plantations).

The term 'plantation' covers a broad continuum of techniques and situations, tailored to the specifics of the local context.

There are usually seven stages to the production of timber or biomass from a plantation: seeds/nurseries, planting/establishment, tending/management, harvesting and one or more stages of processing, transportation and marketing.

Jobs and wealth are created at each node of the supply chain and costs are incurred. Various actors work at the different nodes, whether in a specific node or across the different nodes depending on a range of factors relating to: the legal/policy environment and institutional arrangements, support services, extension agents, service providers, inputs and financial institutions.

3.1 Situation analysis of plantations in Central Africa

3.1.1 Policy measures and the role of the state

Given the diversity of national contexts, legislative provisions on plantation forestry vary significantly across Central Africa, both in terms of their content and how they are implemented. It therefore remains difficult for governments to agree common or harmonized rules on forest management.

3.1.2 Forest plantation size in Central Africa

Forest plantations in the subregion tend to be very small, both in terms of area and production volumes. Updated figures on the size of forest plantations in Central Africa are presented in Table 3.1.

Table 3.1: Forest plantation size in Central African Forest Commission (COMIFAC) countries

Country	Area planted (ha)	Source
Cameroon	30,000	Atyi and Mbonayem (2018)
Gabon	46,800	Bayol et al. 2010, no notable change
Equatorial Guinea	13	Bayol et al. 2010, no notable change
Central African Republic	3,900	Fonds de Développement Forestier [Forestry Development Fund] 2020 + Communication from South-West Regional Development Project (PDRSO) 2020 + Communication from CentraForest 2020 (unpublished data from the FRM engineering database, updated 2022)
Democratic Republic of Congo (Kinshasa supply basin)	30,000	Unpublished data from the FRM engineering database, updated 2022
Republic of the Congo	74,500	Briefing Note on EU-ROC FLEGT VPA, 2010 + Communication SPF2B 2020
Rwanda	301,500	Nduwamungu 2011
Burundi	146,000	Nduwamungu 2011
Chad	-	No data
Sao Tome and Principe	-	No data

3.1.3 Case study on forest plantations in the Republic of the Congo

Development of clonal eucalyptus plantations in the Republic of the Congo: 1950–1996

A number of scientific innovations were made in the Eucalyptus subsector in the 1950s to respond to the need for fuelwood in Pointe-Noire, which was in the midst of a boom. For instance, the National Office for Forests established plantations using *Eucalyptus terticornis*, the product of joint forestry research between France and the Republic of the Congo (yield = 7 m^3/ha/year).

From 1963 to 1986, the Congolese Industrial Afforestation Unit (UAIC) planted 25,000 ha with these two natural hybrids (yield = 12–20 m^3/ha/year). From 1989 on, Congolaise de Développement Forestier (CDF), a subsidiary of Shell, funded UAIC to establish 17,000 ha of clonal plantations in Pointe-Noire. The plantations grew to cover 42,000 ha.

The growth of a subsector with ECO s.a.: 1997–2001

In 1997, CDF merged with UAIC to create the company ECO s.a. (Eucalyptus du Congo s.a.). The company was active until 2001, with Shell as the majority shareholder and the Congolese Government as the minority shareholder.

By 2001, ECO s.a. was a major economic player in the Republic of the Congo, employing 3,500 workers and generating a turnover of around XAF 15 billion.

When the price of wood fell, ECO s.a. ran into financial difficulties. Its performance was unsatisfactory and bioenergy – Shell's real strategic target – was a long way from making its breakthrough, costing USD 20 per barrel.

Shareholders over time and the uncertainty of the subsector: 2001–2018

In June 2001, Shell exited ECO s.a. The Congolese Government took over Shell's shares for a symbolic amount and continued to honour the sales contracts agreed and complete replanting programmes while seeking another private sector partner.

The plantations in Pointe-Noire, some of which are in peri-urban areas, were threatened by problems linked to urbanization, leading to persistent illegal logging affecting almost 10,000 hectares. A presidential decree designating areas for reforestation in the department of Kouilou somewhat alleviated the situation, which had been exacerbated by the fast growth of the city of Pointe-Noire. In 2005, the South African group Chartwell Carbon Ltd, replaced soon after by Canadian group MagIndustries, signed a long-term lease with the Republic of the Congo for a concession covering the 40,000 ha previously held by ECO s.a., 7,000 ha from the National Reforestation Service (SNR) and 20,000 ha from the extension zone.

Eucalyptus Fibres Congo (EFC) was created to manage these 70,000 ha and positioned itself on the woodchip market given that there was little profit in prepared logs. Poles were still harvested from pines in Loudima (200 km from Pointe-Noire), but transporting them to the port in Pointe-Noire by rail was difficult and the road impassable. An XAF 16 billion woodchip factory was built in 2008 in the port, with an annual capacity of 500,000 tons. The Republic of the Congo is the first sub-Saharan African country to have a factory of this type.

Weakened by the 2008 global economic crisis, which disrupted the international wood and wood products market, EFC was not able to get back on its feet.

At the end of 2011, the Chinese Evergreen Holdings Group became the majority shareholder of MagIndustries, and EFC subsequently ceased almost all its operations until the groups' departure.

At the end of 2016, the government signed a new long-term lease with the Moroccan group SOS NDD, which withdrew due to a lack of financing in 2017. Finally, Romanian group ZEBRA TESAF CONGO took over the 25,000 ha southern section of the forest in 2018, but little is known about the company's strategic intentions.

New developments with COFOR in Madingo-Kayes

In 2019, a long-term lease was signed between the Republic of the Congo and the company COFOR, a Congolese subsidiary of the French FRM group, covering almost 38,000 ha. This area forms the Madingo-Kayes Reforestation Area (PRMK) and comprises 8,000 ha of eucalyptus plantations, 6,000 ha of extension zone, natural forests and protected areas.

Due to the degraded state and advanced age (10 to 30 years) of the eucalyptus plantations, it is necessary to implement several replanting and forest restoration strategies aligned with different strategic objectives.

The PRMK forest management project led by COFOR has a number of objectives:

- Regenerate the underdeveloped area around the plantation – where unemployment and rural depopulation take a heavy toll – by creating jobs on the plantations and increasing agricultural production within those areas assigned to agroforestry;
- Reduce the deforestation and degradation of natural forests with a high biological value, which is mainly caused by shifting agriculture, wildfires and forest fires, and the production of charcoal from illegal wood;
- Offer an alternative source of charcoal and timber, from sustainably managed plantations;
- Support climate change mitigation efforts by dynamically managing plantations to sequester CO_2 and by reducing the risk of forest fires.

The strategy for managing the forest is geared towards a multifunctional mosaic plantation made up of geographically coherent blocks organized into several new forests, nature reserves and agroforestry areas.

New forests will be grown or regrown by implementing afforestation, reforestation and agroforestry techniques using different species (*Acacia auriculiformis* and *mangium, Eucalyptus* UxG and PF1).

The commercial products produced by these forests are destined mainly for the local market (including fuelwood in the form of charcoal, timber in the form of veneer, plywood, engineered timber and electricity poles, and food crops).

In 2020, COFOR launched a preliminary pilot to establish a tree nursery and an initial acacia agroforestry plantation. Implementation was delayed by the outbreak of Covid-19 and did not take place until 2021.

The PRONAR and SNR plantations

In addition to the forests described above, tens of thousands of hectares have been planted across the Republic of the Congo by the National Reforestation Service (SNR) and the National Afforestation and Reforestation Programme (PRONAR), which now manage them. PRONAR is a robust policy initiative by the Government of the Republic of the Congo to launch, support and develop different types of plantations.

It aims to promote forestry and agroforestry plantations, to encourage and support stakeholders to undertake afforestation and reforestation to supply national and international markets with timber and non-timber forest products (such as essential oils, resins, biofuels, honey, fruits, vegetables and medicinal plants).

It seeks to relieve human pressure on natural forests by reducing deforestation, to develop land not suited to crop or animal farming, and to improve the country's supply of wood for manufacturing, construction, energy and industry. Feasibility studies for the programme were conducted with the support of international partners (World Bank and FAO). It aims to plant over 1 million ha of forest by implementing a range of components intended to mobilize public and private sector actors and rural communities (Lignafrica 2014).

Lessons learned

In contrast to the industrial success observed in South America and South Africa, which use similar technologies, the plantation forestry subsector has not grown as expected in the Republic of the Congo. This is the case despite the succession of managers, the large areas planted, high yields, the Congo's world-renowned experience in the sector (plant material, research and development, local know-how) and the proximity of the forests to the port of Pointe-Noire.

Table 3.2: Distribution of forests across the three PRONAR components

PRONAR objective	1,000,000	ha (plantations + infrastructure)
% infrastructure (tracks, firebreaks, etc.)	15%	
Area actually planted/productive	850,000	ha planted/productive
Areas not suitable for planting (protection, human occupation, etc.)	30%	
Area required to be allocated to PRONAR (with land title)	1,300,000	ha with a land title
Component 1: Industrial forest plantations	50%	
	425,000	ha planted/productive
Short-rotation plantations (for industry/fuelwood)	80%	
	340,000	ha planted/productive
Medium-rotation plantations (timber)	20%	
	85,000	ha planted/productive
Component 2: Agro-industrial plantations	40%	
	340,000	ha planted/productive
Component 3: Rural agroforestry plantations	10%	
	85,000	ha planted/productive

Source: Lignafrica 2014

The markets and subsectors are shown in the figure below.

This situation can be explained by:

- Proximity to a city that has doubled in population size over 15 years (600,000 to 1.2 million inhabitants);
- Insecure land titles, an issue partially resolved by a presidential decree following long disruptions;
- The lack of genuine product diversification and high dependence on the paper manufacturing sector, which has become very concentrated and highly competitive;
- The lack or absence of industrial strategies on the part of various investors over the years. The withdrawal of Shell, which had many similar companies in its portfolio, was not directly tied to the context in the Republic of the Congo, but was rather a consequence of the strategic decision to exit the biomass energy segment, which was deemed too new in 2000.

Table 3.3: Possible processing subsectors for different types of plantation using the example of PRONAR, Republic of the Congo

PRONAR segments

PLANTATIONS

Logging (cutting, skidding)

	EUCALYPTUS		PINE			ACACIA	TECK	PINE	EUCALYPTUS		
	Industrial wood		Timber					Roundwood	Fuelwood		
1st Processing stage	Pulping	Fiberization	Sawmilling	Peeling	Sawmilling	Sawmilling	Sawmilling	Shaping	Shredding	Shaping	Shredding
2nd Processing stage	Mechanical / chemical processing	Bonding, pressing, shaping	Drying, cutting, profiling	Gluing, pressing, shaping	Shaping, notching	Drying, cutting, profiling	Drying, cutting, dressing	Drying, treating	Burning, hear, steam	Burning, carbonization	Drying, compacting, sizing
3rd Processing stage			Assembly, finishing		Assembly	Assembly, finishing			Energy mech, heat/electricity		
ACTIVITIES	1 Pulp	2 MDF	3 Furniture	5 Plywood	3 Carpentry	4 Joinery	11 Flooring	6 Poles	6 Cogeneration	8 Charcoal	9 Pellets
SUBSECTORS	PAPER	FURNITURE			CONSTRUCTION			EXTERIOR	ENERGY		

Source: Lignafrica 2014

Box 3.1: A 40,000-hectare plantation project led by Total and FRM has recently launched in the Republic of the Congo within the framework of PRONAR

In March 2021, within the framework of PRONAR, the Republic of the Congo signed a partnership agreement with Forest Neutral Congo (FNC), a subsidiary of the FRM group, and Total Nature Based Solutions (TNBS), a subsidiary of the Total group, for the implementation of a large-scale afforestation project on the Batéké plateau, to the north of the Léfini River, 250 km from Brazzaville.

The 40,000-hectare forest will form a carbon sink that will sequester more than 10 million tons of CO_2 over 20 years and will be certified to international standards. The initiative, financed by Total, includes agroforestry farms (charcoal production and crop farming) and a carbon sink, with timber production, offering social, economic and environmental benefits.

Planned to run until 2040, it will employ the selection cutting system to promote the natural regrowth of local species and supply Brazzaville and Kinshasa with sawnwood and plywood.

The 50,000-hectare property will comprise:

- 15,000 ha of infrastructure and protected areas, allowing sites with high biological value and patches of natural forests (gallery forests, slope forests) to recover and even expand in buffer zones.
- 2,000 ha devoted to the agroforestry component with crops (cassava, etc.) grown between rows of acacia trees by local farmers.
- 38,000 ha planted over 10 years under the carbon component, which combines carbon sinks and timber production. Over 20 years, 10 million tons of CO_2 will be sequestered and the growth will then be harvested annually and processed into timber. This forest will supply 160,000 m3 of wood per year for processing into three products: sawnwood, veneer and plywood. A biomass cogeneration plant will also be supplied with wood waste for electricity generation (and heat for drying) for nearby industrial facilities and villages.

For more information see: https://www.makanisi.org/congo-une-foret-de-40-000-ha-dacaciasa-vocation-ecologique-et-agro-forestiere/?fbclid=IwAR0IySsogN63T0sGoK2_0UeGpJ6hWB5C 6fGWTzc5dnAmQcEvijBwexnCTdE

With nearly 50 years of experience, a unique industrial heritage and large areas of savannah land available (few farms and few inhabitants), the Republic of the Congo has immense potential for the development of plantations.

The monospecific, single product/market-oriented planting model, which prevents the land being used for other purposes, has also shown its limitations. Highly inclusive models that involve local people (beyond basic silvicultural operations) and target a range of markets, including local markets, are a much more promising, resilient and effective option, given that they are capable of generating multiple revenue streams from locally processed products simultaneously.

The end of the globalized, highly concentrated and specialized fossil fuel model is set to disrupt economic activity and many industrial sectors. It offers many opportunities for local models that are integrated with modestly sized industrial hubs, located precisely at the source of decarbonized resources and serving mainly local markets.

3.1.4 The acacia-cassava agroforestry system developed in DRC

Agroforestry

Agroforestry combines the time and/or space dedicated to trees with crops and/or livestock (agro-sylvo-pastoralism) by optimizing the agronomic, ecological and economic synergies between the various components of the system. It has several benefits:

- It enriches the soil with organic matter and nutrients;
- It regulates and ensures the availability of water;
- It protects against erosion;
- It acts as a windbreak and shades crops;
- It increases biodiversity;
- It diversifies revenue streams.

Among the many agroforestry models currently available, the ‘sequential’ agroforestry system (also called ‘cyclical’, ‘productive tree fallow’ or ‘Taungya’), as opposed to the ‘permanent’ agroforestry system, has become the dominant model in Central Africa.

Box 3.2: Problems related to slash-and-burn agriculture and the demand for charcoal on the Batéké plateau

Shifting agriculture on cleared and burned land is the predominant model in Central Africa, whether in forested or savannah areas. It is relatively productive for a few years, but soil depletion drives farmers to move on to new land. This practice, together with the concomitant production of charcoal, is the main driver of deforestation.

On sandy savannahs, it delivers only modest yields for 1 to 3 years, following which a fallow period of 5 to 10 years is needed to allow the soil to slowly recover.

The Batéké plateau is made up of sandy savannahs fragmented by valleys, many of which are lined by gallery forests. They cover 12 million hectares from south-eastern Gabon to north-eastern Angola, on both sides of the Congo River north of Brazzaville and Kinshasa.

This ecosystem is characterized by a complex mosaic of savannah and forest. The consequences of slash-and-burn agriculture and charcoal production to supply the two capitals are dramatic, both for the equilibrium of the forest and for the food security of rural populations. Indeed, Kinshasa requires 2.14 million tons of charcoal each year (Dubiez et al. 2022) and Brazzaville more than 100,000 tons.

The acacia-cassava agroforestry system developed in Mampu

To meet the high demand for charcoal from Kinshasa, an innovative agroforestry system was designed and deployed on the Batéké plateau in the DRC in the 1980s, as part of the Mampu project. This system combined Australian acacias (*mangium* and *auriculiformis*), which have a natural capacity to enrich the soil and high-quality wood, with cassava, the main food crop.

Under the supervision of the Hanns Seidel Foundation, this agricultural system, which performs well on poor savannah soils, was deployed over 8,000 hectares between 1987 and 1993 with the voluntary settlement of indigenous farming families from the wider region. The plantations were then divided into 25-hectare farms and allocated to independent farmers between 1995 and 2001.

Sequential agroforestry

In sequential agroforestry systems, the crops (cassava, maize, peanuts, market garden produce, etc.) are planted at the same time as the acacia trees. They benefit from the way the land is prepared for planting (clearing and ploughing) and are farmed for the first two years in the spaces between the rows of trees.

Acacia can be mixed with other trees, local species (*Maesopsis, Pentaclethra, Milletia, Afrormosia, Terminalia*) and even fruit trees. Beekeeping can also be introduced into this agroforestry system.

From the third year, the plantation enters the 'productive tree fallow' phase for 5 to 6 years until the trees are harvested.

A new agroforestry cycle then begins on the loosened soil, which is naturally weed free and enriched with nitrogen and organic matter, without the use of chemical products. The acacias are regrown by replanting or using controlled burning to activate dormant seeds present in the litter. Food crops are replanted between the rows of trees.

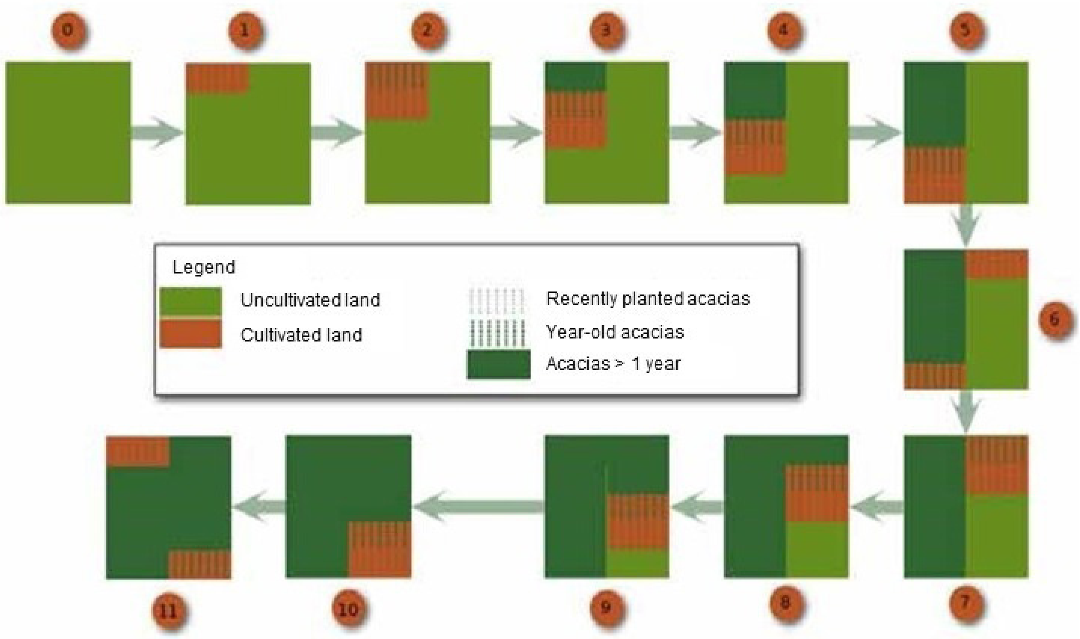

Figure 3.1: Diagram of the sequential agroforestry cycle (Boldrini et al. 2017)

Figure 3.2: Comparison between productive tree fallow (agroforestry) and traditional bare fallow

Source: Paul Bertaux, FRM

Subdividing agroforestry estates into the same number of plots as years of the harvest cycle (for example 8 plots) has the benefit of ensuring that both food (1 to 2 out of 8 plots) and forest products (1 out of 8 plots) are both produced every year.

The tree fallow system offers an effective alternative to the traditional bare fallow system in savannah areas. The period of natural soil restoration (but with regular burning) required by the latter is replaced by a productive period of tree growth that accelerates the enrichment of the soil with organic matter and nitrogen.

Lessons learned from Mampu

The Mampu agroforestry system has proven effective. Three hundred farming families have been living on 25 hectares of acacia trees each for 20 years now, in a plantation zone that is home to several thousand people centred around a residential and commercial hub.

One reason for the project's success is the incorporation of traditional slash-and-burn practices into the agroforestry system, allowing for the natural regeneration of the acacia trees. This technique, which farmers know well, has facilitated the adoption and therefore the sustainability of this agroforestry system.

The Mampu project also has a major environmental dimension in that it replaces charcoal obtained via illegal logging – a major driver of deforestation around Kinshasa – with charcoal from sustainable plantations. Twenty years after the establishment of the plantation, Bisiaux et al. (2009) estimated that the area produces around 10,000 tons of charcoal annually, 10,000 tons of cassava, 1,200 tons of maize and various non-timber forest products, including 2 tons of honey.

With an annual turnover of 10 percent of its initial investment, the project has also demonstrated its economic viability and its positive impact on social development. Mampu is now an autonomous peasant farming system. It does not rely on funding or support from international donors and stands as a valuable example in the field of agroforestry.

The success of this agroforestry system has encouraged international donors and technical cooperation bodies to promote it across the Congo Basin.

The Ntsio agroforestry project

The Ntsio project ('savannah' in the Teke language), implemented by the Hanns Seidel Foundation 200 km from Kinshasa, has incorporated the recommendations from the institutional, technical and sociological reports on the Mampu project:

- Resolve the issue of customary claims over the land by obtaining a ministerial subdivision order that sets out the conditions for acquiring the land;
- Consider whether there is a water source in the area suitable for the implementation of an agroforestry project;
- Reduce the size of the areas assigned to farmers.

The Ntsio project covers 5,500 hectares comprising 260 17-hectare agroforestry farms and the infrastructure required by the participating associations (covered meeting area with an office, warehouse and water tower), materials for which come from timber plantations (mainly *Eucalyptus sp*.).

The project area is served by a water supply network. In addition to increasing farmers' ownership of irrigation activities and maintenance, this infrastructure has allowed for the establishment of a central nursery (1 million plants/growing season, up to two seasons per year, diversification of plantations with *Pinus sp., Eucalyptus sp., Maesopsis,* palm trees, etc.).

Farmers are grouped into four associations, which hold land titles over the project area, monitor compliance with operating standards for the farms and coordinate the community's management of the infrastructure and the sale of the goods produced.

Economic performance, challenges and opportunities

In Ntsio and Gungu, average incomes are around USD 2,600/ha at the start of acacia harvesting, equivalent to USD 200/month. It is estimated that Mampu and Ntsio each produce about 1 percent of the charcoal required by Kinshasa.

Cassava yields have also increased due to wider adoption of improved varieties. The introduction of cereals and legumes to the agroforestry system is currently under way.

Table 3.4: Estimated average incomes per hectare from the first round of acacia farming

Product	Yield (t/ha)	Local selling price (USD/kg)	Income (USD)
Charcoal	10	0.1	1,150
Maize	0.6	0.2	150
Cassava (cossettes)	3.2	0.2	800
Cowpea	0.3	0.3	100
Honey*	0.1	4	400
TOTAL			**2,600**

* From five hives at a rate of 20 kg of honey per hive

Source: Hans Seidel Foundation database, 2021 (data provided by author Pierre Clinquart)

Encouraging producers to plant acacias in cultivated areas is an effective way to gradually convert farms to this system. The creation of sustainable resources through agroforestry encourages the rural population to organize and manage their local environment. This opens up opportunities for rural people, discouraging rural depopulation and reversing the trend of the city feeding the countryside.

The Ibi Batéké agroforestry carbon sink (PCIAB)

Based on the same agroforestry model, the Ibi Batéké agroforestry carbon sink (PCIAB) was established in 2008. In 2015, it produced nearly 500 tons of cassava tubers, 100 tons of maize and almost 900 tons of makala (charcoal) annually on 80 hectares of land.

These activities employ 900 workers on a daily basis and provide 1,200 indirect jobs throughout the value chain.

Table 3.5. Overview of the Ibi Batéké agroforestry carbon sink

Plantation area	1,500 ha	
Plantations recognized as a 'carbon sink'	800 ha	
Carbon stock officially reported to the UNFCCC in 2020 (Tariff = 4 USD/tCO2)	46,700 tCO_2	
Area of forest logged each year for the production of sustainable green makala	900 t	
Average annual production	Cassava (fresh	500 t
	tubers)	500 t
	Maize	100 t
Number of jobs (daily)	Makala	900 t
	Direct jobs	(±900)
	Indirect jobs	> 1,200

Source: PCIAB internal database

Scaling up the Batéké Plateau Ecological Corridor (CEBAT)

The Mampu, Ntsio, Gungu and Ibi Batéké agroforestry carbon sink programmes cover a total of almost 18,000 ha of plantations across a very large area.

At the end of 2020, the Congolese Institute for Nature Conservation (ICCN), DRC, resumed its the activities in the Bombo Lumene Game Reserve in the province of Kinshasa. This initiative opens up new opportunities through the implementation of a large-scale sustainable community-based agroforestry project. The project builds on previous models and aligns with the fundamental principles for the management and conservation of protected areas set out under Congolese law.

In this context, a public-private partnership bringing together ICCN, scientific partners and the sponsors backing the Ibi Batéké agroforestry carbon sink is in the process of launching the Batéké Plateau Ecological Corridor (CEBAT).

This initiative aims to establish a protected area covering 3.5 million hectares, stretching from the Angolan border at an altitude of 1,000 m to the northern edge of the Kwamouth Territory (Mai-Ndombe province) at an altitude of less than 400 m. It will directly impact nearly 18 million people.

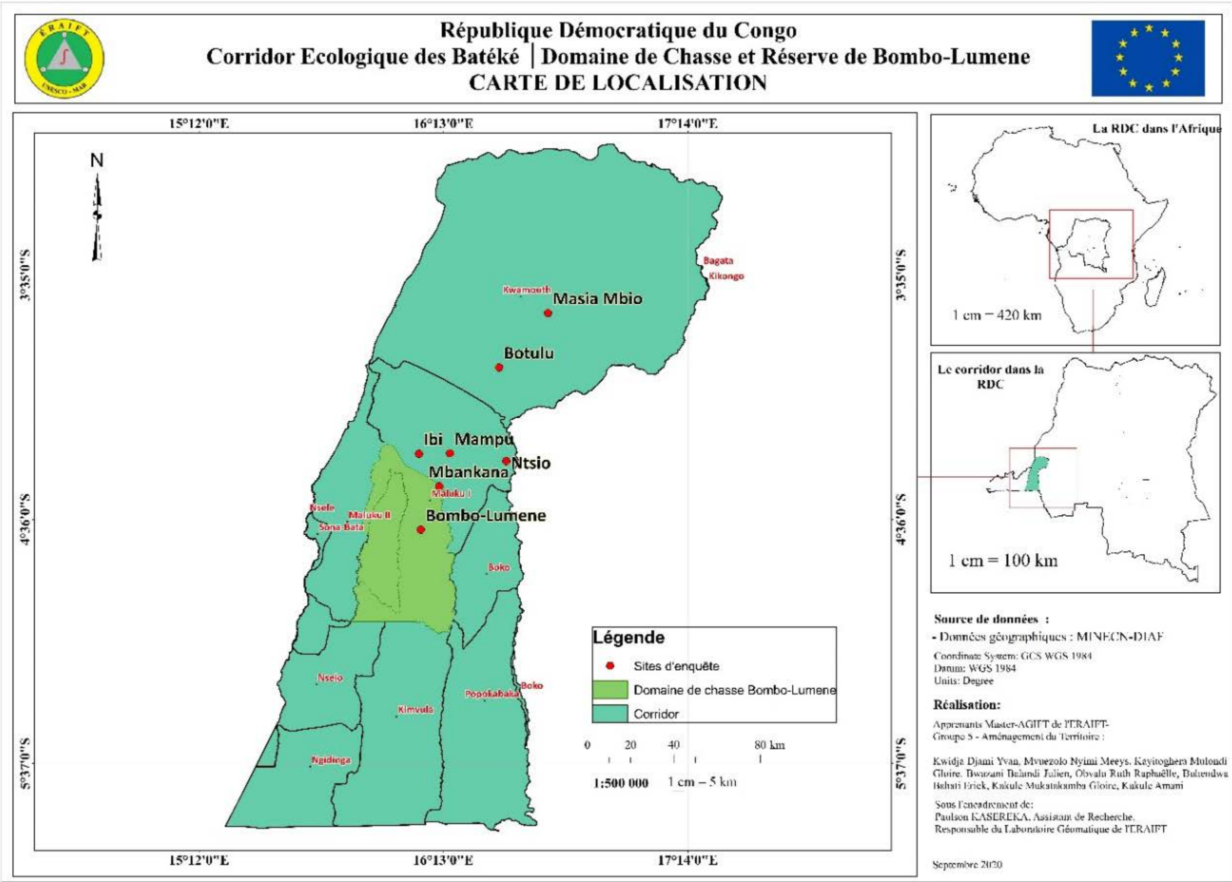

Figure 3.3: Location of the Batéké Plateau Ecological Corridor (CEBAT)

Source: Regional Post-Graduate Training School on Integrated Management of Tropical Forests and Lands (ERAIFT)

The Bombo Lumene Game Reserve is located in the centre of the Batéké Plateau Ecological Corridor and will link nearly 300 villages within the 'Mboka Mayele' network. The project aims to create tens of thousands of jobs. Investments will focus on agroforestry programmes, processing agricultural and forestry products and strengthening basic social and economic infrastructure.

The Batéké Plateau Ecological Corridor is designed to create a green bulwark against the human pressure exerted by Kinshasa and, in 2021, ICCN and its partners began the process of registering the Batéké Plateau Ecological Corridor as a UNESCO World Heritage Site.

Carbon impact

Acacia agroforestry plantations create carbon sinks based on two components:

- The permanent stock of the plantations, on harvest cycles of 8 years to more than 20 years depending on the cycle and markets chosen (charcoal, bioenergy, timber);
- The annual replacement of wood, which would otherwise come from unsustainable illegal logging, deforestation or trees from natural forests, with sustainable plantation wood.

This dual benefit can be used to generate carbon credits once a project has been certified to carbon standards that guarantee a project's concrete environmental benefits. Certification then makes it possible to capitalize on the environmental services delivered by a project in the form of payments for the amount of CO_2 sequestered.

Box 3.3: Factors affecting the agricultural sustainability of the acacia-cassava model

Emilien Dubiez, Vincent Freycon, Régis Peltier, Jean-Michel Harmand (CIRAD)

Fallow land planted with acacia has proved to have high productive capacity over relatively long periods. Remarkable results have been achieved on plateaus characterized by sandy, acidic and very nutrient poor soils with a very low water retention capacity (Kasongo et al. 2009).

Nevertheless, although this method represents real progress and avoids vast areas of forest being destroyed by slash-and-burn agriculture, Dubiez et al. (2018) found contrasting changes in the chemical composition of the soil after 22 years of farming using the Mampu acacia agroforestry system.

Soils under this system had higher levels of carbon and nitrogen as a result of nitrogen fixation by the acacia trees, but were more acidic and had lower levels of exchangeable bases (calcium, magnesium, potassium and sodium) than the original savannah soils.

The depletion of the mineral content of the soil over the 22-year period, for all acacia management models (unlogged plantations, one or two harvest cycles of acacia and food crops), can be explained by the transfer of cations from the soil to the plants and their removal when the products are harvested.

To rectify soil acidification, the depletion of exchangeable bases and the general decline in the productivity of the system, it is necessary to propose new practices and study their impacts on the chemical composition of the soil.

The undesirable effects observed could be reduced by removing the bark from trunks before carbonizing the wood, returning small branches to the ground and adding natural phosphate rocks or liming.

These preliminary findings suggest that further studies are needed to improve the techniques used to manage *A. auriculiformis* stands and increase the sustainability of the system by managing soil fertility more effectively.

Forest carbon is primarily traded on voluntary carbon markets. The Verified Carbon Standard (VCS) is one of the most widely used standards on voluntary markets, with nearly 1,800 projects certified in 2022. This corresponds to sequestration or emissions reductions equivalent to 468 million tons of carbon.[1] Once a project has been certified and verified according to the rules and requirements of a standard, it can receive carbon credits (Verified Carbon Units or VCUs).

In DRC, the Ibi Batéké agroforestry carbon sink is the only project registered under the UNFCCC Clean Development Mechanism. The 2020 Ibi Batéké carbon sink verification report (experts commissioned by the World Bank) approved a final stock of 46,700 tCO_2 over an area of 800 ha (58.45 tCO_2/ha). The 2009 greenhouse gas emission reductions agreement between the World Bank and the sponsors of the Ibi Batéké carbon sink project provides for a fixed payment of USD 4/tCO_2

1 https://registry.verra.org/app/search/VCS

on the basis of temporary credits, valid for 5 years. Carbon payments also go to local family-run agroforestry farms, which have recently organized into cooperatives, such as the Cooperative and Economic Interest Grouping of the Teke Territory, which was established in 2015 with the direct involvement of customary chiefs.

The Ntsio project, for its part, did not initially plan to go as far as trading the carbon it sequestered. Internal studies have shown that producer communities do not have the know-how for carbon trading, both in terms of their technical and administrative capacity. It may however be possible through a specialized third-party organization, depending on the standard chosen, the target market and changes in the market value of carbon. While there are plans to register the project with DRC's REDD unit to lay solid foundations for Ntsio to pursue carbon trading, this has not yet been done.

3.1.5 Case study on forest plantations in Burundi and Rwanda: Complexity and complementarity of stakeholders and management methods

The history of plantations in Burundi

As early as 1907, Burundi was described as a degraded landscape without many plantations. In 1933, the authorities decided to implement legal measures to protect the last remaining fragments of forest.

Fifteen years later, the Burundian forestry sector had grown significantly: the forested area had reached around 90,000 ha, with 40,000 ha of tropical montane forest, 25,000 ha of savannah woodland and gallery forests, 20,000 ha of artificially afforested land and 5,000 ha of trees outside forests (FAO 1999).

In 1978, following increasing pressure on natural forests and timber shortages, Burundi, supported by donors, launched a vast reforestation programme to ensure the supply of timber and reforest denuded ridges. Between 1978 and 1992, the country's forest cover increased from 3 percent to 7 percent (from 25,428 ha to 146,000 ha). More than 30,000 ha were decimated during the crisis of October 1993.

In 2010, plantations occupied 146,055 ha, where 66 species were grown, 52 percent of which were for sawnwood and 48 percent for fuelwood. The species used were mainly fast-growing, multipurpose and low-cost exotic species in protection plantations, such as: ***Eucalyptus sp.*** (36 percent), ***Grevillea*** (3 percent), ***Pinus sp.*** (15 percent), ***Callitris calcarata*** (30 percent), other softwood (10 percent) (Nduwamungu 2011).

Main challenges

Plantation forestry is tied to a number of socioeconomic and environmental challenges:

- In a country like Burundi with a population density of more than 400 inhabitants per km², **the availability of forest resources for multiple uses** remains a major issue. The biggest challenge is finding species that meet different needs, such as for fuelwood, livestock feed and watershed protection.

- **Strengthening the role of forest plantations in soil protection** to prevent sediment runoff and improve carbon storage.
- **Dependence on fuelwood**, which is mainly used in rural areas (76 percent of national consumption). The diversity and complexity of the stakeholders involved is a major challenge. Owners of afforested areas (the state, municipalities, private sector), coal miners, transporters, wholesalers and major consumers (bakeries, restaurants, etc.) do not coordinate and operate without a framework for consultation.
- **The impact of internal and external migration on plantations**. Successive wars and sociopolitical unrest in Burundi have caused massive flows of refugees and internally displaced persons. This takes a heavy toll on plantations, given that these people tend to take refuge in state or communal forests and protected areas, near Lake Tanganyika for its rich fish resources, in the Rumonge and Nyanza region for its fertile land (oil palm) and on the Bururi, Kigwena and Rumonge reserves.
- **Issues related to land tenure and the promotion of private forests and agroforestry systems** linked to securing land rights.
- **Dependence on external funding allocated through the government budget and national actors** in partnership with the government. The government has committed to fund reforestation efforts in full, through the national reforestation programme ‘Ewe Burundi Urambaye’ (‘a well-dressed Burundi’ in English), thereby reducing dependence on external funding.

Gaps and opportunities

The current annual rate of deforestation is estimated at 2 percent, whereas reforestation rates remain below 1 percent (Ministry of the Environment, Agriculture and Livestock 2019).

To address these problems, Burundi should launch new research and development efforts, pilot projects on industrial value creation and assess plantations’ impacts on water and soil (pines, eucalyptus).

In terms of initial and ongoing training, modules on monitoring natural and artificial forests using satellite data could be strengthened to enable degradation and deforestation to be closely monitored.

The role of the forestry sector in the implementation of the Paris Climate Agreement should be strengthened. In its Nationally Determined Contribution, Burundi committed to reduce its greenhouse gas emissions from 2016 to 2030 by increasing the country’s forest cover by at least 60,000 ha at a rate of 4,000 ha/year over 15 years from 2016, and up to 120,000 ha at a rate of 8,000 ha/year (subject to conditions). By 2030, the government also aims to replace all traditional charcoal kilns and all traditional cooking stoves.

Since 2019, Burundi has financed efforts to delay land degradation through national programmes fully funded by national budgets.

This trend should be encouraged and existing efforts should be strengthened with the support of other technical and financial partners, as well as the financing mechanisms advocated by the Paris Agreement.

Box 3.4: Fuelwood in Africa today: A case study on Rwanda

Robert J. van der Plas (www.marge.eu)

In most African countries, wood still makes up a significant proportion of the energy mix, which has evolved without government oversight.

Although the consumption of electricity, gas and petroleum products is increasing, the consumption of fuelwood is not declining at an equivalent rate; indeed, firewood and charcoal remain widely used energy sources (Owen et al. 2013). Nevertheless, the increasing volume of fuelwood and charcoal purchased even in rural areas opens up opportunities for farmers and landowners to sell trees as a cash crop.

Rwanda offers a case in point. Here the strong demand for fuelwood continues unabated, even though wood from natural forests had virtually disappeared decades ago. It is relatively difficult to obtain wood from public plantations and there is very little land available for additional large-scale plantations (whether private or public) due to the high population density. Farmers saw a business opportunity in this situation and planted large numbers of trees on their land to sell to the fuelwood market.

In doing so, they compensated for the loss of natural forest and the majority of fuelwood now comes from trees planted for this purpose. However, this situation is generally poorly recognized, given that the government has recently taken steps to shut down the production of charcoal, which predominantly uses wood from purpose-planted trees. Much of the population will continue to use fuelwood as its main source of energy for some time to come, because it is still cheaper than electricity, gas or petroleum products for an equivalent energy yield. Wood from farmers' fields has a lower production cost than that from large plantations and can be obtained without having to navigate administrative barriers.

Although the government asserts that it can plant more trees on marginal land, it is unclear whether this wood will be easy to sell. Indeed, the cost per m3 is substantially higher than for wood from farmers' land. There are no reliable data on the actual production and use of fuelwood that could be used to reliably determine whether this will be a problem in the future. The supply of fuelwood has met demand for energy without major government intervention and it appears that this will not change in the near future.

Despite alarmist rhetoric about an imminent wood shortage in Africa, fuelwood is still widely used in many African countries. Progress has been slow on improving access to electricity for most people and population growth often outpaces the number of new connections. If the use of electricity and liquefied petroleum gas is not incentivized by generous subsidies, fuelwood will remain the cheapest source of energy for cooking and likely the main source of energy in many countries.

3.2 Challenges and opportunities for the development of plantation forestry in Central Africa

3.2.1 Funding

Despite strong potential and attractive opportunities, investment in commercial forestry plantations in Africa has stalled due to 20 years of sluggish economic growth.

According to the literature, financing is generally available for commercial operations that will generate a positive cashflow in three to five years and that have an acceptable level of risk.

For this reason, banks may be less interested in financing the production side of plantation forestry projects, but more interested in downstream segments like processing or adding value. Indeed, the fastest time to positive cashflow reported by plantation forestry investments is 5-8 years (Harwood and Nambiar 2014).

In Central Africa (with differences between countries), investments are complicated further by unclear land tenure and land-use arrangements, weak industrial infrastructure, poor technology and low productivity, as well as serious funding gaps.

Some authors note that different stakeholders are hindered by different barriers to investing in plantation forestry in Africa: local investors and financiers are opportunistic, strategic investors face barriers to entry, financial investors have demanding investment criteria (mainly risk related) and development financing projects seek enabling conditions (Indufor 2016).

However, investment in the forestry sector may take the form of greenfield investments in plantation establishment, processing or forestry, within the framework of official development assistance. This category of investments can be broken down into five main groups, shown below with a few examples that could be scaled up:

- Development finance institutions, such as the African Development Bank and the World Bank, with the possibility for them to compensate for the long lead times and social risks associated with plantation forestry;
- Donors with incentive schemes for local tree growers and farmers (Global Environment Facility (GEF), Climate Investment Funds (CIF), Adaptation Fund and other trust funds);
- Governments with innovative policies on leasing land to responsible investors;
- Governments and donors jointly providing support, sharing risk, developing infrastructure to facilitate forest investments or providing complementary financial guarantees (forest investment programmes);
- Strategic and financial investors who partner with local actors and take advantage of opportunities in Africa.

3.2.2 Investments

A sector with specific challenges in need of enabling conditions for investment

Compared to other land-use options, the majority of investments in commercial plantation forestry are, at best, marginally profitable. It is therefore imperative to be fully aware of the key challenges affecting African forestry, which, if addressed, can become enabling conditions for successful investment. Poor understanding of these challenges has led to the current suboptimal state of the majority of greenfield plantation investments.

The African forestry sector can be regarded as high risk from an environmental, social and governance, business integrity and financial returns perspective. The main risks relate to land use and loss of livelihoods, occupational health and safety skills, social acceptability, negative impacts on biodiversity, the potential for bribery and corruption, an uncertain investment environment, inadequate infrastructure and illegal logging of natural forests.

Though there is significant opportunity for investment growth in the African forestry sector, progress is hindered by a risk-averse investment climate, the limited availability of financing and the lack of successful forestry business models (outside South Africa).

Investing in Africa's forests is a bold undertaking, but one the continent urgently needs, for the sustainability of its wood supply, climate change mitigation and adaptation, and rural development.

Agroforestry and carbon markets could therefore offer a solution to these challenges, if not be a game changer.

Investment structures

Debt vs equity

African forestry is generally not developed or liquid enough to carry commercial debt.

The basic long-term internal rate of return of forestry projects is usually somewhere between 6 percent and 9 percent. In very specific imperfect market conditions, more can be achieved, but not usually in the long term. Engaging in downstream processing can improve returns, but is not without its challenges.

Financing solutions are becoming more complex in the face of these return metrics and equity from committed investors would be the most appropriate option. Commercial investors often demand more than a 15 percent return on investment to offset the risk profile.

If an investment project succeeds in raising some form of concessional debt, this is very valuable. However, it is difficult to find and often comes with near impossible strings attached.

Many development banks take a commercial approach to the African forestry sector and often demand a return on investment that exceeds the potential internal rate of return. Project leaders are then encouraged to be optimistic when estimating profitability in order to raise the necessary funds.

Project leaders who have obtained debt financing then find themselves urgently trying to reach profitability before debts become too large to service.

Equity financing, on the other hand, comes with its own challenges. For example, assessing the value of a project is difficult for investors who enter a long-term investment at different stages.

Avoiding the need for mid-cycle capital

The lack of a positive track record is a significant challenge for the African forest investment space. If a project ends up needing to raise capital before it is generating significant return on investment, it will most likely find itself in a tenuous position. The project will need to prove to capital providers that it is one of the few success stories and that it is close to turning a profit.

This will require a strong business plan, convincing management, a track record of meeting budgets and a bit of luck.

If the project is indeed successful in raising funds, the original investors will usually find their stake either heavily diluted, subsidizing a high interest rate or both. The only way to avoid this mid-cycle risk is to have sufficient funding to reach positive cashflow from the outset.

3.2.3 Partnership models to support plantations

The various financial and investment options available for the development of plantation forestry can be grouped into three partnership models: public-private partnerships, private sector-community partnerships and partnerships between financial institutions and countries.

Public-private partnerships for establishing forest plantations

Public-private partnerships have proven to be a model for economic prosperity in many sectors and there are a number of examples in Central Africa relating to the establishment of forest plantations.

Case study on Gabon

In Gabon, since the end of 2011, the company Plantations Forestières de la Mvoum (PFM) has been working to develop a 40,000-hectare area about 100 km from Libreville awarded by the Gabonese Government.

Approximately 17,000 hectares of existing 30-55-year-old okoumé plantations are expected to produce 100,000 m^3 of logs per year. These plantations are scheduled to be harvested over 20 years and replaced with clonal teak.

To finance part of its investment programme, PFM carried out a capital increase in 2013 reserved for Gabon's Caisse des Dépôts et Consignations, allowing it to acquire 15 percent of the capital.

Since 2014, work has focused on establishing the first teak plantations and harvesting the existing okoumé plantations. By the end of 2016, the nursery had about 100,000 teak plants and 100 hectares of clonal teak had been planted.

At the same time, PFM continued its applied research programme on tropical forest plantations, focusing on the genetic improvement of plant material.

In 2016, PFM signed a partnership agreement with Gabon Special Economic Zone, which will purchase almost all of the okoumé produced from its plantations.

New avenues for creating value will be explored, working with partners where relevant. PFM's ambition is to meet the growing need for timber and fuelwood in Africa, against a backdrop of strong demand for renewable products and rising fossil fuel prices.

Case study on the Republic of the Congo

The ten-year partnership between the Government of the Republic of the Congo and Société Plantations Forestières Batéké Brazzaville (SPF2B) aimed to plant 10,000 hectares of forest to supply the Brazzaville market with charcoal from sustainable plantations and partially replace the charcoal currently obtained by cutting natural forests.

According to the agreement, SPF2B is responsible for financing the project, while the government, with PRONAR, facilitates access to improved plant material and technical exchanges on plantation management.

Planting started in October 2018 with an annual planting target of 500 to 1,000 ha. The project is expected to create 500 direct jobs in neighbouring communities and to catalyse the development of village plantations, thereby contributing to the national objective of planting trees over 1 million hectares (ATIBT 2019).

Private sector-community partnerships

Lessons can be learned from Uganda's Supporting Timber Plantations through the Sawlog Production Grant Scheme (SPGS).

Before the launch of this project in Uganda, a long history of underfunding forest operations and poor management had contributed to the degradation of forestry plantations that were originally publicly managed.

Productive plantations on degraded forestland were seen as a way to meet the growing demand for timber while relieving the pressure on the remaining natural forests.

The objective of the EU-supported SPGS programme is to promote private sector investment in timber production by supporting plantation development on degraded forestland with much-needed financial and technical support.

Financial assistance is provided as a direct grant paid within two years of planting. The total grant is USD 330 per hectare, but will only be paid if the growers meet the conditions set out in the contracts that must be agreed in advance. No money is paid up-front.

The main conditions are: sound species choice, using only improved seed, with at least 80 percent survival after planting, and ensuring the plantation is weeded and protected for two years. The principle is to 'grow trees' rather than simply 'plant trees'.

SPGS offers farmers sound technical support and two forestry companies also provide training to Ugandan foresters. Through field meetings, practical training courses and publications, the SPGS team has begun to convince people that commercial forestry is a serious business opportunity for those with suitable land in Uganda.

SPGS has funded 10,000 ha of plantations to date, from small community-based tree planting associations to large-scale commercial operations. The programme has also supported communities to plant seedlings, led to the establishment of the Uganda Timber Growers Association and created 5,000 jobs.

So far, growers have used degraded land in forest reserves leased by the National Forest Authority, but interest in using private land is now growing. Support to plant an additional 25,000 ha has been requested.[2]

Partnerships between financial institutions and countries

The issue of independent businesses launching development projects and social inclusion in the forestry sector must not be overlooked if we want to improve the livelihoods of small-scale tree farmers by encouraging them to plant trees on small plots, despite challenges linked to land tenure.

Agroforestry appears to be a relevant approach to relieving the pressure on natural forests. The World Bank is working with partners in Mai-Ndombe province, DRC, on an integrated REDD+ initiative built around investments and performance-based payments (World Bank 2018). Since 2014, the Forest Investment Programme (FIP) has been supporting farmers to implement agroforestry activities, such as planting several million acacia trees under the agroforestry model described in this chapter.

This programme is reported to have improved the living conditions of thousands of farmers, sequestered carbon in planted forests and reduced carbon emissions. Participants also receive payments from the Carbon Fund of the Forest Carbon Partnership Facility (FCPF) under an Emissions Reduction Payment Agreement (ERPA) signed by the World Bank and the Government of DRC. The average cost of establishing one hectare of this type of agroforestry plantation is estimated at USD 1,000.[3]

The African Development Bank (AfDB) recognizes the economic and development potential of a thriving large-scale forestry sector on the continent. Furthermore, the Climate Investment Funds have already invested substantial resources to attract investment to the sector, which is growing in importance as its role in climate change mitigation and adaptation has recently been highlighted. The Climate Investment Funds are currently working to encourage the private sector to invest in transforming the African forestry sector (AfDB et al. 2019).

The Green Zones Development Support Project in Kenya (the Mau Forest Reforestation Project) was financed by the AfDB (2007–2016) to the tune of USD 38.8 million, which led to the reforestation of 14,300 ha. The project led to the creation of 3,000 permanent and sustainable jobs in communities bordering forests and increased the income of 17,100 households (40 percent headed by women) (AfDB 2018). Over the ten years of the project, the average cost of establishing one hectare of forest was estimated at USD 2,713.

2 https://spgs.mwe.go.ug/

3 Dr Clement Vangu Lutete, Coordinator of the Forest Investment Programme in DRC, personal communication.

3.2.4 Enabling conditions for plantation investments

Management, staff, labour and expatriate presence

When it comes to management and staffing, setting up a plantation project in Africa from scratch is not an easy task. There are a number of possible approaches, but all face the challenge of balancing overhead costs and maintaining an adequate skill base.

In the early years, many projects require the presence of expatriate staff to get them off the ground. Planning how to minimize the use of expatriate staff should be a priority early in the project life cycle. Effective high-quality staff training is one of the single most important hallmarks of a successful project. Gradually shifting responsibility from expatriate managers to local staff is more cost effective and ensures sustainability.

Plantation development and management is a science, developed and practised successfully in many countries around the world. Some argue that it is important to incorporate traditional farming practices into plantation management. However, care should be taken not to 'reinvent the wheel' where very simple and successful established practices exist.

Health and safety does not often come naturally to developing markets. Having a healthy and safe workforce requires considerable investment in the early days, but is indispensable for success in the long term. Third-party forest management certification can also be a helpful framework to support the integration of health and safety measures. A skilled, healthy and safe workforce will be motivated to come to work, keen to improve their skills and share the company's values.

Silviculture and forest management

Genetics

It is best practice to use improved genetic material regardless of the type of plantation forestry. There is however some debate around whether to use clonal or non-clonal species and there are many valid arguments on both sides. Clonal forestry using a sufficiently wide genetic base offers the best return on investment for many traditional plantation species. Unfortunately, many plantation projects in Africa have not used high-quality genetic material from the outset. The composition and growth rate of early plantations often has a significant impact on their commercial viability. Many large professional companies have however begun to pay greater attention to genetics more recently. When implementing a project, time and logistical constraints are often cited as reasons for the use of poor-quality genetic material. It is however risky to rush this essential step when establishing a plantation.

Site and species compatibility

The success of a forestry project relies on the compatibility of the site and the species used. While this may seem obvious, many still get it wrong.

To match a site with the rights species, the soil must first be analysed and long-term meteorological data collected (including consideration of climate change-related risks). As those of us who have been caught out know, with rainfall, it is not just long-term averages that matter, but the magnitude of annual variation.

Fire risk

In most African countries outside South Africa, forest owners are on their own in the event of a fire. Fire is a serious risk in most plantation regions in Africa. There are four main ways to manage this risk:

1. Manage the forest to reduce the fuel load during fire seasons (weeding plantations) and by creating firebreaks;
2. Set up rapid response fire detection and suppression capacity;
3. Work with neighbours to prevent fires across the wider landscape and develop community safety plans;
4. Consider buying insurance.

Biodiversity

A major criticism of plantation forestry is the risk of biodiversity loss when planting large areas with a small number of non-native species.

However, in the case of Uganda, for example, the International Woodland Company (IWC) invested in pine and eucalyptus plantations in an area where the landscape had become highly degraded due to slash-and-burn agriculture and unmanaged grazing. Here, the plantations restored productivity to the landscape and protected vast natural forests and riparian areas from encroachment and further degradation.

As part of the Forest Stewardship Council (FSC) certification process, IWC hired an external partner to carry out biodiversity studies twice a year. These studies continuously reported that plantation activities were not harming conservation or biodiversity and that more species of birds and mammals had been observed at all sites surveyed. These plantations are more biodiverse than neighbouring farmland (without responsibly managed plantations scenario).

Processing and markets

In Africa, many markets for forest products are informal and underdeveloped. Understanding the market is crucial in the planning stage. Some organizations have the skills to move downstream into processing, while others may simply wish to remain plantation owners.

To be able to plan for the future, it is crucial that project leaders understand both current trade restrictions and the political will behind them.

Tenure

Land tenure is one of the most contentious issues affecting plantation forestry investments in Africa. Intractable challenges can arise when a land-intensive resource like a forest is combined with poorly defined and enforced land tenure legislation and a local population of marginalized subsistence farmers who are highly dependent on the land.

In Uganda, IWC was able to navigate these challenges through strong leadership, by drafting a company code of conduct, hiring a dedicated community engagement team, consulting regularly with communities, developing and managing a grievance redress mechanism and delivering community co-benefit activities. Despite the perception that tenure poses one of the biggest risks for plantation forestry investments in Africa, IWC's approach has substantially minimized this risk.

Valuable lessons have been learned about land tenure over the investment period. It is necessary to:

- Only invest in a project once the land tenure is clear. Doing so saves precious time and allows investment capital to get to work immediately.
- Have a thorough understanding of the plantable land before investing, not only in terms of biological capacity, but also with respect to conflicting land rights. Not having such an understanding from the outset could negatively impact the expected return on investment.
- Navigating land tenure enforcement with the relevant authorities is challenging, especially while upholding the company code of conduct. Nevertheless, maintaining positive relationships, frequent engagement and collaboration with relevant civil society organizations can be effective.

Frameworks for environmental and social risk management

There are a wide range of stakeholders involved in African timberland investments: investors, sector stakeholders, governments (local, national and foreign), non-governmental organizations (NGOs), research organizations, media representatives and local communities.

Fast-growing forest plantation projects — like any large-scale land purchase — must comply with the minimum requirements imposed by the host country to limit environmental and social harms.

Virtually all countries require projects to conduct an environmental and social impact assessment (ESIA) and adopt an impact management plan, obtain free, prior and informed consent and provide evidence of widespread community support; however, the conditions and guidelines for the establishment, monitoring and application of the measures adopted vary from one country to another.

Given private sector companies' growing interest in commercial plantations and their arrival in complex and vulnerable environments, it is important to recognize weaknesses in the host country's formal risk management frameworks.

In jurisdictions where enforcement is weak, voluntary forest management certification has proven to be a valuable tool for ensuring that forestry investments meet the high environmental, social and governance standards advocated by investors.

Plantation managers are not simply required to ensure a return on investment; they must also secure community and government benefits, manage investments in or support for regional resilience frameworks, and participate in initiatives to build the capacity of local institutions and regional economic communities. The private sector must moreover comply with existing national and international laws and good practices, if its presence is to have a positive impact over time.

Successful investments in plantation forestry in Africa:

- Are actively involved in relevant local and wider networks. This includes tree growers' associations, various local NGOs, the European Commission (or other multinational bodies), the FAO, FSC and various platforms bringing together other plantation operators in the region.
- Develop a process for obtaining the free, prior and informed consent of community stakeholders.

- Establish a flexible community engagement, grievance redress and outreach strategy based on regular and responsive engagement with neighbouring communities.
- Engage in positive media communication and share success stories.
- Establish a company policy on how to address media, research and other indirect stakeholder enquiries, and ensure key staff are informed on how to respond to such enquiries. Enquiring parties with a pre-existing negative agenda pose significant reputational risk.

Managing community expectations can be very challenging. From the outset and through frequent engagement, make it clear what the programme will look like, what both sides expect and how they will benefit. Do not overpromise. Have a support plan for programme co-implementers.

External funding (outside of investment funds) plays an important role in initiating community outreach programmes, which work to reduce risk, secure value and create lasting impact. Nevertheless, investment overheads must still include funding for maintaining community buy-in through continuous engagement activities that outlive external project financing.

Development finance institutions have a range of tools to support private sector actors to make sustainable investments in plantation forestry and agriculture. One of these tools is the implementation of the voluntary sustainability standards or performance standards introduced in the private financial sector. Major financial institutions have committed to apply the International Finance Corporation (IFC) performance standards, which provide a clear framework for managing social, environmental and biodiversity-related risks.

Forestry and carbon credits

Continuing with the example of IWC in Uganda, the initial company that received the investment was founded in the late 1990s with the goal of pursuing sustainable forestry through the sale of carbon credits. The voluntary carbon market and associated revenues did not materialize as expected and IWC's investors undertook to purchase the project and develop a commercially viable plantation.

The company has maintained its Gold Standard certification throughout the investment holding period and the project is expected to generate more than 1.5 million tons of certified carbon credits over its 50-year lifetime.

Although the certification is relatively low maintenance, since the Gold Standard accepts the FSC certification/audit procedure as a proxy (except for the carbon inventory component), carbon forestry is not without its challenges.

Carbon forestry has been the subject of extensive criticism and significant managerial resources have been required to maintain the project's credibility. There was also a potential liability on exit, given that the land is required to be held in continuous cycle forestry for the 50-year duration of the certification (this did not however prove to be a problem). Ultimately, there has been little appetite for carbon credits and prices have not achieved the level expected.

Various lessons can be learned from this experience:

- Until the factors affecting carbon prices shift significantly, it is perhaps best to consider carbon credits sales as an upside to investments in plantation forestry, rather than as a foundational component.

- The question of carbon 'tenure' has become a hot topic following the signature of the Paris Agreement and the adoption of its nationally determined contributions. It is therefore advisable to ensure project leaders have a good understanding of the national government's position on forest carbon ownership and transferability.
- Long-term carbon supply agreements with large buyers should be considered.
- Engaging with critics of carbon forestry is recommended, both to understand the risks and concerns related to engaging in this sector and to take steps to mitigate them, while building positive working relationships.

3.3 Lessons learned from plantation experiences in Africa and other parts of the world

The development of plantation forestry in Africa, particularly in Ghana, Malawi, Mozambique, Rwanda, Sierra Leone, Tanzania, South Africa, Eswatini and Uganda, has been undertaken by the private sector since the 1980s when government initiatives were constrained by limited resources and budgets.

This is in direct contrast to earlier patterns of plantation development (1930s to 1970s) when governments were the dominant developers of commercial plantation forestry.

Box 3.5: Enabling conditions for successful investments

Andries Smith – Forestry Investment Consultant

1. Appropriate allocation of financial capital

- Readily available patient (not time bound) risk tolerant equity capital
  - » Suited to the gradual increase in forestry's economic capacity over the long term
  - » Recourse to debt is advised only once in the "brownfield" stage and operating cashflow is positive
- Appropriate allocation of capital and phasing
  - » Based on a robust strategic business plan that integrates wood products and is supported by forest management measures
  - » Initially focused on adding value through organic growth
  - » Appropriate mergers and acquisitions considered only when there are clear cost and/or revenue synergies
- Leverage non-returnable technical assistance capital to deepen the development impact and address barriers to market development
- Consider alternative revenue streams - such as carbon credits - for additional (but not deal-breaker) income, particularly in the form of forward purchase agreements to cover some of the initial costs of establishment

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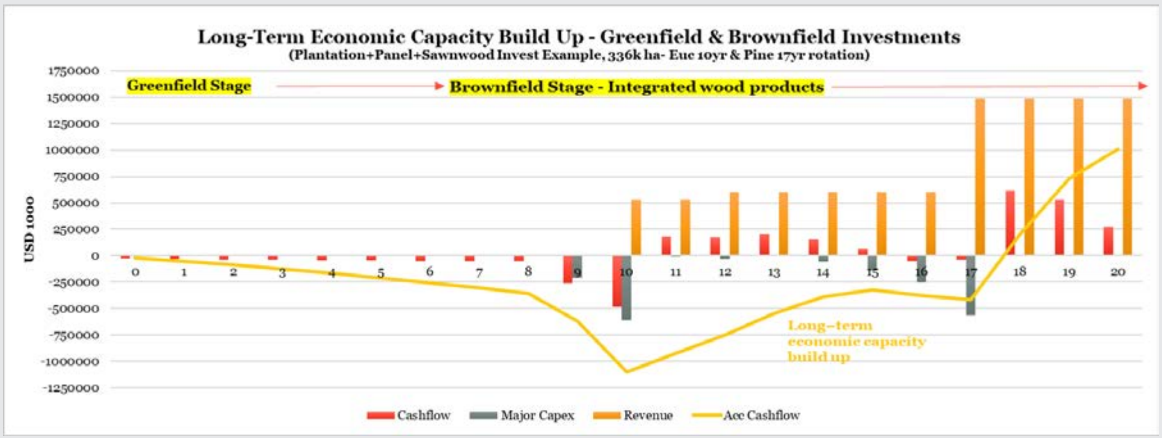
Box 3.5 : Continued



IFC, World Bank Group 2016, Ethiopia Commercial Plantation Forestry Industry Investment Plan

2. Environment and social inclusion

- An ESG management plan and budget should form an integral component of the strategic business plan
- Forestry projects should be developed on the basis of an inclusive landscape approach, perhaps as part of a mosaic encompassing commercial plantations, communities, agriculture/small woods and high conservation areas
- Incorporate FSC principles from the outset, covering both the internal and third-party supply chain
- Inclusive and influential stakeholder roundtable, whose representatives should at a minimum include the company CEO, community groups (including young people, women and men, and minority groups), ESG and farming-related NGOs, and local government
- Encourage and support 'out grower' schemes to help neighbouring smallholders by providing seedlings and/or assistance with tree growing, to enable them to potentially become reputable independent wood suppliers
- Encourage and support the development of non-timber product projects where appropriate
- As regards land tenure, seek transparent win-win agreements without areas of conflict
- A strategic business plan should also include a reputational risk management plan

3. Forest management capacity

- Senior management: Experienced managers, implementing an exceptional programme of skills development and safety measures
- Market and product alignment: Planting regime aligned with wood product strategy (pulpwood/logs/poles/veneer)
- Enhanced profitability: Target lowest cost of wood delivered per m^3 (not lowest cost per hectare) [+cost per ha / + mean annual increment per ha = low wood cost/m^3]

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Box 3.5 : Continued

- » Climatic and edaphic matching of site species to optimize mean annual increment per m^3/ha/year
- » Advanced nursery practices and tree genetic improvement, using those clones or seedlings best suited to the site – considering hardiness and pest and disease resistance
- » High-quality and effective methods for establishing and maintaining the site
- » Effective management of fire, pest and diseases (good community relations are important)
- » Safe, efficient, low impact harvesting and transport system suited to local conditions and tailored to the wood product

4. A defined strategy for wood products

- Senior management: Experienced managers, implementing an exceptional programme of skills development and safety measures
- Market and product development: Wood products tailored mainly to domestic and regional markets
  - » Target the highest possible value add, with a plan to shift from primary to secondary products
  - » Collaborate with industry actors and governments to optimize the sector's value chain
  - » Wherever possible, consider the potential for industry clusters and/or strategic alliances, without forgetting micro, small and medium enterprises
  - » Supply chain logistics: leverage existing knowledge in the forestry sector and take advantage of strategic partnerships
  - » Market intelligence on competitors: imports and unregulated local low-cost products
- Enhanced profitability: Target the highest capacity to pay for wood
  - » Minimize transport distance from the forest and maximize dollar value recovery at processing plants
  - » Develop an optimized wood processing flow from the outset based on the target future processing capacity
  - » Affordable and reliable energy supply: If the energy supply network is unreliable, consider combined heat and power generation during the initial cost-benefit analysis

Interventions supporting the development of plantation forestry in Africa have acted directly and indirectly to varying degrees:

- Direct interventions via the provision of financial assistance: grants or reduced taxation and/or the provision of seedlings and equipment directly to growers;
- Indirect interventions: advice, training, promotional campaigns and support to set up bodies representing the sector and growers' associations.

3.3.1 Lesson 1: Programme objectives, target participants and incentives must be transparent and aligned

Among programmes aimed at rapidly developing the sector to reach significant industrial scale, those focused on large companies have been most successful, as evidenced by the Chilean and Uruguayan schemes where plantations have reach millions of hectares in size.

The example of Chile is interesting: the sale of large tracts of government-owned land at attractive prices, tax breaks and the provision of cheap and long-term credit were very attractive to corporations, as were the clear and simple procedures for accessing these measures. In contrast, where incentives have been aimed at supporting the development of small or medium-size plantations, the size of the areas planted was far smaller than under the South American programmes, but there was far wider participation by rural people.

The Sawlog Production Grant Scheme (SPGS) in Uganda provides insight into the balance that can be achieved between the various scales of growers, if the needs at each scale are recognized and appropriate incentives proposed. For example, large-scale growers were less interested in the indirect services offered by SPGS and far more focused on monetary grants (for improving in-house skills and sending staff on training courses), while small (<10 ha) and medium-size (10-100 ha) growers were dependant on SPGS for these indirect support services.

The example of SPGS in Uganda has also demonstrated the need for ongoing and detailed technical support in the area of forestry for small and medium growers to enable them to meet technical performance standards. Grower field days, plantation visits by skilled extension officers, environmental education and safe working practices are essential prerequisites for the successful establishment and management of these new plantations.

3.3.2 Lesson 2: Ensure the availability of suitable land for forest plantations

Access to land with secure tenure for a period of at least two to three harvest cycles of timber (25 to 50 years) is an irreplaceable prerequisite to attract growers to establish commercial timber plantations.

In Chile, government-owned land was sold to growers at very attractive prices on the condition that the growers would hold the land for a set time and establish plantations on it. As a consequence of the development of the forestry sector, the value of this land has increased considerably, thereby increasing growers' assets. This has allowed them to obtain additional financing for processing facilities, for example, based on the strength of their balance sheets.

In Uruguay, land was specially zoned for forestry and the purchase of this land for plantations was incentivized by grants to subsidize the cost of establishing a plantation. Like in Uganda, the grants were only paid out after a site inspection by the authorities had confirmed that the trees had been successfully established.

In Uganda, growers have been licensed by the National Forest Authority (NFA) to use land on government-owned Central Forest Reserves (CFRs). Subject to a performance review after two years, the licences are issued for a period of 25 years. Initially medium and large-scale growers were given preference when applying for licences, as it was thought that small-scale growers would not be able to meet the performance criteria. These small-scale growers objected to the 50-hectare minimum area requirement and the NFA acknowledged the importance of including them. Small-scale growers were subsequently granted licences to establish plantations in CFRs.

It is now widely accepted that forest plantation interventions that include farmers at all scales are more stable, subject to less conflict and far more socially acceptable. There has been strong opposition to plantation development in Chile, Uruguay and Brazil where plantation ownership is dominated by large corporations, many of them foreign owned. In contrast, where participation has been more broad based, such as in Tanzania and Uganda, there has been far less opposition to timber plantations and in many instances the general public views their creation as very positive.

Competitive tender processes for assigning land for commercial forestry plantations, such as those used in Chile and Uganda, are seen as fair, provided that small growers are protected by a system guaranteeing that a fair proportion of the land is allocated to them.

3.3.3 Lesson 3: Ensure the availability of appropriate funding accompanied by clear and achievable procedures

Access to appropriate financing mechanisms is as important as access to land. The types of funding available and how this funding is accessed and disbursed needs to be aligned with the participants of the plantation development programme, its objectives and the funders involved:

- Grants, which recipients are not required to repay, are most important for small and medium-size growers. Without them, these growers would not have the resources to plant the trees. Where grant disbursements have been subject to performance criteria, access to other sources of funding have been used, typically loans from family members or village saving schemes.
- Equity funding, which comes in various forms, allows funders to take a stake in the shareholding of the company or venture. There are a number of examples in Uganda where family members have provided equity funding to enable the applicant to access the minimum plantation size required by the licence agreement. Larger companies, on the other hand, have all leveraged equity funding from various sources, including high net-worth individuals, family offices and development finance institutions (e.g. Green Resources, New Forests Company and Global-Woods, which are all active in East Africa). The shareholder agreements signed by these large companies are far more sophisticated and formal than those used by the family businesses that have established plantations in Uganda. Greenfield forestry development requires ‘patient capital’ due to the long lead time between establishment and the generation of revenues from the sale of the forest products.
- Loans have to be repaid at some point and typically attract interest. Loan funding is really only accessible to larger, formal companies. All actors that have established plantations in the East Africa region have indicated that loan funding must have the following characteristics:
    - Have a term aligned with the harvest cycle length of the plantations.
    - Allow for an interest deferral period, typically the first few years of the loan when the business does not have the cashflow to service the loan.

» Carry an interest rate that is aligned with the typical returns offered by commercial forestry plantations. Interest rates in excess of 10 percent have been extremely challenging for forestry companies. A nominal interest rate of 1 percent or 2 percent above inflation seems to be the maximum that greenfield plantation projects can realistically afford.

Financial support can also take other forms, such as tax breaks or the sale of land by the government at very affordable prices, as in Chile, but these measures are more attractive to large companies.

3.3.4 Lesson 4: Ensure access to high-quality plants

The value of high-quality planting stock has been proven in many cases where forestry plantations have been developed or extended.

One of the most effective ways to secure high-quality plants is by buying seed from tree improvement programmes that have been in operation for a number of years. Growers in Chile drew on the New Zealand *Pinus radiata* breeding programme that had been running for many years.

The SPGS programme in Uganda not only helped to source improved seed from South Africa, Australia and other counties, but also introduced a nursery certification system to accredit nurseries as suppliers of high-quality plants grown from improved seed. Buying seedlings from an accredited nursery was made a prerequisite for the disbursement of grant funding to growers, ensuring that they would plant only the best plants available. Given that neither seeds nor young plants have any particular visual characteristics that indicate the quality of the trees that will be produced, it is essential that seed is obtained from known and reputable sources.

To accelerate the development and deployment of improved planting material, another option is to join or form a tree improvement cooperative to screen and develop new seeds and plants. Plantation companies in Lichinga province in Northern Mozambique joined the CAMCORE cooperative, which operates out of North Carolina State University, to access a wide range of genetic material to select that most suited to the area.

Increased temperatures due to global warming are already affecting the use of *Pinus patula* and *Eucalyptus grandis*, two of the most common plantation species grown in Africa. These species are becoming increasingly susceptible to pests and diseases. The development and use of hybrids (*P. patula* x *tecunumanii*, *P. elliotii* x *caribaea* and various hybrids of *E.grandis* x *urophylla*, *E. grandis* x *pelita*) offers a potential solution, as these hybrids are far superior to the pure species in that they have faster growth rates, better wood properties and greater resistance to pests and disease.

3.3.5 Lesson 5: Ensure programmes are designed to be long term

For support programmes to be most effective, it is essential that they are designed to run over extended timeframes given the typical harvest cycle length of forestry plantations. It takes time to get programmes up and running to the point where they are both effective and efficient. A long-term programme must have a long-term vision and a funding stream to match. Consistency and continuity are important aspects of successful programmes, because uptake by growers is dependent on growers understanding how the support arrangements work and having confidence in their ability to benefit from the incentives on offer.

3.3.6 Lesson 6: Launch a national forest inventory to track the progress and development of the sector

The old adage 'you can only manage what you measure' is particularly relevant to the development of the plantation forestry sector. The absence of a National Forest Inventory in Uganda is hampering the further development of the sector as there are no publicly available statistics on the extent of the commercial forestry estate. This information gap concerning the raw materials makes it difficult for investors to support downstream processing initiatives. It is common knowledge that there are vast areas of plantations, but details about them — such as their geographic location, region, species or age-class distribution — are not known. It is strongly recommended that a national forestry inventory be launched in tandem with or as an integral component of any plantation development programme.

Conclusions

Fast-growing tree plantations could make a significant contribution to the conservation and sustainable management of forest ecosystems and people's livelihoods in Central Africa. Nevertheless, they come with significant controversy related to the alteration and homogenization of ecosystems and the loss of access to land and resources for indigenous communities and local rural populations (who depend on forest services and products).

Given the private sector's growing appetite for commercial plantations and commercial players' entry into complex and fragile contexts, it is essential to ensure all stakeholders' needs are considered and environmental and social risks carefully weighed. Finance institutions have a range of tools to support private sector actors to invest sustainably in plantation forestry and agriculture.

Interconnected regional and national policy approaches remain imperative to regulate regional and local priorities and to adopt laws and regulations that promote responsible investment.

In Central Africa, such investments are complicated by unclear land tenure and land-use arrangements, weak industrial infrastructure, poor technology, low productivity and serious funding gaps.

Compared to other land-use options, the majority of investments in commercial plantation forestry are, at best, marginally profitable. It is therefore imperative to be fully aware of the key challenges affecting African forestry, which, if addressed, can become enabling conditions for successful investment. Poor understanding of these challenges has led to the current suboptimal state of the majority of greenfield plantation investments.

The various financial and investment options available for the development of plantation forestry can be grouped into three partnership models: public-private partnerships, private sector-community partnerships and partnerships between financial institutions and countries.

The sustainability of plantation forestry in Central Africa depends on the decisions taken at each stage of the project: selecting managers and staff, establishing the plantation, determining the forestry or forest management techniques to be used, and managing land tenure and marketing, stakeholder engagement, carbon impact assessment and certification standards.

CHAPTER 4

Aligning international financial flows and the COMIFAC Convergence Plan

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Photo by Pilar Valbuena

Introduction

Central African forests, including those in the Congo Basin, play an essential role at the global level. They help to regulate the global climate, in part through the exchange of gases, which has led to them being designated the planet's 'second tropical forest lung'. The carbon stock held in their biomass and peatlands is estimated at 80 billion tons, equivalent to almost 10 years of global carbon dioxide emissions.[1] Central Africa's undisturbed forests now sequester more carbon than those in the Amazon (Dalimier et al. unpublished) and South-East Asia, and currently constitute the world's largest tropical carbon sink.[2] According to recent estimates by Global Forest Watch (GFW) researchers, forests in the Congo Basin sequester 600 million tons of CO_2 more than they emit annually. On average, these forests emit 530 million tons of carbon each year – a figure that has remained stable – and remove 1.1 billion tons.[3]

Central Africa is a priority conservation region for biodiversity, considering its exceptional natural heritage and high level of endemism. Its ecosystems constitute a common good for both present and future generations (Pierre Proces et al. 2021). The forests of Central Africa are integral to the lives of around 100 million people, who live within or around their borders. They perform essential social and cultural functions for the local and indigenous peoples who thrive there.

However, the forests of Central Africa seem to attract less attention than those of the Amazon or South-East Asia, whether from official or private international actors or philanthropic initiatives. For example, one analysis by the Central African Forest Observatory (OFAC) found that, over the 10 years from 2008 to 2017, Central African forests received only around 11 percent of international financial flows for the sustainable management and conservation of the planet's tropical forests.[4]

In response to this situation, the Central African Forestry Commission (COMIFAC) has drawn up a Convergence Plan and an accompanying business plan. These documents provide figures on the funding needed to support the sustainable management and conservation of forest ecosystems in Central Africa. The Convergence Plan and the corresponding business plan serve as a strategic

1 https://www.lemonde.fr/planete/visuel/2021/10/29/le-bassin-du-congo-deuxieme-puits-de-carbone-du-monde-entre-preservation-et-exploitation_6100375_3244.html

2 https://www.africamuseum.be/fr/research/discover/news/tropical_forests_carbon_sink

3 https://www.globalforestwatch.org/blog/climate/forests-carbon-emissions-sink-flux/

4 https://www.observatoire-comifac.net/docs/policy_brief/OFAC-Brief-03-fr-web.pdf

framework for attracting funding and organizing the implementation of activities aimed at the sustainable management and conservation of Central African forests.

This chapter highlights the funding needs of Central African forests and identifies possible ways to overcome the challenge of funding their sustainable management and conservation, with particular emphasis on funding from sources outside the region.

4.1 An overview of the COMIFAC Convergence Plan

The COMIFAC subregional Convergence Plan serves as a reference and coordination framework for all interventions relating to the conservation and sustainable management of forest ecosystems and the fight against climate change in Central Africa. The Convergence Plan was adopted in February 2005 in Brazzaville, Republic of the Congo, and revised and approved in July 2014 by the COMIFAC Council of Ministers for the 10 years from 2015 to 2025.

The Convergence Plan is rooted in the international, regional and subregional conventions, treaties and agreements that COMIFAC countries have signed up to (including the Sustainable Development Goals for 2030). It must therefore be implemented in accordance with the fundamental values set out in the Yaoundé Declaration, including:

1. Respect for human rights and the rights of indigenous peoples;
2. Gender mainstreaming;
3. Cooperation, partnership and solidarity;
4. Good governance.

The Convergence Plan is divided into six priority areas:

1. Harmonization of forest and environmental policies;
2. Management and sustainable exploitation of forest resources;
3. Conservation and sustainable use of biological diversity;
4. Combating the effects of climate change and desertification;
5. Socioeconomic development and multi-stakeholder participation;
6. Sustainable financing.

The plan also sets out three cross-cutting themes:

1. Training and capacity building;
2. Research and development;
3. Communication, awareness raising, information and education.

4.2 Current sources of funding for the sustainable management and conservation of forests in the COMIFAC area

Part of the funding for the forestry sector in Central Africa, whether from the subregion's governments or external partners, is currently channelled through the COMIFAC Executive Secretariat. A significant portion is also disbursed by donors to countries directly through bilateral channels. In all cases, the Convergence Plan is rarely mentioned as a framework for mobilizing funding.

4.2.1 Funding through the COMIFAC Executive Secretariat

The COMIFAC Executive Secretariat receives three types of funding: the Economic Community of Central African States (ECCAS) grant, contributions from Member States and funding from partners. Contributions from ECCAS and its Member States are generally assigned to operational costs, while those from partners are allocated to the implementation of the activities under the Convergence Plan and the Annual Work Plan of the COMIFAC Executive Secretariat and Office of the Presidency.

Contributions from ECCAS and Member States

To finance its own operations and activities, ECCAS has designed and implemented a self-financing mechanism called the "Community Contribution to Integration" (CCI). The CCI is funded by a levy – set at 0.4 percent – on products imported from third countries into the ECCAS area. The Extraordinary Conference of Ministers of ECCAS-COMIFAC held in Kinshasa in September 2009 adopted a resolution to automatically direct 0.1 percent of the CCI to COMIFAC for its operations, as part of the self-financing mechanism. However, the amounts agreed have not been paid consistently and ECCAS has struggled to collect the levy itself. To date, the Central African Republic is the only country that has implemented this resolution. Nevertheless, the ECCAS contribution could constitute an important source of funding for COMIFAC operations. Indeed, ECCAS did contribute XAF 320 million in 2018.[5] The outlook in terms of stabilizing this funding source is all the more encouraging given the institutional reforms at ECCAS in 2020, which reflect policymakers' growing interest in this institution, on which COMIFAC depends. The implementation of this self-financing mechanism is one of the best routes to consolidating COMIFAC's achievements.

Member States contribute XAF 45 million per country each year. However, most do not contribute regularly. Although the Council of Ministers designated the self-financing mechanism as COMIFAC's primary source of funding, it is not operational in the vast majority of countries in the subregion. Contribution arrears amounted to nearly XAF 3 billion in 2021 and only Cameroon has paid in full. In contrast, Sao Tome and Principe has not paid any dues since joining COMIFAC.

This low level of direct contributions makes it difficult for COMIFAC to fulfil its missions. The fact that there are no sanctions for countries that do not contribute and no benefits for those that pay in full prevents COMIFAC from reaching its potential.

5 Approximately EUR 487,805

Funding for subregional initiatives from partners

Partners and other development actors have set up initiatives (projects, programmes and platforms) to support the implementation of the Convergence Plan. In 2020, a dozen subregional programmes and projects were implemented under the coordination and/or supervision of the Executive Secretariat. Among these partners, Germany plays a major role (from the Federal Ministry for Economic Cooperation and Development (BMZ) and German national development bank KFW often channelled through the German Agency for International Cooperation (GIZ)). Germany's financial commitments to Central Africa for 2005–2022 total EUR 147 million.

The European Union (EU) is another particularly important partner. European funding under the theme of information management totalled EUR 14 million from 2007 to 2022. This funding has been used to support the Central African Forest Observatory (OFAC) in various ways.[6]

The most emblematic EU initiative in the Central Africa subregion is however implemented through the Central African Forest Ecosystem (ECOFAC) programme. This funding is channelled through ECCAS and not COMIFAC because the ECOFAC programme pre-existed the establishment of COMIFAC. Established in 2007 under the Lomé Convention (EU-Africa, Caribbean and Pacific), the ECOFAC programme has gone through six successive phases, the last of which alone required funding of nearly EUR 85.5 million (Brugiere and Donfack 2021).

In addition to those benefiting from German and EU funding, several other subregional projects under initiatives spearheaded by the COMIFAC Executive Secretariat have received funding over the past 5 years:

- Congo Basin Ecosystems Conservation Support Programme (PACEBCo) (AfDB);
- Regional REDD+ Institutional Capacity Building project (Global Environment Facility – GEF);
- COMIFAC support project (Japan International Cooperation Agency – JICA);
- CBSP-Partnerships for Biodiversity Conservation: Sustainable financing of Protected Areas in the Congo Basin-PIMS 3447 (United Nations Development Programme – UNDP);
- Public-Private Partnership for the sustainable management of Central African forests (P3FAC) (French Facility for Global Environment (FFEM) – France).

These projects or programmes support COMIFAC to achieve its objectives through their activities on the ground. Under a resolution passed by the Council of Ministers, partners must pay a share of the budget of any programme or project to COMIFAC as a management fee to facilitate the institution's operations. However, several projects carried out under the auspices of COMIFAC do not comply with this requirement. Partners often justify their failure to pay COMIFAC management fees for projects and programmes based on the internal rules imposed by donors to satisfy the requirements governing the management of public funds in contributing countries. Unpaid management fees, combined with the difficulty of collecting Member States' contributions, make it difficult for COMIFAC to operate effectively.

6 African Forests (FORAF), Consolidating the Central African Forest Observatory (CEOFAC), Observatory of Biodiversity and Protected Areas of Central Africa (OBAPAC), Strengthening and institutionalizing the Central Africa Forest Observatory (RIOFAC), Biodiversity and Protected Areas Management (BIOPAMA), Joint Research Centre Convention

4.2.2 Analysis of international financial flows to the Central African forest and environment sector

A study was conducted by Favada et al. (2019) on international financial flows for the sustainable management and conservation of forest ecosystems in Central Africa covering 2008–2017.

The main results of the study by Favada et al. (2019) are that, the bilateral and multilateral financial flows to forests and the environment totaled approximately USD 2 billion from 2008 to 2017. EODA aid accounted for more than three-quarters of the total FEODA aid. Over the study period, the evolution of bilateral and multilateral flows was very irregular. Since 2015, both flows have steadily decreased (see Figure 4.1).

The top five of all FEODA donors, in descending order, were Germany, EU, GEF, United States and World Bank. The top five FEODA bilateral aid donors, in descending order, were Germany, United States, France, Japan and Sweden. Finland and Denmark were completely absent in Central Africa during the study period. The top five FEODA multilateral aid donors, in descending order, were EU, GEF, World Bank, CIF and AfDB. GCF and the Adaptation Fund were completely absent in Central Africa during the study period. Figure 4.2 shows that Germany is top 1 overall donor of FEODA, both bilateral and multilateral.

The top five recipients of all FEODA aid, in descending order, were DRC, Chad, Cameroon, Rwanda and Gabon. Equatorial Guinea and Sao Tome and Principe accounted for less than 1 percent each of all FEODA aid. The top five recipients of FEODA bilateral aid in descending order, were DRC, Chad, Cameroon, Rwanda and Gabon. The top five recipients of FEODA multilateral aid, in descending order, were DRC, Chad, Cameroon, Rwanda and Congo. Equatorial Guinea and Sao Tome and Principe each accounted for the lowest share (0.1 percent) of multilateral and bilateral FEODA aid.

The top five areas financed by all FEODA aid, in descending order, were biodiversity, environmental policy and its administrative management, forestry policy and its administrative management,

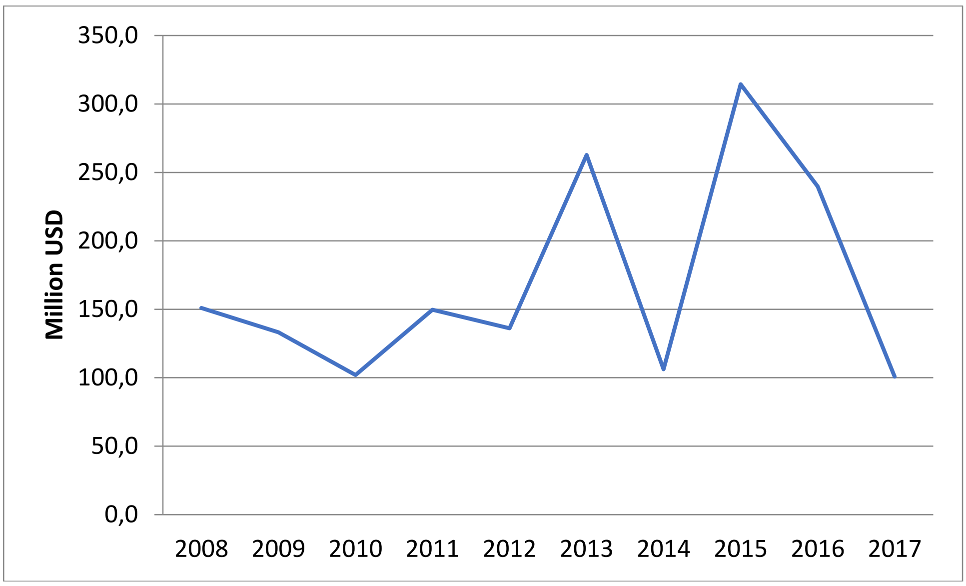

Figure 4.1: International funding flows to Central Africa Forest and Environment (Favada et al. 2019)

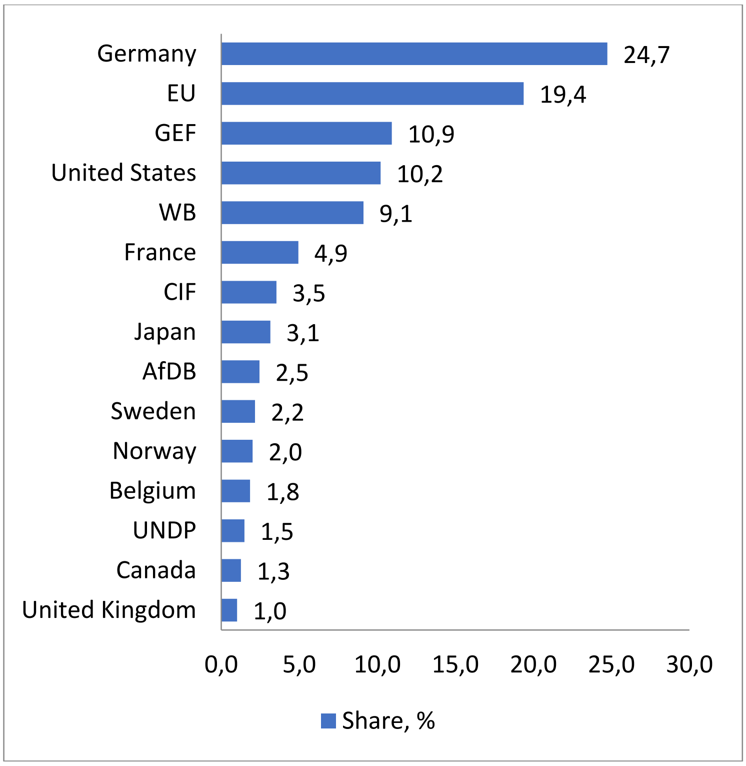

Figure 4.2: Share of total Forest and Environment Official Development Assistance (FEODA) per donor

Source: Favada et al. 2019

environmental research and biosphere protection. The top five areas financed by FEODA bilateral aid, in descending order, included biodiversity, environmental policy and its administrative management, environmental research, forestry policy and its administrative management, and forest enhancement. The top five areas financed by multilateral financial flows, in descending order, were environmental policy and its administrative management, biodiversity, biosphere protection, forest policy and its administrative management, and forest enhancement.

The top five areas financed by all FEODA aid accounted for 89% of the total amount of the FEODA. This constitutes a thematic imbalance of the total FEODA to CA.

Bilateral donor presence was high in Rwanda, Cameroon, DRC and Congo, and lowest in Equatorial Guinea. Bilateral donor absence was high in Equatorial Guinea, Sao Tome and Principe, Chad and Gabon. Cameroon and Rwanda recorded the highest number of donor presence. Fourteen donors were absent in Equatorial Guinea and 12 absent in Sao Tome and Principe. Seventeen bilateral donors financed 470 ODA projects in Central Africa from 2008 to 2017. The DRC received the largest share, followed by Rwanda and Cameroon. Equatorial Guinea and Sao Tome and Principe received less than 5 percent of all bilateral ODAs to Central Africa. On average, the DRC received ODA funding for 9 projects per year, followed by Cameroon and Rwanda (8 each), Congo (5), Chad and Gabon (4 each), Burundi and CAR (3 each), Equatorial Guinea (2), and Sao Tome and Principe (1). Burundi did not receive bilateral ODA in 2017 and Sao Tome and Principe did not receive any ODA in 2010, 2011 and 2015.

Multilateral donor presence was high in Rwanda, Congo, DRC and Cameroon. Equatorial Guinea recorded the lowest number of multilateral donors. Equatorial Guinea recorded the highest number of multilateral donor absences, followed by Burundi and Sao Tome and Principe. Ten multilateral donors were absent in Equatorial Guinea. Twelve multilateral donors financed 189 multilateral ODA projects in Central Africa. Cameroon received the highest number of multilateral ODA flows, followed by DRC, Congo and Chad. On average, Cameroon, Congo and DRC received about three multilateral ODAs, followed by Burundi, CAR, Chad, Gabon and Rwanda receiving 2 each, and Equatorial Guinea and Sao Tome and Principe received 1 each. Burundi did not receive multilateral ODA in 2010. CAR did not receive multilateral ODA in 2015. Equatorial Guinea did not receive multilateral ODA from 2014 to 2017. Gabon did not receive multilateral ODA in 2008. Sao Tome and Principe did not receive multilateral ODA in 2009, 2010 and from 2014 to 2017.

4.2.3 Thematic areas supported by international funding for the conservation and sustainable management of Central African forests

According to Favada et al. (2019), the top five thematic areas supported by international financial flows from 2008 to 2017 were: biodiversity (27 percent of all ODA for forests and the environment to Central Africa); environmental policies and their administrative management (26 percent); forest policies and their administrative management (15 percent); environmental research (11 percent); and biosphere protection (10 percent).

Forestry administration and environmental education and training accounted for the lowest share, with less than 0.03 percent each. Environmental research, forestry education and training, fuelwood and forestry research received negligible amounts.

4.2.4 Differences between Central Africa and other tropical regions

Central Africa recorded the lowest share of all FEODA aid directed to the three tropical zones, the Amazon Basin, Central Africa and South-East Asia. South-East Asia received the highest share.

In Central Africa, the top five areas financed by bilateral aid, in increasing order, were biodiversity, environmental policy and its administrative management, environmental research, forestry policy and its administrative management, and forest enhancement. In the Amazon Basin, the top five areas financed, in increasing order, were environmental policy and its administrative management, biodiversity, biosphere protection, forestry policy and its administrative management, and forestry enhancement. In South-East Asia, the top five areas financed, in order of importance, were environmental policy and its administrative management, flood prevention or control, biodiversity, forestry policy and its administrative management, and biosphere protection.

Comparing the top five areas financed by bilateral aid in Central Africa, Amazon Basin and South-East Asia, the common areas financed by bilateral aid are biodiversity, environmental policy and its administrative management, and forestry policy and its administrative management. Biodiversity ranked first for Central Africa, it was second for the Amazon Basin and third for South-East Asia. Environmental policy and its administrative management ranked second for Central Africa, first for Amazon Basin and South-East Asia. Forestry policy and its administrative management ranked fourth for Central Africa, Amazon Basin and South-East Asia.

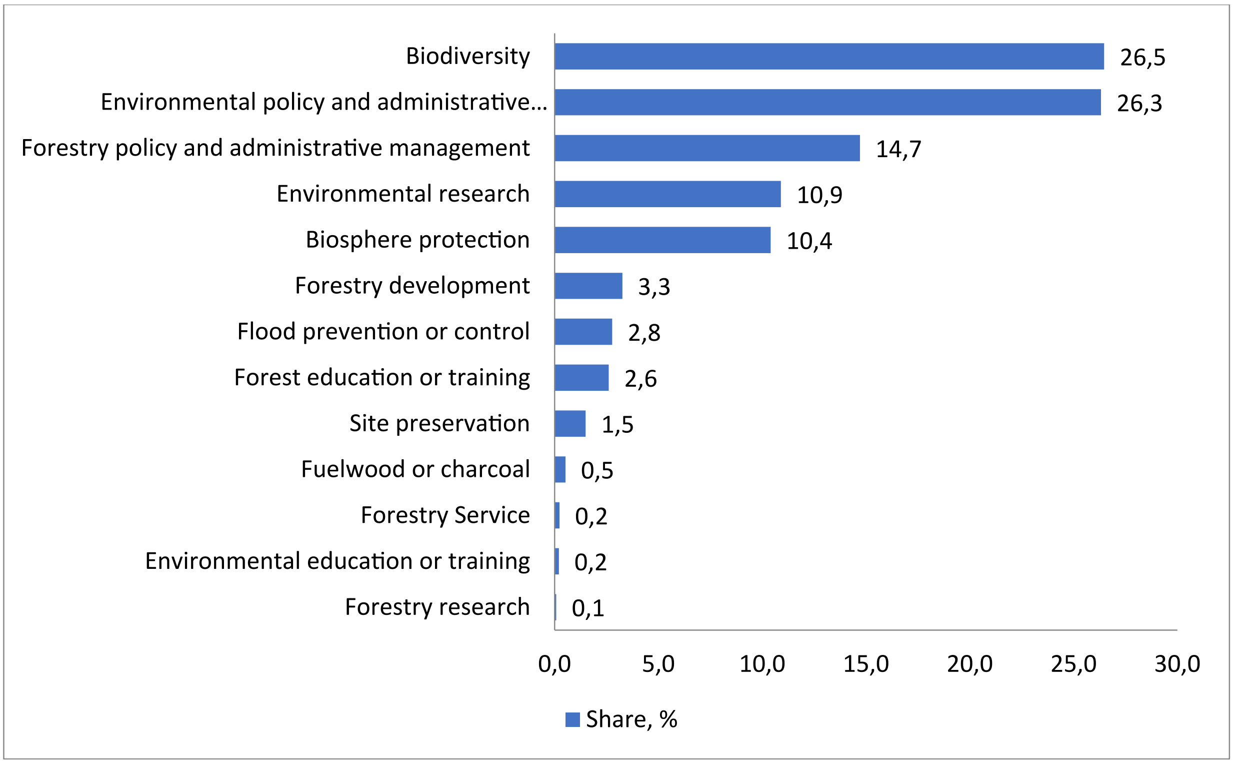

Figure 4.3: Thematic areas supported by international funding received by Central Africa , 2008–2017

Source : Favada et al. 2019

In Central Africa, the top five areas financed by multilateral aid, in increasing order, were environmental policy and its administrative management, biodiversity, biosphere protection, forestry policy and its administrative management, and forest enhancement. In the Amazon Basin, the top five areas financed by multilateral aid, in increasing order, were biodiversity, environmental policy and its administrative management, forestry policy and its administrative management, flood prevention or control and forest enhancement. In South-East Asia, the top five areas financed by multilateral aid, in increasing order, were environmental policy and its administrative management, flood prevention or control, biodiversity, forestry policy and its administrative management, and forest enhancement.

Comparing the top five areas financed by multilateral aid in Central Africa, the Amazon Basin and South-East Asia, the common areas financed by multilateral aid were environmental policy and its administrative management, biodiversity, forestry policy and its administrative management, and forest enhancement. Environmental policy and its administrative management ranked first for Central Africa and South-East Asia, and second for the Amazon Basin. Biodiversity ranked first for the Amazon Basin, second for Central Africa and third for South-East Asia. Forestry policy and its administrative management ranked third for Amazonian Basin and fourth for Central Africa and South-East Asia. Forest enhancement ranked fifth for the three tropical zones.

In Central Africa, the top five areas financed by all FEODA aid, in increasing order, were biodiversity, environmental policy and its administrative management, forestry policy and its administrative management, environmental research and biosphere protection. In the Amazon Basin, the top five areas financed, in increasing order, were environmental policy and its administrative management, biodiversity, biosphere protection, forestry policy and its administrative management, and flood prevention or control. In South-East Asia, the top five areas financed, in increasing order, were environmental policy and its administrative management, flood prevention or control, biodiversity, foresryt policy and its administrative management, and biosphere protection. In comparing the top five areas financed by FEODA aid in Central Africa, the Amazon Basin and South-East Asia, the common areas financed by FEODA aid were environmental policy and its administrative management, biodiversity, forestry policy and its administrative management, and biosphere protection. Environmental policy and its administrative management ranked first for the Amazon Basin and South-East Asia, and second for Central Africa. Biodiversity ranked first for Central Africa, second for the Amazon Basin and third for South-East Asia. Forestry policy and administrative management ranked third for Central Africa and Amazon Basin, and fourth for South-East Asia. Biosphere protection ranked fourth for Amazon Basin and fifth for Central Africa and South-East Asia.

In Central Africa, the top five bilateral donors, in increasing order, were Germany, the United States, France, Japan and Sweden. In the Amazon Basin, the five top bilateral donors, in increasing order, were Norway, Germany, France, the United States and Japan. In South-East Asia, the top five bilateral donors, in increasing order, were Japan, France, the United States, Germany and Norway.

In Central Africa the top five multilateral donors, in increasing order, were the EU, GEF, WB, CIF and AfDB. In the Amazon Basin, the top five multilateral donors, in increasing order, were GEF, the EU, CIF, GCF and World Bank. In South-East Asia, they were: the World Bank, GEF, CIF, the EU and UNDP.

4.3 Funding needed for the effective implementation of the Convergence Plan

As part of the preparation of the operational plan for the Convergence Plan, COMIFAC commissioned a study that estimated the financial needs for 2021–2025 (COMIFAC 2021). The study estimated that USD 191,290,000 will be needed to implement the priority actions between 2021 and 2025.

An estimated USD 4,500,000 will need to be mobilized from governments over the period in question, with each contributing equally to the COMIFAC Executive Secretariat budget.

An estimated total of USD 120,349,800 will need to be sought from development partners over the five years. This will cover the administrative costs of implementing the operational plan for the Convergence Plan (2021–2025), estimated at USD 8,914,800, i.e. 8 percent of the total from partners.

The operating costs of the COMIFAC Executive Secretariat, the COMIFAC National Coordination (CNC) units and other related bodies are expected to reach USD 12,441,200 (i.e. 6.79 percent of the total budget for activities under the 'low budget scenario'). Table 4.1 shows a breakdown of the funding needed for the COMIFAC Convergence Plan priority areas and cross-cutting themes.

Table 4.1 also shows that the most resource-intensive priorities are the management and sustainable exploitation of forest resources (priority 2), combating the effects of climate change (priority 4) and the conservation and sustainable use of biodiversity (priority 3). It should be noted that these funding needs mainly concern subregional activities under the supervision of COMIFAC, possibly in the form of support for several Member States, and do not include the needs of individual countries identified at the national level.

Table 4.1: Funding needs of the COMIFAC Convergence Plan by priority or cross-cutting theme (in USD), 2021–2025

Priority or theme	Heading	Amount (USD)
Priority 1	Harmonization of forest and environmental policies	4,260,000
Priority 2	Management and sustainable exploitation of forest resources	83,390,000
Priority 3	Conservation and sustainable use of biological diversity	30,090,000
Priority 4	Combating the effects of climate change and desertification	49,400,000
Priority 5	Socioeconomic development and multi-stakeholder participation	5,950,000
Priority 6	Sustainable funding	7,900,000
Theme 1	Training and capacity building	4,000,000
Theme 2	Research and development	2,800,000
Theme 3	Communication, awareness raising, information and education	3,500,000
Total		191,290,000

Source: Adapted from the operational plan of the Convergence Plan (COMIFAC 2021)

Research and development and capacity building are among the priority areas requiring the least funding. This is likely the result of underestimation, given that the subregion is generally recognized as lacking capacity in this respect. However, recent figures put forward by leading scientists and policymakers estimate that research, development and training needs across all Congo Basin countries will amount to USD 150 million over 10 years.[7]

4.4 Current and potential sources of international funding for the Convergence Plan

Activities in the forest, environment and conservation sector in COMIFAC countries can access funding from several sources, including:

1. Multilateral ODA from organizations such as: (a) United Nations Framework Convention on Climate Change (UNFCCC) funds managed by the World Bank; (b) UNFCCC funds managed by the United Nations; (c) funds managed by various accredited agencies; (d) EU funds; and (e) funds managed by AfDB;
2. Bilateral ODA, including from: (a) Germany, Norway and the United Kingdom (known as the GNU initiative); and (b) bilateral donors such as: Norway, Germany, France and the United States;
3. Private international funding for tropical forests, which covers: (a) private sector funding mobilized by NGOs to combat deforestation; (b) other private funding initiatives such as impact investing, carbon markets, green bonds and foundations.

Table 4.2 provides a detailed map of the potential sources of funding for tropical forest management that Central Africa could access.

7 https://www.jeuneafrique.com/1258572/societe/cop-26-150-millions-de-dollars-pour-le-bassin-du-congo/

Table 4.2: Mapping potential funding sources for forest ecosystem management in Central Africa

Source	Type of funding	Role of COMIFAC	Comments on intervention areas
Multilateral ODA			
Funds managed by the World Bank			
Global Environment Facility (GEF)	Grants with co-financing requirements	Partner of national projects	GEF interventions prioritize sustainable forest and land management, conservation of protected areas and biodiversity protection. All COMIFAC Member States are eligible.
Least Developed Countries Fund and Special Climate Change Fund (SCCF) managed by GEF	Grants with co-financing requirements	Partner of national projects	Interventions focus on climate change adaptation.
Forest Carbon Partnership Facility (FCPF)	Grants		The aim of the FCPF is to prepare countries for the REDD+ incentive mechanism (Phase 1) and to compensate them for the forest greenhouse gas emissions reductions they achieve through financial incentives (Phase 3).
Climate Investment Funds (CIF)	Grants/loans Investment plan required		The CIF works to help governments adopt sustainable forest management practices and achieve measurable reductions in carbon emissions linked to deforestation and forest degradation.
UNFCCC funds managed by the United Nations			
United Nations REDD Fund	Grants	Beneficiary and/or partner	Funding programmed until 31 December 2020 (expected end of Phase 1). The fund exclusively supports REDD+ Phase 1 activities, including the development and implementation of national REDD+ programmes and capacity-building activities.
Central African Forest Initiative (CAFI) Multi-Partner Trust Fund	Grants	Partner	Designed to respond to the fragmentation of aid, the fund aims to mobilize additional funding for the region. Preparation for REDD+ and development of Investment Plans (in partnership with FCPF and the Forest Investment Programme (FIP))
Funds managed by the World Bank			
Green Climate Fund (GCF)	Grants mainly/ possibility of loans	Beneficiary/partner	Focused on reducing carbon emissions, but also on adaptation (improving the living standards of vulnerable populations, food security and access to water, ecosystem resilience and ecosystem services)
The Adaptation Fund	Grants mainly	Beneficiary/partner	Focused on the implementation of national adaptation plans
Land Degradation Neutrality Fund (LDNF)	Grants mainly	Beneficiary/partner	Focused on the regeneration of forest landscapes
European Union funds			
Global Climate Change Alliance Plus (GCCA+)	Grants	Beneficiary/supporter	Capacity-building on mitigation and adaptation, access to the carbon market Promotion of national, regional and international projects and programmes that support climate change adaptation and mitigation and the transition to low-emissions and climate-resilient societies.
EU REDD+ initiative	Grants	Beneficiary/partner	This initiative aims to reduce deforestation by improving land-use governance.

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Table 4.2 : Continued

Source	Type of funding	Role of COMIFAC	Comments on intervention areas
EU FLEGT initiative	Grants	Beneficiary/partner	The FLEGT fund finances the EU Action Plan adopted in 2003, which aims to strengthen the legal framework around and governance of forests and combat the trade in illegal timber.
Bilateral ODA			
GNU initiative (Germany, Norway and the United Kingdom)	Grants		Germany, Norway and the United Kingdom have jointly pledged USD 5 billion over 2015–2020, or USD 800 million per year, with the aim of reaching USD 1 billion per year by 2020. The conditions for accessing these funds have not yet been announced.
Norway's International Climate and Forest Initiative (NICFI)	Grants	Beneficiary, partner, supporter	The aim of Norway's bilateral NICFI programme, launched in 2008, is to: (i) create effective tools to support the implementation of the UNFCCC; (ii) contribute to measures to prevent deforestation and forest degradation; and (iii) promote the conservation of primary forests given their role (carbon storage and biodiversity).
USA: Central Africa Regional Program for the Environment (CARPE), with USAID as lead implementing agency and other US agencies, including the United States Fish and Wildlife Service, and the United States Forest Service	Grants	Partner	This programme aims to slow the rate of deforestation and biodiversity loss in DRC and the Republic of the Congo. In light of the budget guidelines imposed by the current administration, ODA for forests and the climate has been restricted.
France via the French Development Agency (AFD) and FFEM	Grants/loans	Beneficiary, partner	AFD has focused mainly on the application of sustainable forest management practices through technical and financial support for forest policy reform in Congo Basin countries. Its interventions cover the thematic areas of biodiversity preservation, forest carbon and the application of the REDD+ mechanism.
French Facility for Global Environment (FFEM)	Grants	Beneficiary, supporter	The FFEM takes a holistic approach that addresses the issues of climate change, biodiversity and desertification. Its objective is to promote an integrated strategy for the conservation and management of natural resources through a 'landscape' approach (agroecology).
Germany through the Federal Ministry for Economic Cooperation and Development (BMZ), the Federal Ministry for the Environment (BMU) and the Federal Ministry of Food and Agriculture (BMEL). The implementing agencies are GIZ and German national development bank KFW.	Grants	Beneficiary, supporter	Biodiversity protection, conservation, climate change and local community engagement. Three pillars: forest conservation and climate change mitigation, forest landscape restoration and deforestation-free supply chains.
Federal Ministry for the Environment (BMU) – International Climate Initiative (IKI)	Grants	Beneficiary, supporter	Idem

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Table 4.2 : Continued

Source	Type of funding	Role of COMIFAC	Comments on intervention areas
The United Kingdom through CAFI and the Forest Governance, Markets and Climate Programme	Grants	Beneficiary, supporter	Idem
Japan with the Japan International Cooperation Agency (JICA)			
Canada			
Private international funding for tropical forests			
Funding mobilized through NGOs	Grants	Partner	In the Congo Basin, NGOs do not form a single homogeneous block. On the one hand, there are major conservationist NGOs such as Conservation International, Wildlife Conservation Society (WCS), World Wide Fund for Nature (WWF) and World Resources Institute (WRI), which are more willing to build partnerships with governments and concessionaires in support of a sustainable approach to forest management. On the other are the advocacy NGOs, which are more reserved when it comes to this type of approach (Greenpeace).
Impact investment	Investments	Partner	Impact investors target agroforestry, sustainable land and agricultural development, and deforestation-free production and supply chains.
Carbon market	Purchase of carbon credits	Partner, supporter	Transactions[a] are carried out on the primary markets, i.e. directly from seller to buyer, or on the secondary market through intermediaries.[b]
Green bonds	See comments	See comments	Green bonds are debt instruments issued on a financial market and are intended to finance projects to combat global warming and support the energy transition. Few green bonds are issued for the forest sector at the global level and mainly relate to emissions from major North American and European (Scandinavian) forestry actors.
Philanthropic foundations	Grants	Advocacy, information	A small number of foundations – mostly based in the United States – provide funding for the environment and forests and for REDD+ in particular. They include: Betty and Gordon Moore Foundation, Bezos Earth Fund, ClimateWorks Foundation, Ford Foundation, David and Lucile Packard Foundation, Good Energies Foundation, Oak Foundation, Sobrato Philanthropies, the William and Flora Hewlett Foundation, the Christensen Fund, the Children's Investment Fund Foundation, the Protecting Our Planet Challenge, the Arcadia Fund, Bloomberg Philanthropies, Nia Tero, Rainforest Trust, Re:wild, the Wyss Foundation and the Rob and Melani Walton Foundation. However, funding from the majority of these foundations is directed to Latin America.

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Table 4.2 : Continued

Source	Type of funding	Role of COMIFAC	Comments on intervention areas
Private international funding for tropical forests			
Leaf Coalition: Lowering Emissions by Accelerating Forest finance (LEAF)			The aim of this coalition is to halt deforestation by funding the large-scale protection of tropical forests. In 2021, the coalition mobilized USD 1 billion of funding. This level of funding was unprecedented for a joint public and private sector initiative for tropical forests.
Agricultural Commodity Companies Corporate Statement of Purpose: https: / ukcop26.org/agricultural-commodity-companies-corporate-statement-of-purpose/			In this statement, which is supported by the Tropical Forest Alliance (TFA), the 12 signatory agrifood companies undertake to draw up a roadmap by COP27 to intensify their efforts to limit the temperature increase to 1.5°C.

a The market is not very transparent because carbon credits are traded directly between the buyer and seller

b https://pfbc-cbfp.org/news-partner/Carbon-Pricing.html

4.5 Aligning potential sources of funding and funding needs

Table 4.3 maps the links between potential (and current) sources of funding and funding needs for the sustainable management and conservation of forests in Central Africa. In order to access the funds available to Central Africa, the region's governments, under the supervision of COMIFAC, must build diplomatic ties and sign agreements with donors. This requires Central African governments to identify sustainable management, biodiversity conservation, combating climate change and related issues as priorities for their development.

The table also shows that the capacity to draw up convincing proposals is crucial for these countries and all actors in the Central African forest management space. Governments must be able to mobilize the national expertise at their disposal from government bodies, academic and scientific institutions, and civil society to develop integrated programmes that include the forestry sector. While developing project and programme proposals is necessary, it is not sufficient as they need to be set within a persuasive system of governance. For example, funds managed by the Green Climate Fund and the Adaptation Fund must be managed by accredited entities. However, in the entire COMIFAC area, only Rwanda has an accredited entity. For subregional activities, it would be preferable to have a body whose governance practices are recognized as meeting international standards. Access to some financial mechanisms is subject to the same requirements for all countries. In this context, Central African countries are allocated fewer resources when compared with countries in the other two tropical basins (this is the case for FFEM, for example).

Countries can also seek support from international organizations within and outside the United Nations system to build the capacity of national actors. Examples include: the AFR100 Initiative, and the NDC Partnership whose technical partners can provide expertise for the development of forest landscape restoration programmes.

Efforts to raise funds for the management and conservation of Central African forest ecosystems has been hindered by weak communication about their importance for addressing the global challenges posed by climate change and global biodiversity loss. The forests of the Congo Basin, which are relatively well conserved compared with those in the Amazon Basin, have attracted less attention from philanthropic organizations, for example. There are a number of initiatives in place to gradually address this communication gap. OFAC is working to disseminate information and the COMIFAC Declaration on the subject was presented in September 2021. This declaration was negotiated within the framework of the Congo Basin Forest Partnership and facilitated by Germany, following a multi-stakeholder consultation that lasted over a year. As a result of these efforts, a group of donors pledged USD 1.5 billion for forests in the Congo Basin at the 26th Conference of the Parties (COP26) of the UNFCCC (see Box 4.1).[8]

8 https://ukcop26.org/cop26-congo-basin-joint-donor-statement/

Table 4.3: Links between sources of funding and funding needs for forest ecosystem management in Central Africa

Thematic area in need of funding	Potential source of funding	Main actor	Type of measures
COMIFAC Executive Secretariat operations	Governments of Member States	- Countries	Improving the collection of contributions Implementing the COMIFAC self-financing mechanism
	Projects' financial partners (project management fees)	- COMIFAC Executive Secretariat	Drawing up regional project proposals
Adopting policies and governance practices for forests, the environment and sustainable land use	Central African Forest Initiative (CAFI)	- Countries	Letter of Intent – preparation of a national investment framework (NIF) – donor coordination framework
	European Union	- Countries	Negotiations of FLEGT Voluntary Partnership Agreements (VPAs) and bilateral agreements with the European Development Fund
	German Cooperation (BMZ)	- Countries - COMIFAC Executive Secretariat	Negotiating regional and national projects
	World Bank	- Countries	Negotiating bilateral agreements, loans
Sustainable management and exploitation of forest resources	Central African Forest Initiative (CAFI)	- Countries	Letter of Intent – preparation of a national investment framework (NIF) – donor coordination framework
	European Union	- Countries - COMIFAC Executive Secretariat	Negotiating bilateral agreements, national projects
	French Development Agency (AFD)	- Countries - Private companies	Negotiating bilateral agreements, PROPARCO loans for private sustainable forest management initiatives
	African Development Bank (AfDB)		
	Private banks		
Biodiversity conservation in countries	Central African Forest Initiative (CAFI)	- Countries	Letter of Intent – preparation of a national investment framework (NIF) – donor coordination framework
	European Union	- Countries	Negotiating bilateral agreements
	GEF	- Countries	Drawing up project proposals, mobilizing co-financing, identifying implementing agencies, validation by the administration
	All donors	- Civil society	Establishing partnerships with international environmental NGOs
	Philanthropy	- Countries - Civil society actors	Running information campaigns, drawing up project proposals

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Table 4.3: Continued

Thematic area in need of funding	Potential source of funding	Main actor	Type of measures
	Private sector	– Local actors	Local communities can benefit from payments for environmental services to enable them to carry out biodiversity conservation activities. This can be done as part of infrastructure development projects and with the support of civil society organizations.
Forest landscape restoration	BMZ	– Countries – Decentralized local authorities (communes) – Civil society actors	Countries need to demonstrate political will and seek technical support from AFR100 Initiative technical partners to design development programmes and projects for submission to financial partners.
	AfDB	– Countries	Designing and negotiating forest landscape restoration programmes and projects – AfDB loans
	Forest Investment Programme – Climate Investment Funds	– Countries	Countries can use climate finance instruments (for adaptation and mitigation) to develop programmes that include forest landscape restoration.
	Private sector	– Local communities	Local communities can benefit from payments for environmental services to enable them to carry out forest landscape restoration activities. This can be done as part of infrastructure development projects and with the support of civil society organizations.
Cross-border biodiversity conservation initiatives	European Union	– Countries – COMIFAC Executive Secretariat – ECCAS – Civil society	Drawing up and negotiating partnership agreements
	Global Environment Facility (GEF)		Drawing up project proposals, mobilizing co-financing, identifying implementing agencies, validation by the administration
Climate change mitigation	Central African Forest Initiative (CAFI)	– Countries	Letter of Intent – preparation of a national investment framework (NIF) – donor coordination framework
	Green Climate Fund	– Countries – COMIFAC Executive Secretariat	Drawing up competitive project proposals, identifying accredited entities, validation by the relevant government bodies (national authorities)
	Global Environment Facility (GEF)	– Countries	Drawing up project proposals, mobilizing co-financing, identifying implementing agencies, validation by the administration

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Table 4.3: Continued

Thematic area in need of funding	Potential source of funding	Main actor	Type of measures
Climate change adaptation	Central African Forest Initiative (CAFI)	– Countries	Letter of Intent – preparation of a national investment framework (NIF) – donor coordination framework
	Green Climate Fund	– Countries – COMIFAC Executive Secretariat	Drawing up competitive project proposals, identifying accredited entities, validation by the relevant government bodies (national authorities)
	The Adaptation Fund	– Countries	Drawing up project proposals, identifying accredited entities, validation by the relevant government bodies (national authorities)
	Global Environment Facility (GEF)	– Countries	Drawing up project proposals, mobilizing co-financing, identifying implementing agencies, validation by the administration
Land-use planning	Central African Forest Initiative (CAFI)	– Countries	Letter of Intent – preparation of a national investment framework (NIF) – donor coordination framework
	French Cooperation (AFD)	– Countries	Negotiating bilateral agreements
	German Cooperation (BMZ)	– Countries	Negotiating bilateral agreements
Community resource management	German Cooperation (BMZ)	– Countries – National NGOs – Decentralized local authorities	Negotiating bilateral agreements, drawing up project proposals
	British Cooperation (Department for International Development – DFID)	– Civil society organizations	
Capacity-building and research	European Union	– Countries – Universities – Research centres – Network of Forestry and Environmental Training Institutions of Central Africa (RIFFEAC) – Research Network on Central African Forests (R2FAC)	Monitoring information on available funding, drawing up competitive funding proposals, incorporating research and development activities in development projects, building partnerships with regional and international scientific and academic institutions
	DFID		
	All donors		
Communication, information and awareness raising	European Union	– Countries – COMIFAC Executive Secretariat	Negotiating bilateral and regional agreements, proposals for national and regional projects

Box 4.1: Joint Donor Statement at COP26 on supporting the protection and sustainable management of the Congo Basin forests

Congo Basin Joint Donor Statement at COP26

Supporting the protection and sustainable management of the Congo Basin forests

With reference to the Glasgow Leaders Declaration on Forests and Land Use of 2 November 2021 and its commitment *'to working collectively to halt and reverse forest loss and land degradation by 2030 while delivering sustainable development and promoting an inclusive rural transformation'*, we, the Ministers and representatives from the countries and organizations listed below make the following statement, that we:

Recognize the ecosystem goods and services derived from Central Africa's Congo Basin forests, the world's second largest tropical rainforest region. This includes their critical contribution to global climate change mitigation, provision of rainfall to large parts of African agriculture, hydropower production, biodiversity preservation and helping meet the goals of the Paris Agreement, including the pursuit of efforts to limit the global temperature increase to 1.5°C above pre-industrial levels. They provide a foundation for sustainable development and are critical to the livelihoods and culture of Indigenous Peoples and local communities.

Welcome the political leadership of Central African countries that have sustained forest cover in the face of mounting pressures, including but not exclusively through the commitments set out in the 2021 COMIFAC Declaration and in national Letters of Intent signed with CAFI under the 2015 CAFI Joint Declaration, noting the need to support efforts by working in partnership with Central African countries and regional organizations, to achieve jointly defined objectives.

Recognize that progress on tackling the systemic drivers of forest loss in Central Africa will continue to require high-level, cross-sectoral leadership from Central Africa's forested countries, measured through reductions in forest loss whilst meeting local sustainable economic development needs and implementing principles of sustainable management of natural resources. This will require substantial domestic resource mobilization and long-term financial support from the international community, both public and private sector, also noting the importance of business and governance frameworks conducive to investments.

Acknowledge that maintaining and enhancing protection, sustainable management, and restoration requires scaled up finance, from both public and private sources, in light of the goods and services provided by the Congo Basin forests and their critical importance in achieving local, regional and international climate, biodiversity and development objectives. Also recognizing that more effective, efficient and accessible forms of support will be required to help countries in this region implement development strategies rooted in sustaining these precious forests.

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Box 4.1: Continued

We are demonstrating our commitment to this important region today by announcing an initial collective pledge of **at least $1.5 billion** of financing between 2021–2025 to support ambitious efforts and results in the region to protect and maintain the Congo Basin forests, peatlands and other critical global carbon stores. We intend to build on this in subsequent years, by seeking increased finance and investment from a wide variety of public and private sources while also improving coordination, effectiveness and accessibility. We also call on other donors to significantly increase their support for the protection and sustainable management of the Congo Basin forests.

Supported by:

- European Commission on behalf of the European Union
- Federal Republic of Germany
- French Republic
- Japan
- Kingdom of Belgium
- Kingdom of the Netherlands
- Kingdom of Norway
- Kingdom of Sweden
- Republic of Korea
- United Kingdom of Great Britain and Northern Ireland
- United States of America
- Bezos Earth Fund

4.6 Recommendations

In order to attract funding commensurate with the role played by the forests of the Congo Basin in regulating the global climate and conserving the planet's biodiversity, we make the following recommendations.

For COMIFAC

COMIFAC should improve its communication and participation in international debates to attract the attention of international actors to the importance of Central African forests and place them at the centre of discussions about combating climate change and conserving biodiversity. COMIFAC could also use more appropriate terminology to talk about its priorities to better reflect the latest funding priorities. This could include adopting the 'fair deal' and 'fair share' approach taken at COP26. This approach was also taken throughout the process that led to the COMIFAC Declaration, at the Tropical Forest Symposium and the Congo Basin Forest Day in Berlin in September 2021, and by the United Kingdom as part of preparations for the Glasgow Declaration published jointly by donors for the protection of Congo Basin forests. Governments should advocate for payment for the ecosystem services delivered by Congo Basin forests as a global matter of urgency. COMIFAC should talk more about 'combating deforestation', an issue not yet on COMIFAC's agenda, but which has become a global concern. Another example concerns Priority 4 of the Convergence Plan, which refers only to the effects of climate change (adaptation), even though the forests of Central Africa are also recognized for their potential contribution to mitigation.

COMIFAC should also strengthen its capacity to mobilize international funding (political advocacy, lobbying financial mechanisms) and to draw up project proposals to enable it to submit high-quality proposals to competitive processes and bankable programmes and projects. This capacity building should also extend to the governance of the institution to improve its credibility and enable it to become an internationally recognized accredited entity. Another area for improvement at the subregional level is the promotion of public-private partnerships, which are an effective way to attract structural investors to the Congo Basin.

In order to address the range of problems facing the forestry sector, including deforestation, COMIFAC should open communication channels with other land-intensive sectors in Central Africa, such as agriculture and mining. This could be achieved through better integration with the framework developed by ECCAS.

For countries

COMIFAC Member States should make the financial contributions necessary to implement the Convergence Plan by paying their dues to COMIFAC regularly. One solution could be to tie Member States' contributions to the value of exports of timber and non-timber forest products and to design mechanisms to require private exporters to pay these levies via a subregional payment platform. Member States should also coordinate to create an international negotiation unit to attract more funding to the subregion. Each country should also have at least one credible institution whose governance practices meet international fund management standards to enable them to receive funds raised at the international level. Currently, only Rwanda has such an institution.

For partners

Technical and financial partners of the COMIFAC area should ensure their interventions support the implementation of the 2005 Paris Declaration and the 2008 Accra Agenda for Action on Aid Effectiveness, by incorporating the COMIFAC Convergence Plan into their work. Technical and financial partners should also coordinate their activities to harmonize project funding (areas of intervention, targets, etc.). They should endeavour to comply with the terms of project implementation contracts, in particular by paying management fees to COMIFAC for the projects it coordinates. An innovative approach would be to assess the value of the ecosystem services performed by Central African forests and to propose that donors provide funding representing a small proportion of the value of these services to Central Africa, a fraction of which would go to COMIFAC.

The Congo Basin Forest Partnership (CBFP) partners have taken significant steps to improve communication and raise the international political profile of Central African forests. They should, however, do more to make Central African forest ecosystems a global priority. A college of donors established within the CBFP should serve as an intermediary for accessing the various funding opportunities identified at the international level.

Conclusions

Recognition of the role played by Africa's forests in global climate regulation is increasing. Indeed, they rank first among global tropical forest blocks for carbon sequestration. Moreover, Central Africa is a priority conservation area, considering its natural heritage and the endemism of its forest ecosystems. Its forests are a common good of humanity, both for current generations and those to come. Central African forests should, therefore, be the focus of global efforts, including the mobilization of financial resources, to conserve and sustainably manage them.

In order to coordinate their forest management activities, Central African governments established COMIFAC, a unique initiative to harmonize and coordinate at the subregional level. In terms of technical progress, COMIFAC has adopted a Convergence Plan that defines both priorities and cross-cutting themes to underpin the coordinated management of forest ecosystems.

Notwithstanding their importance and the framework developed to manage them, Central African forests are finding it difficult to attract the same level of funding as the other tropical forest blocks in South America and Asia. Over the decade from 2008 to 2017, the Central African forest and environment sector received only 11.5 percent of the funding made available for the conservation and sustainable management of tropical forests. Moreover, COMIFAC's ability to operate is impeded by the difficulty of collecting Member States' contributions. Financial flows consist mainly of ODA, while contributions from the private sector, foundations and philanthropic organizations remain very low. The main financial contributors are Germany, the European Union and the GEF. New funding opportunities emerged at COP26 – embodied in the declarations made by philanthropic organizations and actors in the private agricultural sector[9] – and must now be harnessed. Indeed, a striking number of philanthropic organizations committed to mobilize USD 1.7 billion for indigenous peoples and local communities for the protection of tropical forests (see Box 4.2).[10]

A significant share of the international financial flows to Central Africa for the conservation and sustainable management of forests is allocated to individual countries. There are however some noteworthy initiatives of subregional scope, including: the ECOFAC programme funded by the EU over 30 years, the German COMIFAC support project, the Congo Basin Ecosystems Conservation Support Programme (PACEBCo), and others including the Central Africa Regional Program for the Environment (CARPE), CAFI and GEF 7.

Financial partners should strive to align their subregional initiatives in the forest and environment sector with the COMIFAC Convergence Plan in the spirit of the 2005 Paris Declaration.

The thematic areas that attract the most funding are biodiversity conservation, environmental policies and forest management policies. Conversely, training and research are neglected, with serious consequences for the subregion, which is severely lacking capacity in this respect.

Central African forests are gradually rising on the international political agenda, thanks in part to the CBFP, which is stepping up diplomatic efforts to promote their essential role in regulating the planet's climate. At COP26, for example, a collective declaration by twelve of the richest countries, and the Bezos Earth Fund, pledged to mobilize at least USD 1.5 billion for the protection and sustainable management of Congo Basin forests.

9 https://ukcop26.org/agricultural-commodity-companies-corporate-statement-of-purpose/

10 https://ukcop26.org/cop26-iplc-forest-tenure-joint-donor-statement-french/

Box 4.2: Donor Statement for Indigenous Peoples and Local Communities for Tropical Forest Protection

Advancing Support for Indigenous Peoples' and Local Communities' Tenure Rights and their Forest Guardianship.

With reference to the Glasgow Leaders' Declaration on Forests and Land Use of 2 November 2021 and its commitment *'to working collectively to halt and reverse forest loss and land degradation by 2030 while delivering sustainable development and promoting an inclusive rural transformation'*;

We, the Ministers and representatives of the countries and organizations listed below:

Recognize the critical guardianship provided by Indigenous Peoples and local communities in protecting tropical forests and preserving vital ecosystem services, and the global contribution they make to climate change mitigation, biodiversity preservation, and inclusive and sustainable development.

Acknowledge the land and resource rights of Indigenous Peoples and local communities, in accordance with relevant national legislation, the UN Declaration on the Rights of Indigenous Peoples, and other international instruments, as applicable, and that, despite the important role they play in protecting forests and nature, only a small fraction of these communities enjoy secure rights to own, manage, and control land and resources and have access to the support and services required to protect forests and nature and pursue sustainable livelihoods.

Note with concern the rising cases of threats, harassment and violence against Indigenous Peoples and local communities.

Welcome the political leadership and steps taken by many countries to recognize and protect Indigenous Peoples' and local communities' land and resource rights, in accordance with relevant national legislation and international instruments, as applicable.

Welcome the initiatives and efforts of Indigenous Peoples and local communities in securing the legal recognition of land and resource rights and in strengthening their institutions, organizations and networks to support concerted action to protect their land, forests and resources.

Commit to renewed collective and individual efforts to further recognize and advance the role of Indigenous Peoples and local communities as guardians of forests and nature, in partnership with governments and other stakeholders, with a particular focus on strengthening land tenure systems, protecting the land and resource rights of Indigenous Peoples and local communities, and protecting indigenous and community defenders of forests and nature.

continued on next page

Box 4.2: Continued

Commit to promote the effective participation and inclusion of Indigenous Peoples and local communities in decision-making and to include, consult and partner with them in the design and implementation of relevant programmes and finance instruments, recognizing the specific interests of women and girls, youth, persons with disabilities and others often marginalized from decision-making.

We are demonstrating our commitment today by announcing an initial, collective pledge of USD 1.7 billion of financing, from 2021 to 2025, to support the advancement of Indigenous Peoples' and local communities' forest tenure rights and greater recognition and rewards for their role as guardians of forests and nature. We call on other donors to significantly increase their support to **this important agenda.**

This financing will be directed at:

- channelling support to Indigenous Peoples and local communities, including through capacity building and financial support for group activities, collective governance structures and management systems, and sustainable livelihoods;
- activities to secure, strengthen and protect Indigenous Peoples' and local communities' land and resource rights, including, but not limited to, support to community-level tenure rights mapping and registration work, support to national land and forest tenure reform processes and their implementation, and support to conflict resolution mechanisms.

Endorsed by:

- Federal Republic of Germany
- Kingdom of Norway
- Kingdom of the Netherlands
- United Kingdom of Great Britain and Northern Ireland
- United States of America
- Ford Foundation
- Good Energies Foundation
- Oak Foundation
- Sobrato Philanthropies
- The David and Lucile Packard Foundation
- The William and Flora Hewlett Foundation
- The Christensen Fund
- Children's Investment Fund Foundation
- The Protecting Our Planet Challenge
- Arcadia
- Bezos Earth Fund
- Bloomberg Philanthropies
- Gordon and Betty Moore Foundation
- Nia Tero
- Rainforest Trust
- Re:wild
- Wyss Foundation
- Rob and Melani Walton Foundation

Central African countries must now seek to clarify the commitments of each donor country, and the mechanisms and arrangements for effectively managing the funds pledged.

COMIFAC must mobilize in pursuit of equitable financing, for a fair deal and a fair share for the Congo Basin. Such funding should amount to USD 6 billion/year to bring in funding commensurate with the contribution of Congo Basin forest ecosystems to the global climate.

There are many opportunities and potential sources of international funding for the Central African forest and environment sector. To benefit from them, capacity building will be required to enable the subregion to draft high-quality proposals and build the credibility of Central African financial institutions in terms of governance, whether at the country or the subregional level. As a first step, Member States must make COMIFAC a priority and pay their agreed annual contributions.

CHAPTER 5

Implementation of REDD+ Activities in Central African Countries

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Photo by Nicolas Bayol

Introduction

> **Several countries in the Congo Basin are aware of the importance of forest potential and have embarked on the REDD+ process. Consequently, they are making institutional arrangements in sectors that are drivers of deforestation (e.g., agriculture, land tenure, land use, energy, forestry, governance) and are developing a national framework to harmonize and facilitate REDD+ implementation. But while the countries of the Congo Basin are all keen to reduce emissions related to deforestation, their levels of commitment differ. Indeed, while some are sidestepping the REDD+ process, others are considered "good students" of the process and are thus involved in all the initiatives (Sufo Kankeu 2019).**

At the same time, the development of the carbon market, voluntary compensation at international level, and investor enthusiasm (from Europe in particular) for forest carbon projects lead us to expect that nature-based solutions will gain momentum.

This chapter provides an overview of national policies and the various types of REDD+ activities being put into action in Central African countries. Among other things, it will take stock of existing actions to reduce emissions or increase GHG removals in forests and then focus on a few REDD+ flagship programmes and projects implemented on the ground. It will also present the regulatory incentive and remuneration mechanisms for stakeholders in the field. Lastly, the chapter will discuss prospects for the REDD+ process in Central African countries and make some recommendations.

5.1 What action should be taken at the national level?

The COMIFAC countries have adopted a holistic and integrated approach when implementing the REDD+ process: their strategic options in this area are a mixture of **cross-cutting programmes** and **integrated sector-by-sector programmes** to promote harmonious and sustainable development.

In addition to these two types of programmes, each country considers **land-use planning and land management** as a strategic policy crucial to the success of the REDD+ mechanism. The far-reaching goal of these countries is to set up a real forest governance policy in order to better manage, over time and spatially, the human activities likely to have an impact on forest cover.

These national processes of forest zoning and land-use management make it possible both to clarify the distribution of different uses and to organize and spatialize the forest estate, thereby helping to make operational the National Forest Monitoring System (NFMS), which is essential for monitoring

REDD+ activities. These various clarifications help to distinguish Intact Forest Landscapes[1] from degraded areas or areas likely to experience more anthropogenic pressures due to their status given by land-use management. Activities to conserve carbon stocks could, for example, be carried out in protected areas by strengthening means of protection or by extending the existing network to include the conservation of new forest areas. This type of action may, however, require prior work to obtain accurate mapping and assessment of the exact legal status of the existing network. In contrast, other activities that could be carried out are those in sustainable management, such as promotion of RIL[2] techniques in production forests under concession (Bodin et al. 2014), and those to increase carbon stocks in areas of undeveloped savannas.

Box 5.1: The importance of land sector reform in the REDD+ process

Reform of the land sector is of paramount importance, as it will make it possible to pool the customary and modern land systems. The permanent dualism between legality and legitimacy in the land sector is a source of many conflicts. Land reform will therefore reduce frequent conflicts, especially in rural areas (Ibanda Kabaka 2020). Under the REDD+ mechanism, land reform will have to determine the forms of access to and methods of use of land, because current land law in each of the Congo Basin countries does not sufficiently empower local communities and indigenous peoples to reduce emissions from deforestation and forest degradation. This situation is due to the fact that, in these countries, registration (Cameroon and Republic of Congo) or the registration certificate (DRC) remain the only legal documents that secure the rights of ownership of any land, even though the State recognizes the rights of enjoyment of those who claim land ownership by customary right (Mpoyi et al. 2013; Kengoum Djiegni et al. 2020).

To create an institutional framework conducive to the implementation of the REDD+ mechanism, the Congolese government initiated a project to reform the land sector in 2012. However, the project lacked financial resources and could be relaunched only in 2014, when the National Land Reform Commission (CONAREF) was established. This process enjoys a budget of USD 7 million as part of the letter of intent signed with the Central African Forest Initiative (CAFI) in 2016. The main expected outcomes of this process are a national land policy document and the drafting of a land law and its decree of application. To date, CONAREF is working on the advanced version of the policy document that integrates the dimension of climate change and rights of local communities and indigenous peoples.

Despite ongoing land reform initiatives in the countries of the Congo Basin, land insecurity persists and is likely to be a barrier to the effective implementation of REDD+ (Client Earth 2020).

The contribution of land tenure to the success of REDD+ is undoubtedly linked to clarification of the distribution of benefits among the various stakeholders, who include the State, local communities and indigenous peoples, and those leading REDD+ projects or initiatives.

1 Intact Forest Landscapes (IFLs) are defined as an “unbroken expanse of natural ecosystems within the zone of current forest extent, showing no signs of significant human activity, and large enough that all native biodiversity, including viable populations of wide-ranging species, could be maintained.” (Potapov et al., 2008).

2 Reduced-impact Logging

Implementation of the REDD+ process in the Congo Basin also requires some **national sectoral policy reforms**, so that a more enabling framework for the programmes determined in the various countries can be created. These sectoral reforms are crucial to the success of the process, given the cross-cutting nature of REDD+. The land sector is the one most in need of reform, as other sectors are dependent on it.

For example, Table 5.1 shows four previously mentioned possible courses of action at the national level for four COMIFAC countries.

Gabon stands out from other countries in the subregion. As a country with high forest cover but very low historical deforestation (an HFLD country), Gabon was long opposed to REDD+. Today, it is engaged in several innovative approaches:

- Since 2019, CAFI has been prepared to contribute up to USD 150 million for the maintenance of high forest cover and a low deforestation rate in Gabon, by setting the carbon floor price at USD 10/tCO_2 when results are certified and USD 5/tCO_2 otherwise.
- The forest reference emission level (FREL) submitted by Gabon to the UNFCCC in February 2021 indicates that it is the only country in the subregion whose national forests absorb more than they emit. According to this FREL, Gabonese forests are thus a net carbon sink, absorbing more than 100 million tCO_2/year.
- In September 2021, the Government of Gabon issued an ordinance establishing the creation of an emissions trading market between all the major economic players in Gabon. This ordinance obliges them (i) to reduce their emissions according to the allowed quotas, and (ii) if necessary, to offset them by financing primarily Gabonese forest carbon projects.

5.2 What action should be taken on the ground to reduce emissions or increase GHG removals in forests?

For all these actions implemented or planned at the national level to have an impact, they must be rendered into local and concrete actions on the ground. We can distinguish two main types of actions: 1) those linked to the maintenance of stocks already present in natural forests (reduction of emissions linked to deforestation and degradation, conservation concessions, forest management, RIL and RIL-C[3] practices, etc.), and 2) those consisting of an increase in forest stocks (forest and agroforestry plantations, prohibitions on cutting and grazing practices in savannas, assisted natural regeneration, etc.).

5.2.1 Reducing emissions from deforestation: changing agricultural practices

In the countries of the Congo Basin, subsistence farming is ranked as the top driver of deforestation (MINEPDED 2017; RDC-MECNT 2012; Ciza et al. 2015). The expansion of subsistence farming in forest areas is mainly due to population growth and lack of alternative livelihoods. In their national

3 Reduced-Impact Logging for Climate

Table 5.1: Objectives and programmes of national REDD+ strategies of several COMIFAC countries

Country	Cameroon	Republic of Congo	Central African Republic	Democratic Republic of Congo
Objectives	– Reduce the carbon footprint of its development without slowing down its growth, via its Intended Nationally Determined Contribution (INDC); – Reduce projected emissions from deforestation and forest degradation by 50% by 2025 and achieve net zero deforestation by 2035.	By 2030, sectors concerned by REDD+ significantly contribute to diversification and economic growth, as well as to the fight against poverty via implementation of practices promoting the sustainable management of forest ecosystems.	Support the CAR in the economic and social development of the Forestry and Other Land Use (FOLU) sector while limiting impacts on forest ecosystems through its **National REDD+ Investment Framework.**	– Organize, plan and quantify the institutional, technical, financial and human needs, which are required to define and implement REDD+ through its **National REDD+ Framework Strategy.** – Proposal for an **Investment Plan**, for the 2015-2020 period, for implementation of a set of sectoral and integrated programmes with national scope.
Cross-cutting programmes	– Improving land management – Improving land governance by promoting land security, gender and social equity; – Payments for environmental services (PES); – Financing of REDD+ implementation; – Improving governance framework, for better institutional coordination.	– Strengthening governance aspects by incorporating REDD+ principles into policies and regulations; – Strengthening intersectoral coordination through the National Land Use Plan (PNAT) and a National Spatial Management Scheme (SNAT); – Improving land ownership management; – Implementation of sustainable financing mechanisms.	– Integrated and inclusive planning of the national territory and securing land tenure; – Increased access to “green” financing for sustainable investments in the FOLU sector.	4 enabling pillars that seek to trigger sectoral reforms: – Governance; – Population growth; – Land-use management; – Land.
REDD+ sectoral programmes	– Agricultural sector: promoting sustainable agricultural systems with low potential for deforestation and forest degradation; – Forest sector: sustainable forest management and bolstering forest and wildlife resources at the national level; – Mining sector: incorporating environmental criteria to reduce impact on forests and designing of compensation systems for inevitable emissions.		– Agricultural sector: developing remunerative, job-creating, sustainable and deforestation-free agriculture; – Forestry sector: adopting practices for the sustainable use and management of forest ecosystems and restoring degraded landscapes; – Mining sector: adopting good practices for environmental and social impact management; – Energy sector: reducing unsustainable woodfuel harvesting.	– Agricultural sector: making subsistence farming in rural forest areas sedentary and improving productivity through effective coordination between the MECNT[a] and the MAPE[b]; – Forest sector: improving sustainable management of permanent production forests; management, development and extension of classified forests; and afforestation and reforestation activities; – Energy sector: reducing demand for firewood, increasing the offer of forest wood products and alternative energy products for households, and limiting the impacts of extractive industries (mining and hydrocarbons).

Continued on next page

Table 5.1: continued

Country	Cameroon	Republic of Congo	Central African Republic	Democratic Republic of Congo
Land-use planning, both a potential source of reduction through the choices made and a framework for field activities	Developing regional and local land-use plans and strengthening effective application of zoning in southern areas by the various stakeholders for better land and forest management in Cameroon, as well as harmonized implementation of the various REDD+ activities.	Developing and implementing a National Land Use Plan (PNAT) and a National Spatial Management Scheme (SNAT) whose aim is to strengthen intersectoral coordination to harmonize and optimize land use and allocation.	Developing and implementing land-use plans for rural areas with the objective of determining new forms for organizing and managing agro-sylvo-pastoral areas.	Finalizing the macrozoning of national territory, to better delimit the forest estate and thus to identify and delimit a long-term objective of maintaining forest cover regardless of the legal status of the land.
Other sectoral policies: forestry, conservation, agriculture, mining, infrastructure, family planning	– Agricultural sector: transition from extensive to intensive agriculture. – Forestry sector: 1) revising the Forest Law to improve the definition of "forest" and 2) strengthening cooperation between REDD+ and FLEGT initiatives at national level to promote forest governance reforms.	Agricultural sector: adoption, publication and popularization of (1) the new agricultural law (and its decree of application) taking into account the objectives of REDD+ and (2) decree of application of Law No. 25-2008 of 22 September 2008 on the agricultural land regime.	Agricultural sector: setting up a framework law on agriculture incorporating a national definition of agroecology and agroforestry, and adoption of agroecological intensification as a pathway to the development of "deforestation-free" agriculture.	– Agricultural sector: defining agricultural sustainability criteria which incorporate REDD+ objectives and which will be mainstreamed into the new agricultural policies. – Energy sector: decrease in the share of unsustainably produced woodfuel, all the while meeting national energy demand.

Sources: MINEPDED 2017, UN-REDD 2012, Ministry of Forest Economy of Congo 2018, Karsenty and Vermeulen 2016, Topa, et al. 2009; CN-climate CAR 2019

a Ministry of the Environment, Nature Conservation and Tourism.

b Ministry of Agriculture, Fisheries and Livestock.

REDD+ strategies, most Central African countries unanimously recognize the need to promote new agricultural practices that would spare forests. These new practices must be defined by agricultural policies, which in turn must take into account the dimension of climate change. We should note that few Central African countries have updated their agricultural policies.

By definition, subsistence farming is family farming, which is the main source of income and livelihood for the population. Emissions reduction therefore cannot take place without the involvement of rural households. As a result, it is important to understand the outlook of these stakeholders and to ask how they will welcome any proposed REDD+ support.

This issue has all the more significance for people in areas where pressure on the forest environment is strong and where the traditional slash-and-burn agricultural system is undergoing crisis.[4] In these areas, it is in people's short-term interest to change practices and try to focus on savanna areas. There is thus an appetite for change, but it must be maintained by a system of regular payment according to results, to compensate for the opportunity costs.

In forest-dominated areas, where this pressure is less strong and where the agricultural system is not yet in crisis, people are more reluctant to change practices.

Obviously, to preserve these forest environments it is more advantageous to change system before the crisis occurs, but it should be noted that this approach requires increased resources for awareness-raising and supervision and, above all, monetary incentives for much more limited impacts.

In general, setting up a payment mechanism for environmental services (PES) – after assessment and verification of achievements – is essential to encourage people to continue a REDD approach.

Indeed, experience shows that increasing people's income is not enough to reduce deforestation. On the contrary, people may use this increase in income to expand crop areas at the expense of forests. Sustainable management of natural resources thus requires good governance and the ability to manage one's land.

5.2.2 Conservation of stocks: conservation concessions in the DRC

Conservation concessions based on PES are being tested in several Central African countries, as part of integrated projects in areas of importance to REDD+. They are a lever for promoting forest carbon storage.

A conservation concession involves the payment of allowances to the people and the State so that they forgo income from logging. In addition to the controversial transformation of farmers into conservation rentiers, evaluation of financial compensation raises the question of equity, and the hypothesis of buying out traditional rights through contracts is unrealistic (Karsenty and Nasi 2004). Several investments have been made by bilateral and multilateral institutions in the past 15 years or so. These investments have received support from CAFI.

4 The PIREDD Maï-Ndombe project deals with savanna-forest mosaic areas where the local populations have seen their forests shift further from the village.

Methodological approach and implementation framework in the DRC

Forest conservation concessions must be the outcome of land-use planning at various administrative and customary levels. The process consists mainly of supporting local populations in the development of Simple Land Use Plans or Simple Natural Resource Management Plans that result in different ways in which land is used. Forest conservation concessions are one of these ways. In this approach, a total restriction on all human activity is imposed on identified and mapped portions of primary forest. It is backed up by PES paid to landowners and to local or indigenous communities of the territories or forest lands around which they live. These payments are intended to reward efforts and motivate landowners to respect their respective plans.

In the case of Simple Natural Resource Management Plans, the following steps are carried out:

- Awareness-raising, communication and signing of a collaboration agreement on forest conservation with local communities (represented by local development committees under the authority of the land chiefs)
- Demarcation of the boundaries of the forest conservation concession
- Signing of the PES conservation contract, based on these payments; implementation and monitoring

The clauses of the conservation contract are summed up as follows:

- The Local Development Committees (LDCs), which enforce the protection and conservation of the forests described in the Simple Natural Resource Management Plan, shall take all necessary steps to detect and control the outbreak of fires and to stop all illegal activities (charcoal burning, artisanal exploitation, etc.).
- New fields in the conservation areas shall no longer be created.
- Existing fields in these protected areas shall be abandoned for two years from the signing of the contract. If necessary, fields for which allocations have been provided for in the Simple Natural Resource Management Plan will be created.
- Conflicts of interest, by engaging in the same activities as those covered by contracts proposed by any other stakeholder, and thereby jeopardizing the outcome expected by that stakeholder, shall be avoided.
- Management of conflicts or any incident that would jeopardize compliance with the terms of the contract shall be facilitated.
- LDCs shall be compensated for their forest conservation efforts at a rate of USD 1 per hectare per year, if there are no deforestation or illegal activities.

Lessons learned from the conservation concessions approach

The experience of conservation concessions has met with mixed success in the DRC: since 2020, the country has been developing and granting many decommissioned concessions.[5] Nevertheless, several lessons can already be learned.

This approach has several strengths: 1) the forming of carbon sinks; 2) preparation for the carbon offset market; 3) restoration of endemic fauna and flora; and 4) the granting of PES funds to help

5 Six new conservation concessions were awarded to TradeLink Sarl in September 2020: four in Tshuapa Province and two in Tshopo Province. Source : https://medd.gouv.cd/contrat-de-concession-forestiere-de-conservation-pour-la-valorisation-des-services- environnementaux-associes-a-un-projet-redd-en-reppublique-democratique-du-congo/

carry out community development actions in villages, such as the construction/repair of facilities (e.g., schools, health centres, markets, drinking water wells).

On the other hand, the approach also has weak points: 1) the weakness of legal and regulatory securement provisions in the face of competition with other resources such as oil or other extractive resources, 2) uncertainty about sustainability of the approach without PES support, and 3) the lack of community expertise in quantifying the efforts made and the CO_2 stored. To sum up, while the management of conservation concessions undoubtedly presents many challenges, it can also provide interesting opportunities.

5.2.3 Sustainable forest management: forest development, RIL / RIL-C, etc.

About 30 percent of the forest area in Central Africa is used for timber exploitation, yet the overall impact of logging on GHG emissions remains poorly understood. Several Central African countries

Box 5.2: Pilot study on low-impact forestry in the SODEFOR forest concession in Madjoko, DRC

This study was implemented by WWF-DRC, WWF Germany, GFA and KfW and funded by the International Climate Initiative of the German Federal Ministry of the Environment. Its aim was to conduct a set of RIL activities on an operational scale, to test whether advanced RIL measures (RIL+) and their emission-reduction potential are feasible and cost-effective compared to an already high standard of logging practices.

Several RIL activities (see Table 5.2) were thus implemented in an area of 502 ha and carried out over a period of five months during the rainy season (beginning of November 2016 to end of March 2017). In a control area of 765 ha, logging took place for four months (beginning of July 2016 to end of October 2016), without any specific RIL measures.

In the end, this pilot study did not identify any reduction in emissions in the RIL area compared to the control area (see Figure 5.1). This result appears to be due to logging being carried out during the rainy season. Indeed, rainy season conditions required the construction of an additional secondary road in the RIL area: without this, emissions would have been about 25 percent lower there (as had been planned) than in the control area.

Table 5.2: List of forestry activities

Category	RIL activities
Roads	• Reduction of road network density • Replacement of secondary roads with skid trails • Reduction in road strip width • Reduction in solar strip width
Skidding	Reduction in skid trail density using GIS planning
Log landings	Reduction in log landing surface area

Continued on next page

Box 5.2: continued

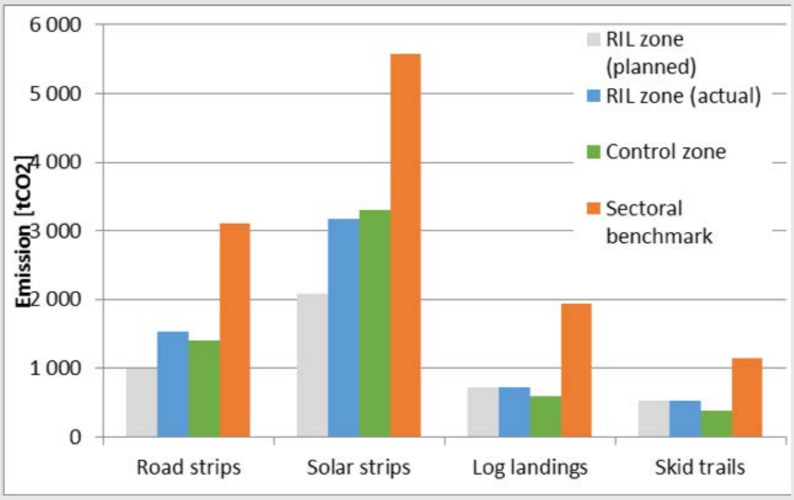

Figure 5.1: Emissions in the RIL area and the control area by category

In this pilot study, emissions due to road building represent between 79 percent (in the RIL area) and 81 percent (in the control area) of total emissions. Reduction in road density, as initially expected, is thus essential to reduce logging-related emissions. The fact that one metre of road (road strip and solar strip) leads to about 50 to 70 times more emissions than one metre of skid trail confirms this approach. Replacing secondary roads with skid trails is thus entirely justifiable from the angle of reducing emissions, even if we consider that several metres of skid trail are necessary to replace one metre of secondary road.

However, while it is theoretically possible to reduce the impact of roads by designing them to be shorter and narrower and by replacing secondary roads with skid trails, there are operational constraints. Longer skid trails are an option for dry-season logging, but not necessarily for year-round operations. Furthermore, there is a limit to the extent to which road width can be reduced. In other words, the forestry companies that have taken measures relatively early will benefit only a little from RIL. RIL+ can thus contribute to the reduction of CO_2 emissions.

have recently introduced compliance with RIL rules in their laws and regulations.[6] Nonetheless, RIL practices have been developed and implemented by some forestry companies in the region since the early 2000s. Various studies have thus been carried out to assess the impact of these practices on the damage suffered by the residual stand.

These techniques lead to a reduction in waste left in the forest and to a reduction in operating costs thanks to better planning of machinery use and better sizing of infrastructures. While studies have been carried out to clarify the costs of implementing RIL measures, very few have focused on Central Africa (Nitcheu Tchiade et al. 2016). But we do know that companies that have developed RIL techniques – sometimes outside of legal or forest-certification constraints – continue to implement them, suggesting that the financial impact of such techniques is either null or positive.

6 See in particular Order No. 6515/MEF setting the standards for reduced-impact logging in the Republic of Congo.

The impact of logging on carbon stocks has become an issue more recently. RIL-C measures are one ecosystem management strategy for reducing emissions and/or increasing carbon storage. The RIL-C measures include practices similar to those of RIL, but they also incorporate techniques to quantify the carbon savings resulting from the implementation of these specific measures.

Large differences in carbon emissions per unit volume of timber can be observed by location, ranging from 4.8 mg cm^{-3} in one concession in Gabon to 0.63 mg cm^{-3} in another in the Republic of Congo. In addition to their impact on maintaining carbon stock, RIL techniques also reduce the effects on flora and fauna.

Implementing RIL and RIL-C measures is one of the quickest solutions for reducing the impact of logging on forest carbon stock depletion. Recognition of the role of logging companies in the fight against global warming has promoted the dissemination and popularization of these measures over the last two decades. But even though most RIL and RIL-C measures are an integral part of good management measures to improve both logging performance and savings in operating costs, their increasing complexity requires support from the scientific and NGO sectors.

5.2.4 Increasing stocks: forest and agroforestry plantations, savanna protection, assisted natural regeneration, etc.

The expansion of agriculture, generally slash-and-burn, is the primary driver of deforestation in Central Africa. Population growth results in hundreds of thousands of new farm households moving into forest areas each year. This increases the need for new agricultural land and in turn puts pressure on forests and reduces forest stocks.

Agroforestry in savanna areas, sustainable agriculture in degraded forests in combination with perennial crops, and prohibitions on cutting and grazing practices in anthropogenic savannas have been shown to relieve pressure on gallery forests and urban peripheries. All these activities are financed by PES to local communities. The aim is both to encourage farmers to move agricultural activities from the forest to the savannas using sustainable and innovative agricultural techniques and to ensure the reconstitution of forest fallow land by introducing perennial crops.

In the case of agroforestry in savannas and sustainable agriculture in degraded forests in association with perennial crops, the technical itinerary includes a two-phase rotation between agriculture (the planting of food crops), and forest (the planting of tree species, such as acacia, *Dacryodes edulis*, citrus, etc.) Perennial forest crops, such as coffee, cocoa, banana and oil palm are being developed through sustainable forest agriculture without changing forest use.

When prohibitions on cutting and grazing practices are imposed on anthropogenic savannas, the methodological approach is the same as that determined for conservation concessions. The objective here is to restore the fertility of the land on abandoned fallows or to encourage forest colonization in savannas that are frequently subject to fires. The approach includes:

- Awareness-raising and communication (signing of a collaboration agreement on prohibitions on cutting and grazing practices with local communities represented by LDCs under the authority of the land chiefs)
- Demarcation of the boundaries of the anthropogenic savanna
- Setting up bushfire control systems

- Setting up assisted natural regeneration techniques
- Signing of a PES contract for prohibitions on cutting and grazing practices in anthropogenic savannas.

We can draw several lessons from the agroforestry approach in the DRC. First, it contributes to better ownership of the technical itinerary by farmers, and it also provides better social, economic and environmental benefits at the same time. Moreover, it facilitates access to land ownership in agroforestry areas. Challenges for the *Acacia* agroforestry model, however, can be observed: between 8 and 10 years of technical support for the agroforestry process are required to reach an autonomous and functional system, and the management process must be established beforehand. In addition to these advantages, PES paid in cash to farmers provide a significant additional incentive for convincing producers to engage in a new activity.

5.2.5 Accounting for emission reductions: scientific methods and knowledge

In order to carry out the variety of payments related to GHG emission-reduction efforts, stakeholders need real data on carbon stocks in the various types of land use. Many methodologies have been proposed by researchers based on destructive experiments. The research by Djomo et al. (2010) and Alipade and Dimandja (2011) on volume tables provides a scientific basis, but other allometric equations available on the GlobAllomeTree platform[7] highlight other methods and knowledge on carbon accounting. Three major studies have been carried out to assess the equations.

The study by Fayolle et al. (2018) recommends use of the following regional model for future estimates and/or monitoring of REDD+ in the Congo Basin forests: AGB = 0.125 x WSG 1.079 x D 2.210 x H 0.506 (AGB being the aboveground biomass in kg, WSG the specific density in g/cm^3, D the DBH in cm and H the total height in m).

In cases of inventory data where height has not been measured, the following equation is recommended in the Congo Basin forests:

$$AGB = \exp [0.046 + 1.156 \times \ln(WSG) + 1.123 \times \ln(D) + 0.436 \times (\ln(D))^2 - 0.045 \times (\ln(D))^3].$$

Martin et al. (2018) argue that existing estimates of the carbon fraction are wrong by 4.8 percent on average and up to 8.9 percent in tropical forests. The carbon fraction varies from species to species and is negatively correlated with the specific density. Furthermore, Umunay et al. (2019) estimate that, in the case of selective logging in the Congo Basin, emissions from logging average 2.1 tC/m^3 (amount of dead organic matter generated per m^3 of logs removed from the forest) or 18.4 tC/ha (amount of dead organic matter generated over 1 ha of logging block). These emissions can be reduced by an average of 51 percent through implementation of RIL-C measures.

7 http://www.globallometree.org/

5.3 Presentation and feedback from REDD+ projects and programmes in the field

Despite the fact that many actions have been set up and developed at the national level, and that there are many possible actions on the ground, implementation of REDD+ projects and programmes in the countries of the Congo Basin is not always easy, especially because of sometimes difficult local situations. In fact, many of the projects that have materialized have turned out to be open-air laboratories, with their results shedding light on the actions for recommendation in the future to maximize the chances of success.

What lessons can be learned from the various REDD+ projects and programmes implemented in recent years? What are the strategies envisaged – for ongoing projects and programmes – and to be considered for the future?

5.3.1 List and presentation of AFOLU projects registered in COMIFAC countries with the UNFCCC or carbon standards

Several AFOLU projects have been registered since 2008 in the COMIFAC countries (or, for the most recent ones, are still in the process of being registered) with the UNFCCC Clean Development Mechanism (CDM) or with carbon standards such as the VCS (Verified Carbon Standard), Gold Standard, or Plan Vivo. This registration provides them not only international recognition, but also value by earning certified emission-reduction credits that can be sold, each equivalent to one metric ton of CO_2. Table 5.2 presents these different projects.

In addition to these AFOLU projects, there are many projects working on the production and distribution of energy-efficient improved cookstoves (ICS) to households, so that they can reduce their consumption of firewood and thus the need for wood. Ultimately, this reduces deforestation and forest degradation. These projects are for the most part registered (or in the process of being registered) with the Gold Standard. They are especially located in Rwanda and Cameroon, but also in the DRC, Burundi and Congo. Slightly less than 2,500,000 carbon credits have been issued as part of these projects (see Table 5.3).

5.3.2 Presentation of the Emission Reduction Programme Documents (ERPDs) of the Congo and DRC

The Sangha Likouala Emission Reduction Programme (ERP) in the Republic of Congo

The Republic of Congo is home to approximately 23.5 million hectares of Congo Basin forest (CNIAF 2015). The country is committed to implementing its low-carbon development policy through the Emissions Reduction Programme (ERP) in the country's two most forested administrative districts (*départements*): Sangha and Likouala.

These two *départements* (see Figure 5.2) cover an area of 12.3 million hectares and include abundant rainforests, peatlands, protected areas rich in biodiversity, and the country's highest point (Mount Nabemba, about 1,020 m).

Table 5.3: AFOLU projects implemented in Central Africa and registered with carbon standards or the UNFCCC. Sources: Plan Vivo, VCS, GS and CDM

	Country	Project name	Project leader(s)	Date	Surface area	Main activities of the project	Estimated/ delivered emission reductions	Project status
Verified Carbon Standard (VCS)	DRC	Isangi REDD+	Jadora and SAFBOIS	2009	187,571 ha	(i) Termination of planned legal logging and reduction of unplanned illegal logging. (ii) Agricultural improvement activities.	1,391,622 VCUs delivered	Registered
	DRC	The Maï-Ndombe REDD+ Project	Wildlife Works and ERA Ecosystems	2011	248,956 ha	(i) Termination of planned legal logging and reduction of unplanned illegal logging. (ii) Agricultural improvement activities.	13,322,277 VCUs delivered.	Registered
	Congo	North Pikounda REDD+	CIB[a]	2012	92,530 ha	Conservation of a forest area subject to selective mechanized logging.	56,209 VCUs delivered.	Registered
	Congo	Agroforestry plantation Batéké Plateaus	SPF2B[b]	2018	7,454 ha	Agroforestry plantations, carbon sinks and sustainable charcoal production to supply the capital (Brazzaville).	1,158,190 tCO_2 (estimated) over 33 years.	Registration in progress
	Congo	Batéké project	Total Energies Nature Based Solutions	2021	40,000 ha	Plantations, carbon sinks.	10,000,000 tCO_2 (estimated) over 20 years.	Under development
Plan Vivo	Cameroon and CAR	Carbon Fund to Reduce Deforestation and Improve Living Conditions of population in the Sangha tri-national forest complex	Fondation pour le Tri-National de la Sangha (FTNS)	2017	14,891 ha in Cameroon and 4,000 ha in CAR	(i) Sustainable and profitable agricultural practices (agroforestry) to reduce expansion of agricultural land (ii) Community involvement in efforts to protect forest resources from illegal logging.	No information currently.	Certification in progress
GS[c]	DRC	EcoMakala Virunga Reforestation project	CO2logic et WWF RDC	2009	4,200 ha	Community forest plantations and sustainable charcoal production.	224,018 VERs delivered.	Certified
CDM[d]	DRC	Ibi Batéké degraded savannah afforestation project for fuelwood production	Novacel Sprl	2008	4,226.53 ha	Fast-growing forest plantations on savannas and sustainable charcoal production to supply the capital (Kinshasa).	1,178,670 tCO_2 (estimated) over 30 years.	Registered

a Compagnie Industrielle du Bois
b Société Plantations Forestières Batéké Brazzaville
c Gold Standard
d Clean Development Mechanism of the UNFCCC.

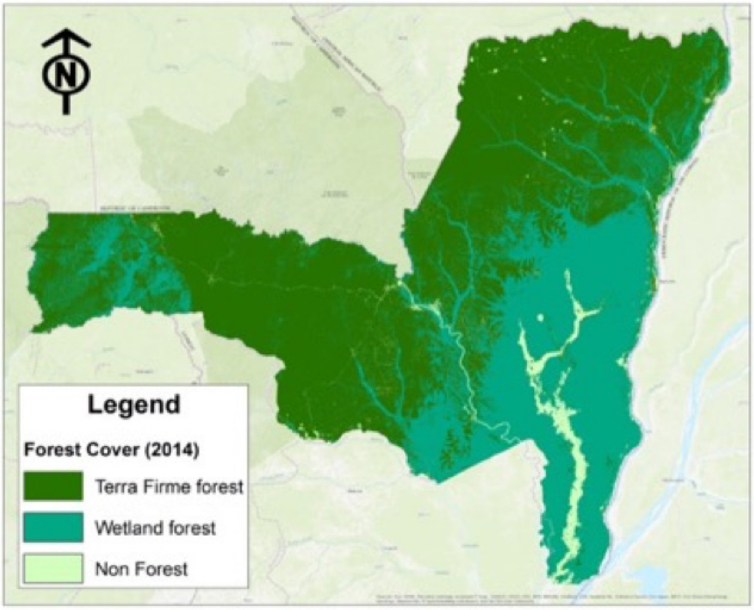

Figure 5.2: Map of the forest cover of the Sangha Likouala ERP area

The programme was finally approved in 2018 by the members of the Forest Carbon Partnership Facility (FCPF). Through it, the Republic of Congo is committed to demonstrating the feasibility of large-scale alternative development approaches to: (i) reduce greenhouse gas emissions, (ii) enhance sustainable ecosystem management, (iii) improve and diversify local livelihoods and preserve biodiversity, and (iv) diversify the national economy and increase government revenues from forests.

The reduction in gross emissions via the implementation of this programme, over a five-year period (2020 to 2024), has been estimated at 13,093,084 tCO_2. Most emission reduction comes from the implementation of RIL practices in forest concessions. Indeed, one of the main objectives of the programme is to demonstrate that it is possible to reduce the impact of logging without reducing timber production.

Taking into account uncertainties and risks of reversal, net emission reductions would be around 9,794,699 $teCO_2$. It should be noted, however, that these are provisional estimates: work is underway to refine the baseline scenario, which will affect the potential net emissions reductions.

The strategy envisaged under the Sangha Likouala ERP will be to harvest forests sustainably using RIL, promote Roundtable for Sustainable Palm Oil (RSPO) certification, improve governance, and provide payments for environmental services.

The conceptual phase of this programme involved extensive consultation and information-sharing at local, regional (*département* level) and national levels with various stakeholders including the private sector; local communities and indigenous populations; civil society; and local, departmental and national government bodies.

This very ambitious programme seeks to test REDD+ on a large scale, as a model for sustainable development in a country with high forest cover and low deforestation rates. It is one of the major REDD+ programmes in Africa. It will start in 2021, following the signing of the Emission Reductions Purchase Agreement between the Government of the Republic of Congo and the World Bank, which administers the Carbon Fund.

Box 5.3: Participation and respect of the rights of local communities and indigenous peoples in REDD+ in the DRC

Since the DRC's REDD+ readiness phase, indigenous peoples and local communities have been regularly consulted. Several REDD+ pilot projects (financed by the African Development Bank, as part of the Congo Basin Forest Fund, and by other donors) were carried out prior to the investment phase. These made it possible, between 2012 and 2013, to collect the opinions of local and indigenous communities to inform the REDD+ process and finalize the drafting of the DRC's National Strategy.

Indigenous peoples and local communities are fully involved in the ongoing initiatives and participate in the implementation of the various existing programmes. For example, WWC is developing a REDD+ project with the local and indigenous communities of Maï-Ndombe, in Inongo territory. In addition, the Maï-Ndombe Emissions Reduction Programme seeks to provide opportunities for local communities and indigenous peoples within the programme area to develop nested REDD+ subprojects, and for those outside the area to develop PES activities.

However, many challenges remain with regard to respect for the customary land rights of indigenous peoples and women in particular. Clarification is needed on the use rights and customary possession rights of land and forests in the Maï-Ndombe region. Land chiefs and their clans are customary owners of land and forests under the provisions of the DRC's Forestry Code and Land Law. They have the right to alienate land and forests that they own by custom.[a] Women enjoy full customary use rights to land and forests belonging to their clan, but they do not have the right to alienate or lease them. Migrants who have lived in a community for a long time have rather restrictive use rights, limited to the collection of dead wood or straw, and extending to the possibility of temporarily leasing land for survival activities. They are not part of the lineage of land chiefs, and as such they are not customary owners.

The approval order recognizes that the State is the owner of the forest carbon. However, in the case of nested projects, the State transfers carbon asset rights to private project developers and communities upon registration of the projects, in accordance with the approval order.

Note:

a REPALEF-GTCRR, Report on consultations with indigenous peoples and local communities in the jurisdictional area of the Emissions Reduction Programme of Maï-Ndombe in the Democratic Republic of Congo, on key aspects of the benefit-sharing plan within the framework of its finalization, Kinshasa, April 2020, p.22. https://bit.ly/2Feh3NE

Presentation of the Maï-Ndombe Emission Reduction Programme Documents (ERPDs) in the DRC

The DRC has been engaged in a REDD+ process since 2009. In anticipation of the results-based payment – corresponding to the third phase of the REDD+ process – the DRC has been preparing, with support from the World Bank, the design of the Maï-Ndombe jurisdictional Emissions Reduction Programme (ERP) since 2012. This ERP was formally included in the FCPF portfolio in November 2016, and an Emission Reductions Payment Agreement (ERPA) was signed between the World Bank and the DRC on 21 September 2018.

During this process, the DRC was able to secure several financing sources including 1) secured financing of USD 2.2 million (through CAFI or other financing sources) to operate and improve the implementation conditions required for the ERP and 2) financing of USD 5 million through the World Bank for making the ERPA operational.

The far-reaching goal of the Maï-Ndombe ERP is to implement a province-wide green development model offering alternatives to deforestation and providing performance incentives to mitigate climate change, reduce poverty, manage natural resources sustainably and protect biodiversity. The programme is designed to bring together different sources of financing, such as the Forest Investment Program (FIP), the Congo Basin Forest Partnership (CBFP) and CAFI, as well as to leverage private financing to scale up pilot activities and facilitate the shift to a large-scale land-use planning approach.[8]

Among the activities planned in the programme, the following should be mentioned as enabling activities: (i) strengthening the means of action of decentralized government services; (ii) strengthening the means of multilevel action and the design of Sustainable Development Plans; and (iii) promoting family planning.

As for sectoral activities, the following can be mentioned: (i) agroforestry and improved cultivation techniques, (ii) development of perennial crops in non-forest areas (coffee, cocoa, palm oil and rubber), (iii) strengthening of agricultural value chains, (iv) assisted natural regeneration for charcoal production (v) afforestation/reforestation for charcoal and timber production, (vi) reduced-impact logging, (vii) formalization and strengthening of the woodfuel sector, (viii) conservation of local community forests, etc.

To date, the DRC has met all the conditions for implementation of this project, with the exception of the Benefit Sharing Plan (BSP), the finalization of which depends on revision of the baseline. It is important to recall the legal obligation to revise the baseline of the Maï-Ndombe Programme, which was requested by the FCPF donors when the ERPA was signed. Indeed, the DRC had to review the accuracy of net emission reductions (NERs), estimated at 48 million tCO_2/year in the ERPD document. There was thus a need for an internationally recognized independent assessment, and this was conducted by the University of Maryland (UMD) with support from DIAF and OSFAC. The provisional results were presented to the DRC stakeholders on 23 October 2020. The estimates, developed in strict compliance with the FCPF Methodological Framework, indicate that the NERs of the Maï-Ndombe Jurisdictional Programme are 33,025,746 tCO_2/year.[9]

The programme's performance would thus be more than 4 million tCO_2/year[10] over the 2018-2019 monitoring period. The Programme could thus benefit from results-based carbon payments, under the terms of the ERPA, without putting into question the environmental integrity of the system.

5.3.3 Presentation of the DRC's PIREDD programmes

PIREDD Maï-Ndombe is one of the Integrated Programmes funded by CAFI. The project is run, under World Bank supervision, by the Coordination Unit of the Forest Investment Programme (UC-PIF) of the Ministry of Environment and Sustainable Development, under the delegated project management of the FRMi/WWC Consortium.

8 DRC, Emission Reductions Program Document, November 2016.

9 These figures are provisional pending submission of the final report of the study.

10 Idem.

The programme budget is USD 30 million over a five-year period (2018-2023), divided into two phases (USD 20 million for the initial 2018-2022 phase and USD 10 million for the second 2022-2023 phase).

This is a multi-sectoral project with the aim of improving people's living conditions through the implementation of activities to reduce GHG emissions from deforestation and forest degradation. Located in Maï-Ndombe Province, 200 km from Kinshasa, it comes in addition to the investments made under the PIREDD Plateaux project in the same province.

PIREDD Maï-Ndombe is putting into motion a set of activities (see Table 5.4) to address the direct and indirect causes of deforestation. The various REDD+ investments made as part of this project are framed by enabling activities, such as governance and family planning, which seek to create favourable conditions for their implementation and sustainability. The investments are also covered by a PES mechanism that encourages people to continue to adhere to the REDD+ approach.

The support provided to reduce household pressure on the forest has been adapted to the environment and to people's requests. For example, in areas where there are savanna zones,[11] the project provides for dissemination of practices such as the establishment of acacia-manioc agroforestry systems that allow for migration of agriculture to these zones. In areas where forest is dominant, the systems disseminated seek to establish sendentarized fields by introducing perennial crops.

After three years of implementation, the achievements of PIREDD Maï-Ndombe have grown in scale:

- Governance bodies are operational at the provincial, territorial and sectoral levels, as well as in some 480 village lands.
- Nearly 480 communities have been supported in their land-use development.
- Nearly 175 communities have been assisted in implementing their planning document for the dissemination of sustainable agricultural practices.
- Six indigenous villages receive support via implementation of microprojects to develop new income-generating activities.
- A priority road has been identified in collaboration with the provincial government, and an agreement has been signed with the Roads Authority for the repair or construction of bridges, gutters and dykes.

Lessons have been drawn from the difficulties encountered, thereby providing guidance for the implementation of REDD+ integrated projects.

The first is that the multi-sectoral nature of the project can be restrictive. Second, its range of actions is very broad and covers isolated areas. This sometimes leads to dissipation of efforts, thereby impeding behavioural change, which is a long-term process requiring a regular presence. Third, the project's results framework was scaled based on REDD+ projects in savanna areas. Fourth, rural communities, which live on a day-to-day basis, lack the means for behavioural change if they do not receive frequent monetary compensation.

11 An environment traditionally rarely farmed by local people

Table 5.4: Activities implemented as part of the PIREDD Maï-Ndombe project

Action component	Geographic scale	Expected results
Strengthening of governance and support for land-use planning	Province, local areas, sectors, village land	- Natural-resource governance bodies are operational. - Land-use planning documents are produced.
Support for implementation of land-use plans	Village land	- More sustainable agricultural practices are disseminated. - Forest protection zones are created and monitored. - Savannas are protected via fire barriers. - Alternative income-generating activities are developed.
Road infrastructure improvement	Province: priority roads	Movement of goods and people on the priority road is improved.
Awareness-raising in family planning	Province, village land	Rural households have greater awareness about family planning.
Support for development of income-generating activities for indigenous populations	Targeted lands	The targeted indigenous populations have improved incomes.

Finally, the process of determining, verifying and disbursing these payments is cumbersome to administer. Indeed, a large number of rural households participate in the efforts, and it must be ensured that each receives a payment commensurate with the effort they have made.

Among the various stakeholders, there are multiple and varying opinions of what represents a "deforestation avoidance effort" that should be remunerated. This difference in perception leads to difficulties in project implementation, as well as to a gap between the actual situation and the way in which the project results are made use of.

Can we already talk about reduction in CO_2 emissions at the end of a five-year project when it involves improvement of agricultural practices via the development of perennial crops that will be productive only three to seven years after planting? And simply creating a plantation of perennial crops is not enough to keep a family from using the forest, if that plantation is not yet productive. Plus, there is no guarantee that the plantation will be maintained or farmed in the future after the results-based payments end. The duration of the PIREDD Maï-Ndombe project is too short to support this type of momentum and to ensure that the investments made will be sustainable and will enable real reduction in CO_2 emissions.

The ERP could thus be an interesting prospect for consolidating the results that will have been achieved by the PIREDD Maï-Ndombe project, since these will generate income if they lead to emission reductions. However, this requires a benefit-sharing mechanism that allows for direct benefits to individual farm households that have made an effort. REDD+ projects and the sale of avoided emissions thus represent a real opportunity to finance the development of the Maï-Ndombe region while preserving its forest capital.

5.3.4 Lessons from REDD+ implementation

It has been nearly 14 years since the Bali COP, and assessment of REDD+ project implementation is needed so that we can draw lessons from it. The pilot projects discussed here are veritable "laboratories" of such implementation. Around 15 different pilot projects have been identified in Central Africa. They have helped convince the most reluctant governments regarding the feasibility of REDD+ mechanism implementation, promote the incentives associated with this process (Sunderlin et al. 2014), and highlight the complexity of their implementation.

Mixed success for the pilot projects

Despite the standards' commitment to clarify the procedures for implementing AFOLU projects, initial findings have revealed malfunctioning on the ground. Some project initiators realized that sustained efforts to reduce forest emissions require enabling conditions that have not yet been systematically set up, and they consequently discontinued their initiatives (Sunderlin et al. 2014; Awono et al. 2014).

Hardly any REDD+ project in Central Africa received their long-awaited payments, which are not immediate (in most cases, five years after submission of the Project Design Document). For this reason, a long-term monitoring budget is needed, without which the project cannot continue. In addition, the reluctance of donors and the price per metric ton of carbon greatly impacted the success of the pilot projects.

Box 5.4: World Bank guidance on REDD+ benefit sharing

We will consider four key themes proposed by the World Bank (2019) on good practices in results-based benefit sharing for land-use programmes, including under the Forest Carbon Partnership Facility (FCPF) and the BioCarbon Fund Initiative for Sustainable Forest Landscapes (ISFL).

i. ***Beneficiaries and benefits:*** The identification of beneficiaries and the types of benefits they receive depends heavily on understanding the key stakeholders and the types of incentives most conducive to achieving the overall objectives.

ii. ***Stakeholder participation:*** Stakeholder participation is necessary in all phases of benefit sharing, especially in the design and management of a benefit-sharing mechanism (BSM), as this leads to a greater sense of ownership and mutual trust.

iii. ***Institutional, financial and governance agreements:*** The effectiveness, efficiency and equity of REDD+ projects in delivering benefits depend on the ability to design provisions on institutional, legal, financial and governance aspects that meet the needs and capacities of all stakeholders. Governance agreements are moreover fundamental in terms of impartiality and inclusion.

iv. ***Monitoring, evaluation and adaptive management:*** situations regarding regulations, demography, threats and other aspects can be expected to change. It is therefore crucial to examine the potential that a monitoring and evaluation system has to adapt to such changes, so that effectiveness and efficiency can be improved.

What mechanisms are needed for REDD success at the local level?

We must rethink the system of biodiversity conservation through carbon markets. Encouragement of stakeholders can be considered, for example, by instituting a reward for efforts made. To overcome these difficulties, one approach is to identify the knowledge present on the pilot sites in order to find out the capacities of the stakeholders.

COMIFAC, as a subregional integration body for the environment and forests, must strengthen negotiation capacities and also provide capacity building for local technicians. In addition, the pooling of capacities, which has been undertaken in recent years, should be updated.

The organizations involved in the design of the REDD+ mechanism at the international level need to understand developing country perspectives, and institutions at all levels must work together to develop concrete strategies to improve overall outcomes (Brown et al. 2011). This approach requires synergy among stakeholders and between scientific and indigenous knowledge (Sufo Kankeu 2019; Sufo Kankeu et al. 2020).

5.4 Regulatory, incentive and remuneration mechanisms for stakeholders in the field (local communities and private operators)

5.4.1 Design, development and implementation of benefit-sharing mechanisms

The countries in the subregion that are engaged in the REDD+ process are using the guidelines issued by international REDD+ financing mechanisms to develop and implement benefit-sharing guidelines at both national and project levels. These guidelines are proposals, leads and policy advice for designing, developing and implementing REDD+ benefit-sharing mechanisms (CIFOR 2014).

REDD+ benefit sharing can be defined as the distribution of direct and indirect net gains stemming from REDD+ implementation.

Thus, benefit sharing refers to the sharing of monetary or non-monetary benefits with beneficiaries under the ERP and in accordance with the benefit-sharing plan (GoI 2019).

The notion of a BSM is defined as the system(s) or channel(s) through which monetary or non-monetary profits are distributed. This mechanism must take into account all sensitivities, implying that the beneficiaries and the type of benefits be clearly defined and that agreements be established.

Of all the REDD+ initiatives and projects in the Congo Basin, the Maï-Ndombe Emissions Reduction Programme in the DRC (led by Wildlife Works) is the most illustrative case of existing experiments with a benefit-sharing mechanism framed by a national regulation.

Box 5.5: ERs of voluntary carbon markets and their accounting under the Paris Agreement

The Paris Agreement commits all Parties to the UNFCCC to reduce their emissions, including the "non-Annex 1" countries not subject to quotas under the Kyoto Protocol. In this context, the carbon market projects pose a risk to the Parties, and especially to those that are developing countries, in that they may monopolize all the ERs that can be achieved "easily" and at a reasonable cost, thereby making it very difficult for the countries to achieve the targets they have set themselves.

Approaches are being examined (1) to reassure investors (future as well as current, as the issue also concerns projects already in progress, including former CDM projects under the Kyoto Protocol) and (2) to enable host countries to recover some of the ER benefits produced on their territory. This second approach would enable those host countries to claim these ERs under their NDC) while ensuring that they cannot at any time be double-counted (i.e., claimed simultaneously by two different Parties) and thereby risk weakening the environmental integrity of the Paris Agreement.

This raises the question of who can claim to have carried out an ER. Is it the host country where the ER is made? Or is it the country that provided the financing enabling the ER? The ongoing discussions on the rules of Article 6 of the Paris Agreement, and in particular of 6.4 on the Sustainable Development Mechanism are focusing precisely on this issue.

For voluntary market projects led by the private sector, one approach proposed is to disconnect the commercial benefit of an ER from the claim to it. See the ICROA paper on this subject: https: /*www.icroa.org/resources/Documents/* ICROA_Voluntary_Action_Post_2020_Position_Paper_July_2019.pdf

5.4.2 Example of benefit sharing for the Maï-Ndombe Emission Reduction Programme

The legal basis and procedures for any REDD+ project or programme, including the Maï-Ndombe ERP, are established in Ministerial Order No. 47/CAB/MIN/EDD/MML/05/2018 of 9 May 2018. The Order specifies several categories of potential beneficiaries, including sectoral ministries (forestry, agriculture, environment), administrative actors (FONAREDD) and indigenous peoples.

Indigenous peoples are taken into account in the benefit-sharing process at the local level, both because they are the guarantors of the success of the projects and because of their historical contributions to the conservation process. A set amount of 2 percent of the benefits was discussed with the indigenous peoples' network (REPALEF) and unanimously accepted by all stakeholders (see Table 5.5). However, no payments can be set up without institutional and practical provisions for the implementation of benefit sharing within the PIREDD framework. These provisions are currently being worked out.

Table 5.5: Analysis of the benefit-sharing mechanism of the Maï-Ndombe project, and of its strengths and weaknesses in relation to international requirements

Size of area concerned: 12 million hectares

The DRC's REDD+ benefit-sharing mechanism in the context of its Emission Reductions Payment Agreement (ERPA) within the FCPF Carbon Fund will be managed by FONAREDD (the REDD+ National Fund). Approximately 85.9 percent will go to performance-based payments for subprojects, and approximately 14.1 percent will be used as an advance payment for the management of the ERP. Payments for project management will be made before payments for performance by the subprojects (PIREDD project funded by FIP, PIREDD project funded by CAFI and conservation project funded by Wildlife Works).

Within programme management, the benefits will be shared as follows: about 4.1 percent will go to activities on involvement with indigenous peoples and local communities as an advance payment, about 9.4 percent will go to advance payment of programme administration, and about 0.6 percent in advance payment will be used for risk-mitigation activities.

The programme management will take into account the following:

1. A Programme Management Unit (PMU), which will strengthen the capacities of the provincial government and assist it in ERP management (coordination of subprojects, implementation of a benefit-sharing plan, safeguards and MRV, etc.). In compliance with the benefit-sharing plan, the ERPA and ER payments will be supervised by the PMU and monitored by the transactions registry.
2. Indigenous peoples and local communities will receive payments over five years, based on programme performance, in recognition of both their historical role and their current efforts in sustainable forest management, and as encouragement for their involvement as potential subproject developers.
3. Risk mitigation: The operations of national-level REDD+ institutions and infrastructure established during the REDD+ readiness phase will also be supported in advance by ERPA payments and other funds to support and ensure the continuity of national-level REDD+ operations.

The subprojects[a] will be subject to the following:

4. Payment ceiling: No private subproject will be allowed to receive more than 17.5 percent of the ERPA's nominal value. The purpose is to redirect payments to community activities outside of the limits of the private subproject, even if their performance is inferior. The remaining ERs not purchased by the FCPF Carbon Fund will go into a pool of in-kind ERs, which can be provided to individual subprojects for performance achieved.
5. Reference levels: subprojects will be rewarded in relation to subreference levels validated by the regulator. The PMU should develop guidance and information on how to develop future baselines.
6. Legacy projects: an existing legacy project has apparently been approved. If the project is integrated and rewarded for performance over the ERPA period (2018-2023), it would reduce its baseline by 33 percent.

Theme	Strengths	Weaknesses
Beneficiaries and benefits	– There were a total of 50,000 beneficiaries. – Several socioeconomic benefits seemed to result from project activities such as school construction, a mobile medical clinic, an immunization programme, distribution of school supplies and ongoing capacity-building workshops for employees and communities in the project area. – Income from the sale of carbon credits will be channelled directly to the project area. A "Local Development Fund" will be managed by a committee of villagers, who will decide how the income will be spent.	
Stakeholder participation	The stakeholders involved in the project include most of the local communities and the government (represented by the Ministry of Environment).	– No CLIP for REDD+ activities – Low level of community inclusion and ownership – Insufficient involvement by the private sector – Lack of clarity on the available procedures
Institutional, financial and governance agreements	– The BSM is managed by the PMU along with support from local stakeholders (communities), the private sector (WWC, SODEFOR, SOGENAC) and international actors (CAFI and FIP). – The main documents governing the operating of FONAREDD, which manages the BSM, are available on their website and easily accessible.	Local government capacity to oversee the jurisdictional REDD+ programme is still lacking, despite years of so-called "REDD readiness" activities.

Continued on next page

Table 5.5: continued

Theme	Strengths	Weaknesses
Monitoring, evaluation and adaptive management	The mechanism set up by the FONAREDD Secretariat has improved overall (FONAREDD Forum in 2020).	Monitoring and evaluation are fragmented, as they focus on the interests and approaches of the different donors.
Analysis by principle		
Equity and inclusion	All stakeholders are represented, i.e., local communities, civil society representatives and the government (represented by the Ministry of Environment).	
Legality and legitimacy		We were not able to obtain access to the founding documents of FONAREDD, whose activities began in 2016.
Land rights holders		The rights and tenure of the trees are still not clear.
Transparency	Most of FONAREDD's internal documents (related to its activities) can be consulted on its website.	Lack of updating of the FONAREDD website
Economic and social development	Several socioeconomic benefits have resulted from the project activities at the community level.	

Sources: Iwerk and Toroskainen 2017; World Bank 2019; Nature Bank 2019; WWC 2019; Transparency International 2020; Lang 2021; DRC 2018; WWF 2021.

a There continue to be disagreements among stakeholders on these subprojects in particular.

5.5 Conclusions and outlook

Through various activities over the past ten years or so, Central African countries have been preparing for implementation of the REDD+ mechanism on their territory. They are investing in various activities, and some countries, thanks to support from the FCPF Carbon Fund, are gradually entering the third and final phase of the mechanism's implementation: that of results-based payments. This notion of positive incentives has been part of the initial design of REDD+ since its official launch (UNFCCC 2007).[12] It was confirmed in the Warsaw Framework (UNFCCC 2013), which sets out the core elements for REDD+ implementation for results-based payments, and then reinforced by the Paris Agreement (UNFCCC 2015). But today REDD+ implementation must adapt to the new climate governance framework of the Paris Agreement. This voluntary agreement is based on the submission of national climate plans (Nationally Determined Contributions - NDCs). While the NDC content is freely determined by each country, it also commits REDD+ recipient countries[13] (Aykut 2017). This development has several implications for REDD+ implementation and financing (Angelsen et al. 2018) and provides new perspectives for the mechanism.

Since 2007, several technical and financial support initiatives have been developed to help countries prepare and start implementing REDD+ (in particular the FCPF Readiness Fund, UN-REDD, as well

12 The mechanism was first introduced in 2005 at the Montreal COP by member countries of the future Coalition for Rainforest Nations and officially launched in 2007 as part of the Bali Action Plan.

13 This is in contrast to the Kyoto Protocol, which, reflecting the principle of common but differentiated responsibility, obliged only those countries considered historically responsible for climate change.

as the FIP, the REDD+ window of the Green Climate Fund, and others). Thanks to this support, mainstreaming of climate change mitigation issues has taken on an unprecedented dimension, particularly in the Central African countries that have benefited from these funds (Cameroon, CAR, DRC, Republic of Congo and Gabon), but also – by rebound effect – in the other countries of the region. However, this mainstreaming remains relatively limited to the forest sector, and REDD+ has not achieved the expected results in terms of intersectoral coordination. Today, it is crucial to link REDD+ to more comprehensive green growth and/or low-carbon development policies (Thu Thuy et al. 2018), in order to drive the sectors that cause deforestation and forest degradation (agriculture, mining, land, energy, etc.) and ensure its sustainable and effective implementation. In this respect, CAFI is an important source of financing.

Similarly, countries need to harmonize carbon monitoring tools and instruments on their territory. Theoretically, insofar as REDD+ targets are included in the NDCs, the Measurement, Reporting and Verification (MRV) systems developed under REDD+ should feed directly into a broader carbon accounting system that would meet the requirements of the Enhanced Transparency Framework (ETF) of the Paris Agreement.

In practice, the REDD+ MRV is often available before the global accounting tool into which it should be included. And it is not uncommon to observe semantic and methodological inconsistencies (often due to anachronisms[14]) between the information submitted to the UNFCCC (GHG inventories, NDCs, etc.) and the REDD+ MRV instruments (some of which are also submitted to the UNFCCC, such as the FREL). At this time when countries are preparing to submit their second NDC, it is important to correct inconsistencies and harmonize methodologies.

Finally, this dual effort of perspective and harmonization should help align REDD+ commitments (i.e., the NDCs as well as the commitments made regarding the forms of implementation of the mechanism, including with regard to compliance with the Cancun safeguards)[15] and REDD+ projects and programmes. As part of the Paris Agreement and the universality of climate commitments, this alignment (which we can also call moving closer together, linking or interlocking) has become necessary. Countries must be able to ensure that the REDD+ activities implemented on the ground contribute to achieving their NDCs and, in doing so, to what extent they do so. This alignment is not without its problems, both technical (FREL allocations, additionality, etc.) and related to the claim of emission reductions achieved under a REDD+ project or programme. With the entry into force of the Paris Agreement, several voluntary market standards have questioned the role of voluntary market projects in the post-2020 context.[16] They have revised their rules to make the nesting of REDD+ projects in national strategies mandatory and effective[17] or are considering new rules to avoid the risk of double accounting.[18]

At their own level, countries can develop tools and instruments complementary to those required by the Warsaw Framework, for example:

- REDD+ certification guidelines to ensure that REDD+ activities implemented in the country comply with the national strategy and commitments made by the country

14 For example, the definition of "forest" used in the CAR's GHG inventories (which act as baseline data for setting NDCs) is not the one used by the stakeholders consulted in the development of the MRV system – and for good reason, as the consultation took place in 2020, after the finalization of the IGES project (2019).

15 UNFCCC 2011.

16 https://www.goldstandard.org/our-work/innovations-consultations/operationalising-and-scaling-post-2020-voluntary-carbon-market

17 https://verra.org/project/vcs-program/rules-and-requirements/redd-nesting-public-consultation/

18 https://verra.org/wp-content/uploads/2020/08/Proposal-for-Scaling-Voluntary-Carbon-Markets-and-Avoiding-Double-Counting.pdf

- A National REDD+ Registry, or even a Transaction Registry, to ensure the monitoring and carbon accounting of all activities and ERs implemented in the country
- A national FREL allocation tool
- Measures for support and capacity building as well as benefit-sharing mechanisms to guarantee attractiveness, universal accessibility and inclusion

Today, one of the major challenges of REDD+ is to succeed in mobilizing financing to implement the activities. In fact, the main source of financing that had been envisaged for REDD+ (a binding carbon market) never materialized (Angelsen et al. 2018). Instead, a voluntary carbon market has taken over. Its development has been both explosive and substantial. In 2019, forestry projects accounted for 36.7 million metric tons of CO_2e on the voluntary carbon markets, worth around USD 160 million. In financial terms, it is by far the biggest category of voluntary market projects, not only in terms of tCO_2e, but also in average sales price per metric ton, which exceeds all the other project categories (4.3 USD in 2019).[19]

Today, this voluntary market remains one of the main ways to capture private financing. But, as mentioned earlier, several questions remain unanswered with regard to the relationship between these voluntary markets and the Paris Agreement. Furthermore, financing does not cover needs (Atmadja, et al. 2018), and new avenues of financing must be explored. Their application is not exclusive and depends mainly on the type of REDD+ activity that is implemented. These avenues for financing and redistribution instruments include the following:

- Establishment of national programmes such as PES or forestry funds, financed through carbon taxation or taxation on forestry or agricultural production.
- Programmes to support the development of low-carbon or green-growth strategies.
- Bilateral aid programmes, in particular targeting the cooperation mechanism under Article 6.2 of the Paris Agreement. This mechanism provides for a simple transfer of emission reductions achieved by one Party to another Party, with a reliable accounting system.
- Fund-type mechanisms that enhance environmental assets and/or are dedicated to the full implementation of the REDD+ mechanism, such as the FCPF Carbon Fund or the Green Climate Fund (via its budget dedicated to REDD+ results-based payments in particular).
- Private investments, via carbon markets (whether voluntary markets or the Sustainable Development Mechanism provided for in Article 6.4 of the Paris Agreement). Although postponed due to the COVID-19 pandemic, the “CORSIA” (Carbon Offsetting and Reduction Scheme for International Aviation) initiative makes it possible to offset emissions from the aviation sector by using REs produced by REDD+ programmes. This provides a new opportunity for REDD+ projects and programmes.
- Establishment of domestic carbon markets that can be developed in conjunction with a carbon or other taxation system and that would capture local financial resources.
- Private investments, through “zero deforestation” strategies or commitments made by companies as part of the Science Based Target Initiative.[20]

19 Forest Trends’ Ecosystem Marketplace. The Only Constant is Change. State of the Voluntary Carbon Markets 2020, Second Installment Featuring Core Carbon & Additional Attributes Offset Prices, Volumes and Insights. Washington, DC: Forest Trends Association, December 2020.

20 https://sciencebasedtargets.org/

Congo Basin forests in international discourse

PART 2

CHAPTER 6

Mainstreaming the Sustainable Development Goals (SDGs) into Forest Management in Central Africa: current status, challenges and improvement options

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Photo by FAO

Introduction

The forests of the Congo Basin play a crucial role in regulating the climate system of not just Africa, but the entire world. These forests also provide a livelihood for the 60 million people who live in them or nearby; perform essential social and cultural functions for local and indigenous populations; and, more indirectly, help feed the 40 million people living in nearby urban centres, as pointed out by Marquant et al. (2015). When these forests are managed sustainably, they have the potential to provide "sustainable nature-based solutions" to many issues related to water, energy, food and nutritional security, poverty alleviation and others. In this way, they contribute to achieving several Sustainable Development Goals (SDGs). Nonetheless, the question of how to harness this huge potential remains.

In September 2015, the 193 member states of the United Nations (UN) adopted the 2030 Agenda for Sustainable Development. This programme, known as "Agenda 2030," consists of 17 Sustainable Development Goals (SDGs) and 169 targets. It is a people-centred development agenda that seeks to eradicate poverty in all its forms and dimensions, preserve the environment and ensure more peaceful and inclusive societies.

Agenda 2030 recognizes the following: *"Targets are defined as aspirational and global, with each government setting its own national targets guided by the global level of ambition but taking into account national circumstances. Each government will also decide how these aspirational and global targets should be incorporated into national planning processes, policies and strategies."*

The Central African Forests Commission (COMIFAC) Convergence Plan for the conservation and sustainable management of Central African forest ecosystems comprises six priority action areas and three cross-cutting areas. It serves as a reference framework for actions in the forestry and environmental sector in Central Africa.

To better guide Central African countries in implementing Agenda 2030, it is crucial to ensure that the Convergence Plan aligns with the SDGs. The nine action areas of the Convergence Plan and the 17 SDGs of the UN Agenda 2030 will serve as a framework for the analyses to be carried out. The mainstreaming of the SDGs into sustainable forest management in Central Africa will consist of reviewing the ways in which the COMIFAC Convergence Plan action areas are linked to the SDGs. This mainstreaming will make it possible to monitor the contribution of Central African forests to the SDGs, via reviews of the voluntary national reports produced by countries and of the efforts made by these countries and the challenges encountered. This review will also facilitate exploration of options for better mainstreaming of the SDGs into the sustainable management of forests in Central Africa.

The first part of this chapter deals with the alignment of the COMIFAC Convergence Plan with the SDGs. It provides an overview of the SDGs and targets that can be prioritized in light of the expected results of the priority action areas of the Convergence Plan. The second part focuses on national ownership of the SDGs through voluntary national reviews (VNRs) and the inclusion of forest contribution to the SDGs in national reports. Contrary to the findings on the Convergence Plan's alignment with the SDGs, the contribution of efforts to the SDGs – as reflected in the country ownership exercises – is still limited to one or two forest-related SDGs. This practice does not sufficiently take into account the range of forest contributions to the SDGs. The third and last part of this chapter presents the options for improving SDGs mainstreaming into the sustainable management of forests in Central Africa.

6.1 COMIFAC Convergence Plan: a reference framework for SDG alignment

Application of the SDGs to sustainable forest management is not yet a common practice. Up to now, focus has been on analyses that show that forests and their related policies contribute to achieving many of the goals and targets of Agenda 2030 in addition to SDG 15, which specifically addresses the sustainability of forest ecosystems (De Jong et al. 2018; Baumgartner 2019; FAO 2018). Generally speaking, application of the goals and targets to local circumstances and priorities involves mainstreaming the SDGs into national agendas.[1] In recent years, other levels of SDG ownership have emerged, at both the territorial and theme-based levels.

Cities and regions in particular are viewed as the most suitable level for grassroots work to achieve the SDGs. Having cities and regions mainstream the SDGs has thus become a major concern of urban governance (UN-HABITAT 2018) and of local development (Thibault 2017).

In contrast, the theme-based approach to SDG ownership has been explored mainly at the global level, as evidenced by the discussions at the High-Level Political Forum for Sustainable Development (HLPF) held in July 2018. With regard to forests, this approach is key to the global objectives on forests of the United Nations Strategic Plan for Forests (2017-2030). The 6 goals and 26 related targets of this Strategic Plan were adopted by the General Assembly in 2017. Their aim is to contribute to achieving the SDGs, the Aichi Biodiversity Targets and the Paris Agreement reached as part of the United Nations Framework Convention on Climate Change.[2]

The Congo Basin forests provide many ecosystem goods and services. For this reason, it is important to provide the resources needed to monitor and enhance the contribution of these forests to the SDGs. However, it should be noted that aligning the SDGs with the cross-border governance of a forest ecosystem as important as the Congo Basin is a painstaking exercise and that the lack of a joint reference framework for sustainable forest management is very often the first obstacle to be removed. It is for these reasons that the COMIFAC Convergence Plan is essential.

1 This is stipulated in UN General Assembly Resolution 70/1 of 25 September 2015, paragraph 55.

2 https://www.un.org/esa/forests/wp-content/uploads/2019/04/Global-Forest-Goals-booklet-Apr-2019.pdf

6.1.1 Convergence Plan priority action areas

The Central African countries have agreed to the SDGs and have undertaken monitoring of the progress made towards achieving them. These countries have also signed a treaty[3] committing them to the conservation and sustainable management of Central African forest ecosystems and establishing COMIFAC as the subregional reference institution for the harmonization of forest and environmental policies. COMIFAC has a Convergence Plan which defines the action strategies of the subregion's countries and of other stakeholders in the conservation and sustainable management of forest ecosystems in Central Africa.

Box 6.1 presents the priority action areas, the cross-cutting action areas and the main impacts expected from the Convergence Plan.

6.1.2 Alignment of the Convergence Plan with the SDGs

An exercise was carried out to see how the Convergence Plan aligns with the SDG targets; this work made it possible to prioritize 31 targets of 10 SDGs.[4] The main findings from this analysis are presented below.

- SDG 1 "End poverty in all its forms everywhere" is closely linked to the concerns addressed in priority action area 5 "Socioeconomic development and multistakeholder participation" of the Convergence Plan. Through its operational objective 5.1.3. "Fostering the development of job- and income-generating activities in forest environments," the Convergence Plan seeks to increase the incomes of forest dependent populations and the number of jobs for men, women and young people in the forest sector. Forests offer income-generating opportunities via collection and sale of wood and non-wood forest products, as well as through the sharing of logging benefits with nearby communities (see operational objective 5.1.2). *In the Central African Republic (CAR) and Gabon, the forestry sector is the country's largest private employer and the second-largest employer after the State. In Cameroon, nearly 8,000 jobs are provided by the formal forestry sector. However, women are poorly represented in the sector: 281 out of 8,047 workers in 2008* (Eba'a Atyi 2013). Sustainable forest management is helping to alleviate poverty by creating wealth and protecting the essential functions of forests that underpin the livelihoods of poor people.
- SDG 2 "End hunger, achieve food security and improved nutrition and promote sustainable agriculture" is consistent with the Convergence Plan's priority action areas 5 "Socioeconomic development and multistakeholder participation" and 3 "Conservation and sustainable use of biological diversity." The forests of Central Africa offer a wide range of food products of plant and animal origin (Ndoye 2016; Tata-Ngome 2016). In some places, hunting meat accounts for up to 80 percent of people's protein intake; about 5 million tonnes of bushmeat are harvested each year (Van Vliet et al. 2012). Forest foods contribute to household resilience by providing a safety net in times of crisis (Tata-Ngome 2016). According to COMIFAC's strategic orientations,[5]

3 The treaty is available online: https://comifac.org/images/documents/traitecomifac_français.pdf

4 The prioritized SDGs: SDG 1, SDG 2, SDG 5, SDG 6, SDG 7, SDG 8, SDG 12, SDG 13, SDG 15 and SDG 16.

5 These guidelines are spelled out in the Subregional Guidelines on the sustainable management of non-wood forest products (NWFPs) of plant origin in Central Africa (http://www.fao.org/3/ak414f/ak414f.pdf), the toolkit on integrating the Right to Adequate Food (RAF) in plant-based NWFPs in Central Africa (http://www.fao.org/forestry/42451-0dea 893d3253a87ad78abcad1833ff739.pdf), the subregional strategy for the sustainable use of wildlife by indigenous and local communities in COMIFAC countries, the COMIFAC strategy on access to biological and genetic resources and fair and equitable access and benefit sharing (ABS) arising from their utilization, and the sub-regional programme on forests for food security and nutrition in Central Africa, etc.

Box 6.1: COMIFAC Convergence Plan for the sustainable management of Central African forest ecosystems (2015–2025)

The revised Convergence Plan is divided into six priority action areas and three cross-cutting action areas. The priority action areas:

1. Harmonization of forest and environmental policies
2. Sustainable management and exploitation of forest resources
3. Conservation and sustainable use of biological diversity
4. Combating the effects of climate change and desertification
5. Socio-economic development and multistakeholder participation
6. Sustainable financing

The cross-cutting action areas:

- Training and capacity building
- Research and Development
- Communication, awareness, information and education

The expected impacts of the revised Convergence Plan:

- The deforestation and forest degradation rate is stable compared to the current level within each country of the COMIFAC area.
- The integrity of protected areas and transboundary protected areas is maintained.
- The living conditions of the local populations are improved.

The Convergence Plan also clearly states the values on which efficient implementation of the priority actions should be based, as well as basic assumptions for ensuring that the framework conditions for success are met.

COMIFAC Convergence Plan 2015–2025

three priorities can be considered in the SDG 2 indicators. The first relates to access to forest foods (SDG target 2.1). The second relates to improving the productivity and income of small-scale food producers (SDG target 2.3), and the third relates to the conservation of forest genetic resources (SDG target 2.5).

- SDG 5 “Achieve gender equality and empower all women and girls” is aligned with the core values to be respected during the implementation of the Convergence Plan. In addition to good governance, the other three values are respect for human rights and the rights of indigenous peoples; gender mainstreaming; and cooperation, partnership and solidarity. This SDG is also related to the concerns addressed in priority action area 1 “Harmonization of forest and environmental policies” of the Convergence Plan. Even though the laws in force often grant equal rights to men and women, there are still gender-based differences that are rooted in traditional norms and practices. A subregional strategy for mainstreaming gender into the sustainable management of natural resources in Central Africa has been adopted by COMIFAC member countries.[6] It especially focuses on gender equity in the distribution of social roles and responsibilities, as well as on gender mainstreaming into national policies and subregional programmes (in line with target 5.5). It also deals with securing rights and access to forest resources for women (in line with target 5.a).

- SDG 6 "Ensure availability and sustainable management of water and sanitation for all" (in particular target 6.6 "By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes") partially overlaps with priority action areas 2 "Sustainable management and development of forest resources" and 3 "Conservation and sustainable use of biological diversity." In addition to forests, the Congo Basin is also characterized by its wealth of water resources. The Congo River Basin, for example, accounts for about 30 percent of Africa's water resources and covers an area of about 4 million km^2, 85.3 percent of which is covered by tropical rainforests in Cameroon, the Central African Republic (CAR), the Democratic Republic of Congo (DRC) and the Congo. The relationship between forests and the watercourse system that criss-crosses them is both complex and highly interdependent. Not only is water fundamental to the life of trees and therefore of forests, but forests also play a crucial role in maintaining the quality and quantity of water (Betti 2011).
- SDG 7 "Ensure access to affordable, reliable, sustainable and modern energy for all" (in particular targets 7.1 "By 2030, ensure universal access to affordable, reliable and modern energy services" and 7.2 "By 2030, increase substantially the share of renewable energy in the global energy mix") is synonymous with the strategic guidelines of priority action area 4 "Combating the effects of climate change and desertification." Even today, millions of people in rural areas and large cities depend on firewood and charcoal to cook their food. Woodfuel is the main source of energy for 90 percent of Kinshasa's population (Schure et al. 2013). The turnover of the woodfuel sector is estimated at more than 186 billion CFA francs per year in Cameroon (Eba'a Atyi et al. 2016), where nearly 16 million people depend on this energy for cooking. Because of its great economic importance, supply of woodfuel to large cities is one of the main drivers of deforestation. The Convergence Plan seeks to better deal with this threat via guidelines to establish the conditions needed to make woodfuel a clean and renewable source of energy. Several initiatives have been taken in recent years to take up this challenge. One example is the "Sustainable Management of Woodfuel Resources in Central Africa" project (Marien et al. 2013). Another that can be mentioned is the PREFOREST Initiative, which aims to reduce greenhouse gases (GHGs). It was recently financed by the Green Climate Fund (GCF) and receives co-financing from the Central African Forest Initiative (CAFI) and the International Fund for Agricultural Development (IFAD) to overcome the barriers and constraints to the sustainable production and consumption of woodfuel in five administrative divisions (départements) of the Congo. See https://www.greenclimate.fund/project/fp159 for PREFOREST and https://mptf.undp.org/factsheet/project/00130492 for PROREP Bois-Energie (project to enhance sustainable woodfuel potential in the Republic of Congo).
- SDG 8 "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all" is in line with the values pursued in the Convergence Plan, including respect for human rights and the rights of indigenous peoples, and operational objective 2.2.3 "Enhance legality and promote certification." This objective contributes to the fight against forced labour and child labour in all its forms at forestry sites (in line with target 8.7), and it aims to promote safety in the workplace and protection for all workers (in line with target 8.8). Forest certification programmes launched more than a decade ago are already making a

6 https://www.comifac.org/documents/directives-strategies-accords

remarkable contribution to improving working conditions in the formal forestry sector (Cerutti et al. 2017). At the policy level, the national industrialization strategies for greater processing of forest products and the strategies for the development of ecotourism as part of the economic enhancement of protected areas and the wildlife sector are promoted in operational objectives 2.2.2 and 3.1.3 respectively. They contribute to targets 8.3 and 8.9.

- SDG 12 “Ensure sustainable consumption and production patterns” has a number of targets that are fully aligned with the Convergence Plan. This is the case of target 12.2 “By 2030, achieve sustainable management and sustainable use of natural resources,” which is largely in line with priority action areas 2 “Sustainable management and development of forest resources” and 3 “Conservation and sustainable use of biological diversity.” Another example is target 12.5 “By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse,” which addresses similar aspects to those addressed in the national industrialization strategies for more advanced processing of forest products promoted by the Convergence Plan. In the forest industry, measures have already been taken to ensure reduced-impact logging, improve raw-material productivity in wood processing, and recover waste and other residues from forestry, etc. Perhaps the most significant variation of the circular economy concept is the adoption of cogeneration in wood processing industries (Crehay 2012). Operational objective 2.2.3 “Enhance legality and promote certification” also contributes to target 12.7 “Promote public procurement practices that are sustainable, in accordance with national policies and priorities.” Making legal timber an obligation in public procurement in Central Africa is already making headway (Eba’a Atyi et al. 2018) and has even become a reality in Cameroon.
- SDG 13 “Take urgent action to combat climate change and its impacts” corresponds in general terms to priority action area 4 “Combating the effects of climate change and desertification” of the Convergence Plan. Nature-based and especially forest-based solutions for climate-change mitigation and adaptation are those that have been explored the most in Central Africa. Over the past decade, emphasis has been placed on combating deforestation in order to reverse the trend of emissions from forests. Several countries have developed national strategies and REDD+[7] investment plans and are committed to establishing national systems for forest monitoring. Most of these countries are conscious of the fact that climate change affects Central Africa,[8] and they have developed both national plans and investment plans to promote adaptation to climate change. All these measures are provided for in the Convergence Plan, in particular in operational objective 4.1.1, which is to develop and implement national strategies for adaptation to climate change, and operational objective 4.1.2 “Develop and implement measures to mitigate the effects of climate change.” While the former is linked to target 13.1 “Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries,” the latter fits in well with target 13.2 “Integrate climate change measures into national policies, strategies and planning” and target 13.3 “Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.”
- SDG 15 “Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss” cross-cuts all the Convergence Plan priority action areas. The Central African countries have been committed to sustainable forest management for nearly 30 years (Nasi et al. 2006). They have made remarkable progress: the surface area of natural forests with a management plan has more than quadrupled between 2005 and 2010, reaching more than

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7 Reducing Emissions from Deforestation and forest Degradation.

8 See State of the Forest 2015 (https://www.cifor.org/knowledge/publication/5884), in particular chapter 4, devoted to the vulnerability and adaptation of forests and communities.

31 million ha, including 10.2 million with certification (OFAC[9] 2019). Further, at least 11 percent on average of the surface area of each Central African country has been made protected areas, thereby allowing for the establishment of networks of protected areas that cover biodiversity better in each country (Doumenge et al. 2019).

- SDG 16 "Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels" touches on aspects that are core to forest governance in Central Africa. These include the fight against corruption, participation and gender-based discrimination. The first aspect is addressed in priority action area 1 "Harmonization of forest and environmental policies" of the Convergence Plan. Nearly all the Central African countries have made the fight against corruption in the forest sector one of their priorities, by creating specific units or services to tackle this scourge. The fight against corruption in the forest sector is part of target 16.5 "Substantially reduce corruption and bribery in all their forms." The second aspect, in this case participation and inclusive forest management, occupies a prominent place in priority action areas 1 and 5. Subregional Guidelines on the "Participation of Local and Indigenous Peoples and NGOs in the Sustainable Management of Forests in Central Africa" have been adopted[10] and contribute to target 16.7 "Ensure responsive, inclusive, participatory and representative decision-making at all levels." The third aspect is related to the fight against gender-based discrimination in the forestry sector. Indigenous peoples in particular are quite often victims of discriminatory practices, as recent reports on human rights violations in biodiversity conservation projects show.[11] Measures have been taken in some countries to protect these vulnerable groups. This is the case, for example, of (1) the CAR, which on 30 August 2010 ratified the Indigenous and Tribal Peoples Convention of the International Labour Organization (ILO No. 169); (2) the Congo, which promulgated Law No. 5/2011 of 25 February 2011 on the promotion and protection of the rights of indigenous peoples; and (3) the DRC, where on 7 April 2021 the National Assembly adopted the law on the protection and promotion of the rights of indigenous Pygmy peoples. These measures are in line with target 16.b "Promote and enforce non-discriminatory laws and policies for sustainable development."

Of the 10 SDGs considered in FAO's *State of the World's Forests 2018* report, only SDG 11 "Make cities and human settlements inclusive, safe, resilient and sustainable" has not been prioritized and mainstreamed in this analysis focused on Central Africa. Concerns related to urban forestry, to trees in the city and to green spaces are indeed not specifically addressed in the COMIFAC Convergence Plan 2015–2025. However, this observation should not diminish the efforts made in certain COMIFAC countries to maintain, for example, the integrity of the Raponda Walker arboretum and the Sibang forest reserve in Libreville (Gabon), the Patte d'Oie forest reserve in Brazzaville (Congo), and green spaces in Kigali (Rwanda). Conversely, SDG 16, which is prioritized in this analysis, was not included among the 10 SDGs considered in FAO's *State of the World's Forests 2018* report. The implementation of the SDGs in forest governance in Central Africa has made it possible to obtain a subregional package of 31 prioritized targets (see Annex 6.1).

9 The Central Africa Forest Observatory

10 See: http://extwprlegs1.fao.org/docs/pdf/Ecc189705.pdf

11 See, for example, the documents available at https://www.survivalinternational.fr/actu/12540; https://www.buzzfeednews.com/collection/wwfsecretwar; https://wwf.panda.org/wwf_news/wwf_independent_review_/droits_humains_en_matiere_de_conservation/

6.2 National ownership of the SDGs

6.2.1 Production of voluntary national reviews

The countries produce voluntary national reviews (VNRs) as part of the monitoring and review of the 2030 Development Agenda (Agenda 2030). Preparation of the VNRs by the countries is governed by a manual[12] which sets out the different steps to be followed. These VNRs make it possible to monitor the progress made by countries in their Agenda 2030 implementation and in the challenges and lessons that emerge from it. Emphasis will be put on (1) monitoring the contribution of forests to the SDGs through the analysis of national voluntary reports produced in 2019 and/or 2020 and (2) ongoing subregional efforts and initiatives to address the challenges encountered.

6.2.2 Mainstreaming forest contribution into the national voluntary reports on SDG monitoring

The Central African countries have undertaken to mainstream the SDGs into their national agendas.[13] The approach adopted by these countries is very often inspired by the guidelines circulated by the UNDP (2016) for mainstreaming Agenda 2030. Three main outcomes are expected from this approach: analysis of how to put the SDGs into context, the prioritized targets and indicators, and the resource mobilization strategy for the implementation of Agenda 2030. The targets and indicators from the prioritized SDGs guide national SDG ownership efforts to integrate them into global and sectoral strategies. They also act to monitor the progress made towards achieving the SDGs and to prepare the national voluntary reports.[14]

The forest-related indicators are an integral part of nationally prioritized SDG targets and indicators. To this effect, review of the mainstreaming of forest contribution will focus on the national voluntary reports of the following seven Central African countries[15]: Burundi, Cameroon, Congo, Rwanda, DRC, CAR and Chad.

It should be kept in mind that each country chooses its own targets according to its priorities and their relevance to the achievement of the SDGs. For example, Cameroon has selected 153 targets and 52 priority targets to reduce poverty, catch up in the Millennium Development Goals (MDGs) and improve the resilience of its population. In the DRC, the awareness and outreach process targeting stakeholders has helped the country's commitment to achieving the 17 SDGs take on concrete shape and led to the selection of 38 priority targets and 59 indicators. Congo adopted 14 objectives, 74 targets and 113 indicators. The CAR has prioritized 37 targets and 245 indicators, and Chad has prioritized 70 out of the 169 targets identified. It should be noted that the national reports of the Central African countries have focused more on progress in monitoring the achievement of SDG 15 and secondarily on SDG 13.

Alignment of the SDGs with national agendas provides an overview of the forest-sector contribution, which very often remains focused on the natural characteristics of the forest. This approach hides

12 See: https://sdgs.un.org/sites/default/files/documents/20872VNR_hanbook_2019_Edition_v4.pdf

13 Under UN General Assembly Resolution 70/1 of 25 September 2015, paragraph 55.

14 These reports are presented to the High-Level Political Forum of the United Nations Economic and Social Council.

15 The national voluntary reports of the countries not mentioned (Gabon, Equatorial Guinea, and Sao Tome and Principe) had not yet been published on the United Nations website at the time of writing of this chapter.

the many benefits that other sectors derive from sustainable forest management without bearing the costs. In fact, in the national reports that have been analysed, the multiple strengths and potentialities of forests are not sufficiently highlighted when monitoring achievement of the SDGs. Indeed, the countries of the subregion are making huge efforts in the conservation and sustainable management of their forests. These efforts should be capitalized so that they contribute to the achievement of most of the targets and indicators of all the SDGs. This capitalization should focus on taking into account the efforts made by these countries, particularly in achieving the following goals: combating poverty (SDG 1); combating hunger and food security (SDG 2); gender equality (SDG 5); clean water and sanitation (SDG 6); decent work and economic growth (SDG 8); and peace, justice and strong institutions (SDG 16). The positive externalities of forest management are as important as the health of the forest.

At the subregional level, OFAC is currently compiling information to monitor the implementation of the COMIFAC Convergence Plan.

6.3 Options to enhance the monitoring of forest contribution to the SDGs in Central Africa

6.3.1 Towards subregional guidelines for monitoring forest contribution to the SDGs

The synergies between the SDGs and the COMIFAC Convergence Plan clearly show that forests contribute to achieving most of the SDGs by providing various social, economic and environmental benefits. If we focus primarily on SDG 15 indicators and somewhat on SDG 13 (as can be seen in the targets and indicators prioritized by countries), we gain only a partial picture of the range of the forest contributions to the SDGs. In fact, a sector as important as the forests of the Congo Basin contributes to resolving a wide range of development problems and, in turn, contributes to several SDGs. It is against this backdrop that COMIFAC has initiated an inclusive process to develop subregional guidelines to monitor forest contribution to the SDGs. This process, which FAO is facilitating with technical assistance,[16] has shed new light on forests and their contribution to the SDGs. It has also made it possible to provide Central African countries with guidance on how to achieve harmonious tracking and reporting on 31 targets of the prioritized SDGs.

The Subregional Guidelines[17] are formed by 5 principles, 12 guidelines and the priority action areas associated with them. The principles are derived from the four areas of action common to the Convergence Plan and the SDGs: forest governance, inclusive and responsible economic growth, sustainable livelihoods of forest-dependent populations, and the biophysical results of forest management and its externalities. Figure 6.1 presents the four areas of action common to the SDGs and the priority action areas concerned.

16 http://www.fao.org/3/ca9261fr/CA9261FR.pdf (consulted on 14/06/21).

17 These Guidelines were reviewed and approved during a subregional workshop held in Libreville on 26 and 27 November 2019. They will be submitted to the COMIFAC Council of Ministers for adoption.

The first draft of the Guidelines was reviewed and approved from a technical angle during a subregional workshop held in November 2019 in Libreville, Gabon. These Guidelines will be submitted for adoption by the COMIFAC Council of Ministers, prior to the launch of outreach activities and support for country ownership.

To facilitate the implementation of these Guidelines, a set of indicators has been identified as a directory of "thematic actions" associated with each indicator. With these new Guidelines, countries will be better equipped to fill the above-mentioned reporting gaps and to monitor progress towards achieving the SDGs, particularly with regard to forest contribution. A better assessment of the contribution of forests to the SDGs will provide policymakers, technical and financial partners, and the general public with new insights into the value and importance of Central African forests to the SDGs.

The Subregional Guidelines can also be used for awareness-raising, ownership and mainstreaming of "forest-based solutions" into sectoral policies and programmes on water, energy, food, employment, poverty alleviation and other issues. For example, by highlighting, SDG 6 target 6 on the protection and restoration of water-related ecosystems, the Subregional Guidelines draw attention to the role of forests as a regulator of fresh water and also as an alternative to the "grey infrastructure" on which countries are still heavily dependent. Moreover, by prioritizing targets 7.1 and 7.2 of SDG 7, the Subregional Guidelines also highlight the solutions that forests can provide in the energy transition.

The alignment of these Guidelines with the global objectives on forests of the United Nations Strategic Plan for Forests (2017–2030) can serve as a harmonized framework for the monitoring of the contribution of Central African countries to these global objectives and of forest contribution to the SDGs.

Finally, taking into account the wide range of forest functions, as set out in the Subregional Guidelines for monitoring the SDGs, also offers an opportunity to explore and consider emerging issues such as internationalizing the concept of "nature-based solutions."

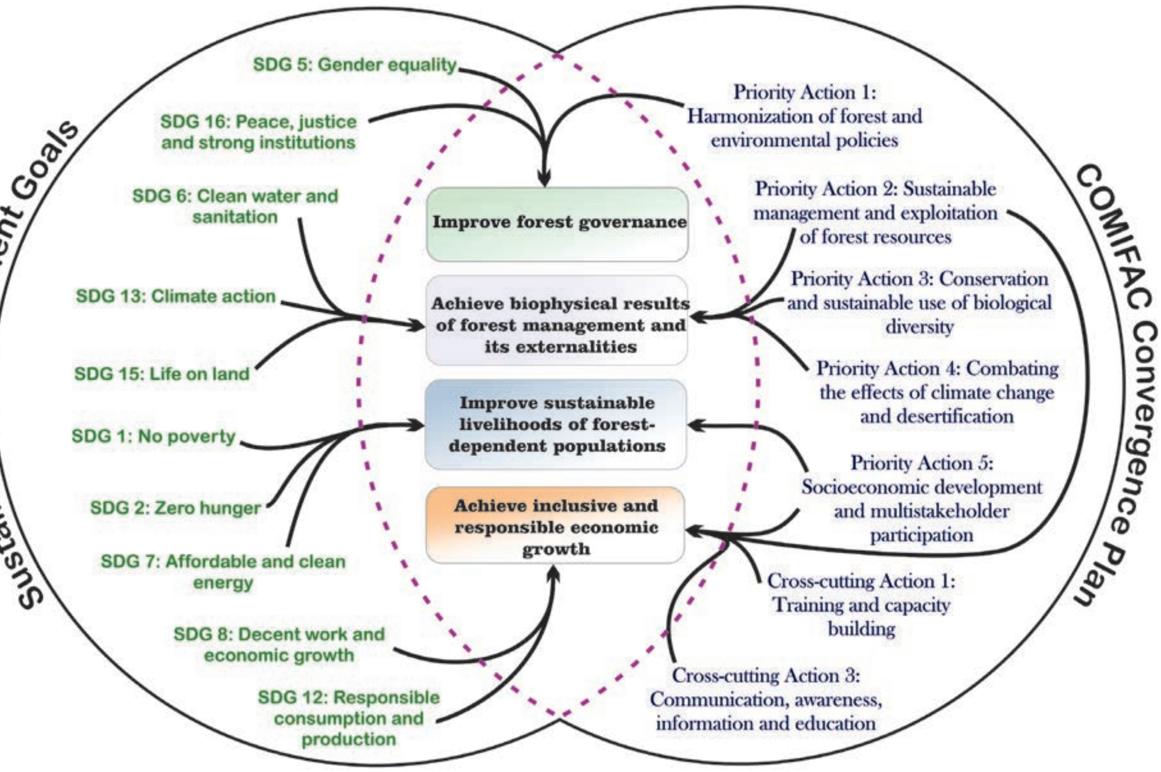

Figure 6.1: Fields of action common to the Convergence Plan and the SDGs

6.3.2 Facilitating enhanced monitoring of the forest contribution to the SDGs

Ownership of the SDG themes makes it possible to monitor the forest contribution from the various angles, such as economic, social and environmental. However, in doing so, various types of barriers are encountered: insufficient coordination between sectors, administrative red tape that hampers periodic review of public policies, and weak statistics systems, etc.

a) Insufficient coordination between sectors

Forests affect a number of other sectors and vice versa, in particular agriculture, energy, infrastructure and extractive industries (Pouakouyou and Mayers 2015; Buttoud and Nguinguiri 2016). Stakeholder involvement in forest management is a recurrent concern in forestry. Coordination among stakeholders in different sectors is crucial.

Lack of coordination between sectors thus appears to be a major obstacle to proper monitoring of forest contribution to the SDGs in Central Africa. Some countries in the subregion are trying to find solutions to this problem by setting up bodies to promote coordination between sectors. One

Table 6.1: Principles and guidelines for reporting the forest contribution to the SDGs in Central African countries

Principles	Reporting guidelines
Principle 1: Availability of sufficient good-quality, up-to-date and accessible statistical data that meet SDG monitoring needs	*Guideline 1*: Consistency, reliability and credibility of the national statistics system
	Guideline 2: Adaptation of the institutional framework for forest statistics management to new demands, including the monitoring of forest contribution to the SDGs
Principle 2: Biophysical results of sustainable forest management	*Guideline 3*: Highlighting the role of forests in maintaining water quality and watercourse systems as part of monitoring SDG 6
	Guideline 4: Outreach on climate change mitigation and adaptation efforts and their impact on reducing greenhouse gas emissions and on strengthening the resilience of forest-dependent populations as part of the follow-up to SDG 13
	Guideline 5: Highlighting the biophysical results of sustainable forest management, biodiversity conservation, and the fight against desertification and land degradation in national SDG 15 monitoring reports
Principle 3: Sustainable livelihoods of forest-dependent populations	*Guideline 6*: Highlighting the forest contribution to the eradication of poverty, especially among local and indigenous communities, within the framework of monitoring SDG 1
	Guideline 7: Highlighting the role of forest-derived foods in ensuring food security and in improving nutrition within the framework of monitoring SDG 2
	Guideline 8: Quantifying and disseminating the results of efforts to make woodfuel clean and renewable, within the framework of monitoring SDG 7
Principle 4: More inclusive and responsible economic growth	*Guideline 9*: Assessing and disseminating the impact of measures taken to promote decent employment in the forest sector within the framework of monitoring SDG 8
	Guideline 10: Highlighting the impact of actions taken to improve productive use of forest resources, within the framework of monitoring SDG 12
Principle 5: Forest governance	*Guideline 11*: The values system based on ethics, equity and social justice that underpins forest governance should be periodically evaluated, and these results should be highlighted in monitoring SDG 16.
	Guideline 12: Efforts to make forest policies and programmes gender-responsive should be made as part of monitoring SDG 5.

example is the Congolese Observatory for Sustainable Development (OCDD) in the DRC. It was created within the Ministry of Planning and is working towards an inclusive process of ownership, implementation and monitoring of the SDGs.

b) Insufficient mainstreaming of forest multifunctionality

A silo approach is unsuitable for the multifunctional nature of forests. Responses by individual sectors to forest degradation or biodiversity loss have shown their limitations. It is largely because of pressures from other sectors of activity that forests are threatened by degradation and deforestation in Central Africa (Tchatchou et al. 2015). From this angle, enhancing the monitoring of forest contribution to the SDGs cannot be done in isolation by forest-sector stakeholders alone. It is thus clear that work with other sectors on joint projects is necessary.

There are several issues raised in the COMIFAC Subregional Guidelines that should not be addressed from a forestry perspective alone. For example, woodfuel is the main source of energy for 90 percent of Kinshasa's population (Schure et al. 2013), and responses to woodfuel supply problems should not be compartmentalized into activities by individual sectors. Rather, these problems should be addressed as an integral part of a coordinated energy policy that takes into account the main players in the biomass energy sector.

c) Lack of an adaptive management culture

In the countries of the subregion, most of the public administrations involved in development sectors (agriculture, forestry, fisheries, livestock, economy, etc.) use traditional management approaches rather than ones that are more flexible and that adapt to various circumstances (e.g., results-based management, ecosystem approach, nature-based solutions). Moreover, these countries lack an organizational culture in which periodic review of policies and strategies is carried out so that they can be updated and adapted to new situations and requirements. It is highly likely that the targets prioritized by Central African countries in their voluntary national reports will not be revised by their 2030 deadline, as is the case of several of their forest and environmental policies.

Box 6.2: Monitoring SDG implementation in the DRC

Since 2016, the DRC has been implementing Agenda 2030 via a participatory, transparent and in-depth approach at the provincial, national, regional and international levels.

The creation of the Congolese Observatory for Sustainable Development (OCDD) within the Ministry of Planning has enabled not only ownership, but also steering and monitoring of the Agenda 2030 SDGs. For this reason, the awareness-raising and dissemination process targeting all stakeholders was launched in 2016, with 38 priority targets and 59 priority indicators from among 105 targets and 159 indicators.

The DRC's VNR report assessed the progress made in achieving the SDGs and the impact of the policies and strategies that had been implemented. However, this report did not address the details of each sector's contribution to achieving the SDGs nationally. Indeed, the report on the forest sector did not present specific data on forest contribution to the SDGs in the DRC.

d) Weaknesses in statistics systems

To implement the Subregional Guidelines to monitor forest contribution to the SDGs, reliable data is required to establish baselines for the identified indicators and to report on progress made in reaching the priority targets. However, in the Central African countries, national statistics systems lack sufficient capacity to produce forest data that are timely, systematic, accurate, relevant and comparable. Lack of reliable data is one of the risks of failure in SDG implementation, as pointed out in the Africa Sustainable Development Report (2017).[18] In nearly all the countries of the subregion, national statistics institutes face a shortage of financial and human resources. Given this situation, the task of monitoring the SDGs seems out of proportion compared to their capacities (Roca and Letouzé 2016). These difficulties can be explained primarily by differences in methodologies, lack of coordination within the national statistics system, lack of funding and human resources, inadequate infrastructure and somewhat of a lag in data technology (CEA et al. 2017).

Several countries in the subregion recognize that it is urgent to meet the growing need for harmonized and good-quality data for monitoring the SDGs and the African Union's Agenda 2063. Chad, for example, in its 2019 VNR report on SDG implementation, announced launch of reforms to enhance statistics production. In Cameroon, meanwhile, work is under way to develop the third generation of its National Strategy for the Development of Statistics.

6.3.3 Recommendations for enhancing the monitoring of forest contribution to the SDGs

a) Strengthen capacities of national statistics units

The units in charge of statistics in the countries of the subregion face both a shortage of suitable work equipment for analysing and processing statistical data and a lack of qualified personnel to produce reliable statistical data, this despite the existence of several large statistical training schools in the subregion. To deal with this situation, functional and operational capacity building for the countries' statistics units is a prerequisite, as is capacity building (1) for the staff of those units, for mastering the tools, software, approaches and techniques currently in use for data collection, analysis and processing; and (2) for identification and coding of indicators and targets related to the SDGs. These two types of capacity building for national statistics units are needed to enable the countries in the subregion to produce reliable statistical data and to facilitate the monitoring of the contribution of forests and other development sectors to the SDGs.

b) Strengthen the countries' capacity to implement the Subregional Guidelines for monitoring forest contribution to the SDGs

The disparities observed in the voluntary national reports of the countries analysed in this research have highlighted the shortcomings in identification of indicators and targets and in reporting on the contribution of forests and other development sectors to the SDGs. These shortcomings justify the need in the countries of the subregion for capacity building in proper use of the Subregional Guidelines for monitoring forest contribution to the SDGs. This capacity-building work can be carried out once the Subregional Guidelines are adopted by the COMIFAC Council of Ministers.

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18 A joint publication of the African Union, the Economic Commission for Africa, the African Development Bank and the United Nations Development Programme.

c) Improve institutional coordination

Because forest-related SDGs cut across several development sectors that fall under the responsibility of several government ministries, the production of voluntary national reports on forest contribution to the SDGs requires good coordination between the different sectors involved. Coordination via the establishment of an inter-sector platform will allow contribution by the various sectors to the SDGs to be better taken into account in the national reports. Such a platform can be facilitated by a government ministry in charge of planning or development issues. Lack of good institutional coordination leads to the production of national reports that do not necessarily reflect all the contributions of the different sectors to the SDGs. Furthermore, institutional coordination will make it possible to better harmonize approaches to data collection, analysis and monitoring of forest contribution to the SDGs in national reports and thereby facilitate comparisons between countries. To achieve this, strategic policy guidelines for sectoral ministries are crucial for guiding the choices of the ministries in charge of institutional coordination, so that they will not be challenged by other ministries.

d) Strengthen the capacities in the assessment of forest ecosystem services, among technical staff in the ministries responsible for forests and the environment

The sectoral ministries in charge of forests and the environment in the countries of the subregion lack expertise in assessing forest ecosystem services. However, this expertise is essential for assessing the range of the contributions of forests and their ecosystem services to the SDGs. Capacity building in this area of expertise will equip the technical staff of these ministries to better assess forest contributions to the SDGs in Central Africa and to produce national reports that will better reflect these contributions.

e) Strengthen the capacities of OFAC

OFAC is already compiling information to help monitor the implementation of the COMIFAC Convergence Plan. It would be useful to strengthen OFAC's capacities so that it can process data on the SDGs in addition to the data which the countries are collecting to inform the indicators of the COMIFAC Convergence Plan that OFAC is already processing.

Conclusions

Our research shows that the COMIFAC Convergence Plan can serve as a frame of reference for assessing the contribution of Central African forests to the SDGs. It highlights fields of action common between the Convergence Plan and the SDGs.

The exercise of aligning the COMIFAC Convergence Plan with the SDGs has once again highlighted the multiple functions performed by the forests of the Congo Basin and the many services they provide to humans and the planet.

Our research also shows that the range of forest contributions to the SDGs has not been sufficiently understood or reflected in the voluntary national reports produced by the countries of the subregion. Indeed, few of the countries provided detailed information on forest contribution to the SDGs, and the national voluntary reports which were analysed did not highlight forest contribution to SDGs other than SDG 15 and SDG 13. In fact, nearly all the countries tracked forest contribution only to these 2 SDGs out of the 10 prioritized SDGs.

The multifunctional approach employed by COMIFAC in monitoring forest contribution to the SDGs goes beyond just an environmental function. This approach pays as much attention to the economic and social functions of forests as to their environmental function. The multifunctional approach should be used more, in order to identify the range of services that forest ecosystems provide to achieve the SDGs.

Our research also explored options for enhancing the monitoring of forest contribution to the SDGs and has made recommendations for improving the monitoring of forest contribution.

As for future prospects, the production of the Subregional Guidelines for monitoring forest contribution to the SDGs in the COMIFAC countries is a significant step towards improving the reporting of forest contribution to the SDGs. Once these Guidelines are adopted by the COMIFAC Council of Ministers, they can be adopted internally by the countries. To this end, the capacities of the countries of the subregion should be strengthened, in order to help them obtain better ownership and implementation of the principles, guidelines and priority actions needed to improve their reporting on the SDGs and on forest contributions to the latter.

Annex

Annex 6.1: Subregional package of prioritized targets to enhance forest contribution to the SDGs

SDGs	TARGETS
SDG 1. No poverty	1.1 By 2030, completely eradicate extreme poverty for all people everywhere.
	1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance.
SDG 2. Zero hunger	2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.
	2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.
	2.5 By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed.
SDG 5. Gender equality	5.5 Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life.
	5.a. Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws.
SDG 6. Clean water and sanitation	6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.
SDG 7. Clean and affordable energy	7.1 By 2030, ensure access to affordable, reliable, sustainable and modern energy for all.
	7.2 By 2030, increase substantially the share of renewable energy in the global energy mix.
SDG 8. Decent work and economic growth	8.3 Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services.
	8.7 Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms.
	8.9 By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products.
SDG 12. **Responsible consumption and production**	12.2 By 2030, achieve sustainable management and efficient use of natural resources.
	12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.
	12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities.

SDGs	TARGETS
SDG 13. Measures to combat climate change	13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.
	13.2 Integrate climate change measures into national policies, strategies and planning.
	13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.
SDG 15. Life on earth	15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.
	15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.
	15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.
	15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.
	15.6 Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed.
	15.7 Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products.
	15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species.
	15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts.
	15.a Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems.
SDG 16. Peace, justice and strong institutions	16.5 Substantially reduce corruption and bribery in all their forms.
	16.7 Ensure responsive, inclusive, participatory and representative decision-making at all levels.
	16.b Promote and enforce non-discriminatory laws and policies for sustainable development.

CHAPTER 7

Central African countries' international commitments on climate change

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Photo by Olivier Girard/CIFOR

Introduction

> **Article 4 of the United Nations Framework Convention on Climate Change (UNFCCC) sets out the main commitments of the Parties, "taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances". As Central African countries work to revise their Nationally Determined Contributions (NDCs) under the Paris Agreement and strengthen their efforts to meet their international climate change commitments, it is important that we take stock of the current situation.**

This chapter presents all these commitments and provides an overview of how well Central African countries have upheld their commitments under the UNFCCC and on combating climate change more generally. These commitments include binding commitments (e.g. National Communications, Biennial Update Reports (BURs) and NDCs) on the one hand and voluntary commitments on the other (e.g. National Action Plans for Adaptation to Climate Change (NAPAs), REDD+, Nationally Appropriate Mitigation Actions (NAMAs), Forest Carbon Partnership Facility (FCPF), UN-REDD, Central African Forest Initiative (CAFI), AFR100 Initiative, Forest Law Enforcement, Governance and Trade (FLEGT), Forest Investment Programme (FIP), and high forest/low deforestation (HLFD)). We will conclude by identifying lessons learned and the outlook for these commitments.

7.1 Binding commitments within the framework of the UNFCCC

7.1.1 Obligations under the UNFCCC

National Communications and Biennial Update Reports

Under Article 4 of the UNFCCC, National Communications from countries must provide up-to-date information on:

- Greenhouse gas inventories;
- Adaptation;
- Mitigation measures and their effects;
- Challenges and gaps;
- Support needed and received, as well as other information relevant to the achievement of the Convention's objectives.

Article 12 of the UNFCCC provides that developing country parties to the UNFCCC must submit their first communications within three years of the entry into force of the Convention for them or of the availability of financial resources. In 2010, the 16th Conference of the Parties (COP16) determined that National Communications must be submitted every four years in line with the revised guide on preparing the National Communications of non-Annex I Parties. Biennial Update Reports must be submitted every 2 years and must update the information provided in the National Communications, in particular with regard to national greenhouse gas inventories, mitigation actions, challenges and gaps, including support required and received, based on the biennial update reporting guidelines.

The main obligation of Central African countries not listed under Annex I to the UNFCCC is to submit a National Communication. Below, we examine the extent to which each country has fulfilled this obligation.

Figure 7.1 shows that all Central African countries have submitted their first National Communication and that the majority of countries did so on average 5 years after the UNFCCC entered into force for them. A second National Communication was submitted by nine out of the ten countries, an average of 9 years after the submission of their first communication. Four countries (Burundi, Rwanda, the Democratic Republic of the Congo (DRC) and Sao Tome and Principe) have already submitted their third National Communication, on average 6 years after the submission of their second. Therefore, every Central African country party to the UNFCCC except Equatorial Guinea has submitted at least two National Communications. There is a large gap, of close to a decade, between the submission of countries' first and second communications, mainly due to administrative delays and a lack of technical capacity. The gap between the submission of their second and third National Communications is, however, shorter, because teams have become more familiar with the guidelines and technical capacity has improved over time.

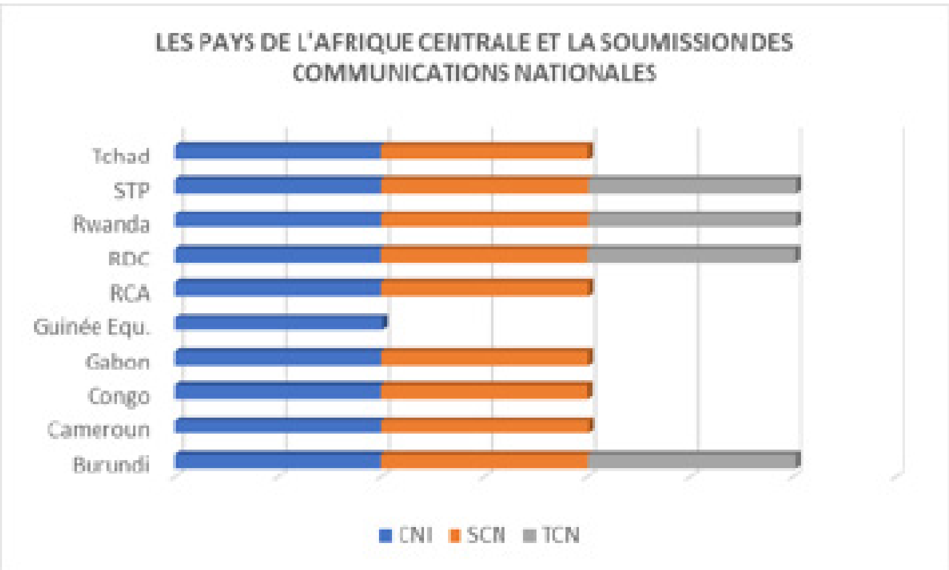

Figure 7.1: Submission of National Communications by Central African countries

Legend: CNI: First National Communication; SCN: Second National Communication; TCN: Third National Communication

Even so, Central African countries are lagging behind. To date, 85 non-Annex 1 Parties have submitted their third National Communication, 12 have submitted their fourth and one has submitted its sixth.

Table 7.1 details the date that each Central African country reached each UNFCCC National Communication milestone.

Only Rwanda has submitted a Biennial Update Report to date, even though – according to the decisions adopted at the 17th Conference of the Parties (COP17) held in 2011 – the first reports were expected by 31 December 2014. This deadline is, naturally, dependent on national capacity and how much support countries have been provided to prepare the reports. Globally, 64 non-Annex 1 Parties have submitted their first Biennial Update Report and 5 have submitted their fourth.

Table 7.1: National Communications and Biennial Update Reports under the UNFCCC: Status of Central African countries' submissions

No.	Country	Date of ratification	Years National Communications submitted	Year Biennial Update Report submitted
1	Burundi	1997	First: 2001 Second: 2010 Third: 2019	0
2	Cameroon	1994	First: 2005 Second: 2016 Third:	0
3	Republic of the Congo	1996	First: 2001 Second: 2009 Third:	0
4	Gabon	1998	First: 2004 Second: 2011	0
5	Equatorial Guinea	2000	First: 2019 Second: Third:	0
6	Central African Republic	1995	First: 2003 Second: 2015 Third:	0
7	DRC	1995	First: 2000 Second: 2009 Third: 2015	0
8	Rwanda	1998	First: 2005 Second: 2012 Third: 2018	December 2021
9	Sao Tome and Principe	1999	First: 2005 Second: 2012 Third: 2019	0
10	Chad	1993	First: 2001 Second: 2012 Third: The process has started, but has been marred by irregularities that remain to be resolved.	The process has started, but has been marred by irregularities that remain to be resolved.

Source: Data compiled from countries' first, second and third National Communications.

Nationally Determined Contributions (NDCs)

At COP17 (Durban, South Africa), the Parties to the UNFCCC recognized the need for all countries to take urgent action to address the serious and potentially irreversible threat of climate change. Following COP17, steps were taken to prepare a post-2020 agreement under the Convention, another legal instrument or legally-binding text agreed by and applicable to all parties, as described in Decision 1/CP.17 and recommended by the Intergovernmental Panel on Climate Change (IPCC), to keep the increase in global average temperature below 2°C or 1.5°C above pre-industrial levels. In this spirit, 2 years later at COP19 (Warsaw, Poland) the Parties were invited to begin or step up the preparation of their Intended Nationally Determined Contributions. These contributions were then communicated the day before COP21, held in Paris, and would become the Nationally Determined Contributions (NDCs) of each party to the Paris Agreement once they had deposited their ratification instrument.

All Central African countries submitted their first NDCs under the Paris Agreement in accordance with this process (see Table 7.2). A regional plan of action for the implementation of the Paris Agreement was prepared by COMIFAC and approved by an extraordinary session of its Council of Ministers in May 2016. Unfortunately, this plan has not yet been implemented.

Table 7.2: Summary of Nationally Determined Contributions submitted by Central African countries in 2015 and date of submission of updates

No.	Country	Emissions reduction commitment (percentage by 2030)	Mitigation (focus and priority sectors)	Adaptation (focus and priority sectors)	Outlook, specific measures	Date of submission of improved versions of first NDCs
1	Burundi	Between 3 percent (unconditional reduction) and 20 percent (conditional reduction)	Energy, forestry, agriculture, technology transfer	Water, energy, forestry, agriculture, livestock	Continuation of the traditional development model, greener measures subject to external assistance, valuation of ecosystem services, request for compensation	5 October 2021
2	Cameroon	32 percent (by 2035) subject to international funding	Sectoral policies (forestry, agriculture, energy), technology transfer, agriculture, fisheries, forestry, energy, waste	National resilience plan (agriculture, livestock, fisheries, land use, energy, industry, forestry, water, health, social)	Continuation of the traditional development model, greener measures subject to external assistance, reducing carbon footprint without slowing down economic growth	11 October 2021

Continued on the next page

Table 7.2: continued

No.	Country	Emissions reduction commitment (percentage by 2030)	Mitigation (focus and priority sectors)	Adaptation (focus and priority sectors)	Outlook, specific measures	Date of submission of improved versions of first NDCs
3	Republic of the Congo	Between 48 percent (by 2025) and 55 percent (by 2035) with conditions	Energy, industrial processes and waste treatment, mining and cement production, agriculture and livestock, forestry and land use	Risk management, protection of assets and production systems, technology transfer	Continuation of the traditional development model, greener measures subject to external assistance. Must not jeopardize socioeconomic development, "green economy"	2 August 2021
4	Gabon	Between 50 percent (by 2025) and 65 percent	Improving the energy efficiency of the economy, controlling emissions within the context of development	National strategy focused on coastal areas	Continuation of the traditional development model, greener measures subject to external assistance	Not yet submitted
5	Equatorial Guinea	Between 20 percent (unconditional reduction) and 50 percent (conditional reduction)	Forestry, agriculture, land use, waste, energy, transport	National plan targeting planning policies and processes, risk reduction, technical capacity building	Continuation of the traditional development model, greener measures subject to external assistance, "green economy", economic diversification, REDD+	Not yet submitted
6	CAR	Between 5 percent (by 2030) and 25 percent (by 2050) with conditions	Reducing vulnerability and increasing resilience and sustainable management (agriculture, livestock, forestry, land use, natural resources, waste, planning, health)	Agriculture, health, infrastructure, forestry, energy, natural resources, waste, water	Continuation of the traditional development model, greener measures subject to external assistance (low-carbon development)	24 January 2022
7	DRC	17 percent (conditional reduction)	Agriculture, forestry, energy	National programme of action to secure livelihoods, rational resource management, coastal zones	Continuation of the traditional development model, greener measures subject to external assistance	28 December 2021
8	Rwanda		Reducing emissions with external assistance. Renewable energy, transport, industry, waste, forestry	Reducing vulnerability and increasing resilience and sustainable management. Agriculture, forestry, tourism, water, land use	Continuation of the traditional development model, greener measures subject to external assistance: green growth, low-carbon economy, green industries	20 May 2020

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Table 7.2: continued

No.	Country	Emissions reduction commitment (percentage by 2030)	Mitigation (focus and priority sectors)	Adaptation (focus and priority sectors)	Outlook, specific measures	Date of submission of improved versions of first NDCs
9	Sao Tome and Principe	24 percent with external assistance	Renewable energy, all sectors of the economy	Reducing vulnerability and fragility and achieving resilient development. Agriculture, livestock, forestry, soil, water, energy, coasts, health, education	Continuation of the traditional development model, greener measures subject to external assistance. Carbon market	30 July 2021
10	Chad	Between 18.2 percent (unconditional reduction) and 71 percent (conditional reduction)	Technology transfer. Energy, agriculture, livestock, land use, forestry, waste.	National plan targeting priority areas and vulnerable sectors (water, agriculture, agroforestry, livestock and fisheries)	Continuation of the traditional development model, greener measures subject to external assistance. Technical needs and recourse to the Clean Development Mechanism (CDM) and REDD+	19 October 2021

Source: https://www4.unfccc.int/sites/NDCStaging/Pages/All.aspx

Altogether Central African countries' commitments shown in Table 7.2 should deliver a reduction of 455.4 $MtCO_2e$ (conditional and unconditional) and represent funding needs of USD 117,882 billion for the commitment period to 2030 in most cases (Fobissie et al. 2016; Eba'a et al. 2018). A recent study has shown that the implementation of these commitments requires greater coordination between sectors within countries (Eba'a et al. 2018).

Under Article 4(2) and (9) of the Paris Agreement, the Parties must submit an NDC every five years. Countries' commitments and their progress towards achieving their NDCs should grow in ambition. Five years after the adoption and ratification of the Paris Agreement by all Central African countries, they embarked on the process of revising their NDCs or preparing new ones for submission to the UNFCCC Secretariat by the end of July 2021. Rwanda and Sao Tome and Principe met this deadline. In March 2022, the UNFCCC website showed that eight countries had submitted an updated NDC (see Table 7.2). Gabon and Equatorial Guinea had not yet done so. These updated NDCs were submitted in preparation for COP26 in Glasgow, Scotland. These commitments will need to be monitored closely and a new regional plan of action for the implementation of the Paris Agreement in Central Africa should be drawn up following the submission of the revised or updated NDCs.

7.1.2 Voluntary commitments within the framework of the UNFCCC

Adaptation-related commitments (NAPAs and NAPs)

In accordance with Article 4.9 of the UNFCCC, the Conference of the Parties (COP) drew up a programme of work in 2001 to support least developed countries (LDCs) to respond to the challenges climate change poses for them due to their vulnerability. This programme of work incorporates, among other things, countries' National Action Plans for Adaptation to Climate Change (NAPAs), which seek to identify the urgent and immediate needs of LDCs for adapting to current climate change-related threats. To meet these needs, these countries aim to increase their resilience and their capacity to adapt to climate vulnerability, current extreme climate events and future climate change.

In 2010, the National Adaptation Plan (NAP) process was launched under the Cancun Adaptation Framework, adopted at COP16. This process was intended to support the transition from one-off project-based interventions focused on short-term needs to more strategic approaches. It aimed to help countries put adaptation at the heart of their decision-making around development to ensure it would not be treated as an isolated environmental issue.

The Central African LDCs engaged willingly in the voluntary process of drawing up NAPAs (see Table 7.3). All countries in the subregion also recognized the need to prepare NAPs, to identify and respond to medium and long-term adaptation needs.

The NAPAs and NAPs assessed COMIFAC member countries' level of vulnerability for each climate-sensitive sector and resource. Priority activities were identified to enable each country to improve its resilience. In LDCs, NAPAs act as a focal point for the preparation of NAPs. This process is already under way in some countries, such as CAR. Cameroon, on the other hand, which is not an LDC, submitted its NAP directly. Six of the ten Central African LDCs (Burundi, Rwanda, CAR, DRC, Sao Tome and Principe, and Chad) have upheld their commitments and submitted NAPAs to the UNFCCC. These documents outline their urgent and immediate needs, which, if addressed, will enable them to respond to climate change. Equatorial Guinea has also drawn up a NAPA. Three countries (Cameroon, CAR and Chad) have a National Adaptation Plan (NAP), of which two (CAR and Chad) had first drawn up a NAPA. Gabon and the Republic of the Congo, however, have not yet submitted their NAPs to the UNFCCC.

To support countries to access climate finance, as part of its Readiness scheme, the Green Climate Fund has made a funding envelope of USD 3 million available to each developing country to help them prepare their NAPs. COMIFAC has worked with some countries in the subregion, including CAR and Equatorial Guinea, to prepare project documents for the mobilization of these funds. It would be worth examining how much funding has been mobilized for NAPs and the challenges countries face in this regard.

Table 7.3: Policy documents on adaptation under the UNFCCC: Status of Central African countries' submissions

No.	Country	Year National Action Plan for Adaptation (NAPA) submitted	Year National Adaptation Plan (NAP) submitted	Number of priority projects submitted under the NAPA and budgets	Support under the NAP
1	Burundi	February 2007	-	12 projects Urgent and immediate needs estimated at USD 7,294,000 when the NAPA was submitted in February 2007	
2	Cameroon	Non-least developed country (non-LDC)	26 October 2015		Needs for five cross-cutting projects estimated at USD 21,547,140, 15 sectoral projects at USD 100,931,340.
3	Republic of the Congo	Non-LDC	-		
4	Gabon	Non-LDC	-		
5	Equatorial Guinea	January 2013	-	Urgent and immediate needs estimated at USD 76,934 when the NAPA was submitted in January 2013	
6	CAR	June 2008	February 2022	Ten projects Urgent and immediate needs estimated at USD 3,000,000 when the NAPA was submitted in June 2008	Five projects in the first adaptation plan, not budgeted
7	DRC	September 2006	-	Three projects Urgent and immediate needs estimated at USD 16,475,654 when the NAPA was submitted in September 2006	
8	Rwanda	May 2007	-	Seven projects Urgent and immediate needs estimated at USD 8,110,000 when the NAPA was submitted in May 2007	
9	Sao Tome and Principe	November 2007	-	22 projects Urgent and immediate needs estimated at USD 11,239,500 when the NAPA was submitted in November 2007	
10	Chad	February 2010	October 2021, date of submission of Chad's first NAP	Ten projects with needs of USD 14,000,000 when the NAPA was submitted in February 2010	

Sources: https://unfccc.int/files/cooperation_support/least_developed_countries_portal/napa_project_database/application/pdf/napa_index_by_country.pdf
https://www4.unfccc.int/sites/NAPC/Pages/national-adaptation-plans.aspx

Mitigation-related commitments (NAMAs and REDD+)

While developing countries were not required to reduce their emissions under the Kyoto Protocol, the Bali Action Plan, adopted at COP13 in 2007, marked a decisive turning point. It invited developing countries to engage in sector-specific emissions reduction efforts and pledged substantial support to those who committed to do so. These provisions were strengthened and clarified at COP15, 16 and 17.

Nationally appropriate mitigation actions (NAMAs) are measures implemented by developing country governments to reduce their emissions. They are submitted to the UNFCCC, as described in Decision 1/CP.16, paragraph 50, and aim to help countries transition from the traditional high-emissions model to a low-carbon model.

Pursuant to Decision 4/CP.15, countries must prepare four key documents to ensure their readiness for the REDD+ process: a national forest monitoring system (FMS); a forest reference (emission) level (FREL/FRL); safeguards and a safeguards information system (SIS); and national strategies and/or action plans for REDD+. Countries may also deliver a communication plan for their REDD+ activities. Table 7.4 shows the progress countries have made on their commitments in this regard (data collection: 2021).

Table 7.4: Climate change mitigation: Central African countries' response

No.	Country	Nationally Appropriate Mitigation Actions (NAMAs) (documents submitted to the UNFCCC)	REDD+ (four documents and date) https://redd.unfccc.int/fact-sheets/forest-reference-emission-levels.html (countries that have submitted a forest reference (emission) level (FREL))					Comments
			National strategy or action plan, year submitted	NFM inc. monitoring, reporting and verification	FREL/FRL year	Safeguards information system (SIS)	Communication strategy and plan	https://redd.unfccc.int/fact-sheets/unfccc-documents-relevant-for-redd.html
1	Burundi		2019					
2	Cameroon	8 June 2010[a]	2018	2014	2018	2020	2016	National reference emissions level to be established. Not yet submitted to the UNFCCC https://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/cameroon_cphaccordapp2.pdf
3	Republic of the Congo	3 February 2010[b]	2018	2016	2016		2013	http://cog.registreredd.org/outils-REDD/SIS-Redd?l=fr https://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/congocphaccord.pdf

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Table 7.4 : Continued

No.	Country	Nationally Appropriate Mitigation Actions (NAMAs) (documents submitted to the UNFCCC)	REDD+ (four documents and date) https://redd.unfccc.int/fact-sheets/forest-reference-emission-levels.html (countries that have submitted a forest reference (emission) level (FREL))					Comments
			National strategy or action plan, year submitted	NFM inc. monitoring, reporting and verification	FREL/FRL year	Safeguards information system (SIS)	Communication strategy and plan	https://redd.unfccc.int/fact-sheets/unfccc-documents-relevant-for-redd.html
4	Gabon	24 February 2010[c]			2021	2021		https://redd.unfccc.int/submissions.html?country=gab FREL/FRL under review by the UNFCCC assessment team https://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/gaboncphaccord_app2.pdf
5	Equatorial Guinea		2020		2020			
6	CAR[d]	1 March 2010		2014				https://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/centralafricanrepublic_cphaccord_app2.pdf
7	DRC	30 January 2010 (Copenhagen Accord declaration)	2012	2019	January 2018		2013	http://www.rdc-snsf.org/
8	Rwanda	2012						https://unfccc.int/documents?f%5B0%5D=country%3A1436
9	Sao Tome and Principe							In progress http://www.fao.org/3/a-ax427f.pdf
10	Chad	25 August 2010[e]						https://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/chadcphaccord_app2.pdf

a https://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/cameroon_cphaccordapp2.pdf

b https://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/congocphaccord.pdf

c https://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/gaboncphaccord_app2.pdf

d https://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/centralafricanrepublic_cphaccord_app2.pdf

e https://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/chadcphaccord_app2.pdf

In short, countries are at different stages of submitting documents on their emissions reductions. Even those forested countries that are ‘undertaking’ the REDD+ process are not up to date with the documentation they need to submit to the UNFCCC Secretariat. The COMIFAC PREREDD 2 project should help all countries in the subregion fulfil the requirements of the Warsaw Framework for REDD+. This project is being developed by COMIFAC for submission to the Green Climate Fund with the support of the United Nations Forum on Forests (UNFF) and UNDP.

Commitments related to both adaptation and mitigation

Green Climate Fund (GCF) commitments

The GCF is a global fund designed to help developing countries reduce their greenhouse gas emissions and increase their capacity to respond to climate change. It was set up by the UNFCCC in 2010. It focuses on the needs of countries that are highly vulnerable to the effects of climate change, in particular LDCs, Small Island Developing States (SIDS) and African countries. Five Central African countries have submitted their projects to the GCF; the other five are still at the project preparation stage (see Table 7.5).

Table 7.5: Green Climate Fund (GCF) and Climate Technology Centre and Network (CTCN) policy documents within the framework of the UNFCCC: Status of Central African countries’ submissions, December 2020

No.	Country	GCF			CTCN		
		Number of projects	Total GCF funding (USD million)	Number of preparation activities	Number of requests for technical assistance	Grant amount (USD)	Amount transferred (USD)
1	Burundi	1	9.1	1	2	50,000 50,000	-
2	Cameroon	3	25.5	4	1	9,982,000	-
3	Republic of the Congo	1	29	1	-	-	-
4	Gabon	2	-	5	-	-	-
5	Equatorial Guinea	-	-	3	-	-	-
6	CAR	-	-	2	-	-	-
7	DRC	2	21.0	5	1	9,999,909	1,996,677
8	Rwanda	3	45.3	4	2	25,000 9,969,619	9,969,619
9	Sao Tome and Principe	-	-	2	-		-
10	Chad	1	7.3	3	1	47,449	-
	Total						

Source: https://www.ctc-n.org/ www.ctc-n.org (accessed 2 March 2022)

Cameroon and Rwanda have the most projects, more than DRC, Burundi and Chad, and far more funding has been allocated to Rwanda than Cameroon and DRC. All countries are actively engaging in preparatory activities. Cameroon and Rwanda have the same number of GCF activities, followed by Gabon and DRC, while Burundi and Rwanda rank first ahead of Cameroon, DRC and Chad for the number of requests for technical assistance (CTCN). Three countries in the subregion must make a concerted effort to catch up: Equatorial Guinea, CAR and Sao Tome and Principe.

Climate Technology Centre and Network (CTCN) commitments

The CTCN is mandated by the UNFCCC to assist developing country Parties and to disseminate environmentally sound technologies. These technologies should help address climate-related challenges, and promote low-carbon and climate-resilient development. Countries must nominate a Designated National Entity (DNE) that will be responsible for preparing requests for climate technology-related technical assistance for submission to the CTCN. COMIFAC has supported all Central African countries to nominate their DNEs and four countries in the subregion to prepare their Technology Needs Assessments (TNAs). COMIFAC, in partnership with the CTCN, organized an awareness-raising workshop in Douala on in September 2019 on the opportunities that the CTCN offers to private sector actors and development banks in West and Central Africa.

The countries mentioned above (see Table 7.5) also submitted projects to the CTCN requesting grant funding for their planned activities. Only Rwanda has received the full grant expected for one of its activities, while DRC has so far received only around 20 percent of the expected grant for its project activity. In the whole subregion, only Rwanda and Burundi have two activities. Rwanda provides technical assistance for gender studies and is also engaged in reducing climate change-related vulnerability in the north-west of the country through community-based adaptation efforts. Burundi and Chad are prioritizing South-South cooperation, while Cameroon is seeking to increase the resilience of local communities to climate change through youth entrepreneurship and the integrated management of natural resources. DRC, on the other hand, plans to strengthen the adaptive capacity of vulnerable communities living in the Congo Basin.

Table 7.6: Number of lead authors of the sixth IPCC assessment cycle reports (AR6): Status of Central African countries

IPCC reports	Africa	Congo Basin		All report authors
		Men	Women	
Working Group 1	20	1	0	235
Working Group 2	33	0	0	327
Working Group 3	32	0	0	235
Global warming of 1.5°C	12	1	0	91
Climate change and land	18	3	0	107
Special Report on the Ocean and Cryosphere in a Changing Climate	5	0	0	103
Total*		4	0	743**

*The total is not necessarily the sum of the rows, as several authors have contributed to several IPCC reports.

**For the Sixth Assessment Report, 743 experts were selected as coordinating lead authors, lead authors or reviewers out of the 2,827 individuals put forward. The number of authors may increase or decrease slightly during an assessment due, for example, to the addition of an author with complementary expertise or to the resignation of another for health reasons or due to unavailability (https: /www.ipcc.ch/site/assets/uploads/2021/07/AR6_FS_select.pdf, accessed 15 February 2022)

Intergovernmental Panel on Climate Change (IPCC) commitments

The IPCC is an intergovernmental body established in 1988 to advance global scientific, technical and socioeconomic knowledge on climate change, its causes and potential impacts, and strategies for combating it. The IPCC began its sixth assessment cycle in 2016. Countries are invited to nominate an IPCC Focal Point and make their network of scientists and experts available to the assessment process (drafting, reviewing and validation). Few experts from the Congo Basin have been nominated and appointed to IPCC reporting teams. Indeed, only four experts from the region are included in the sixth IPCC assessment cycle (see Table 7.6), none of whom are women.

7.2 Voluntary commitments or participation in related structural initiatives

7.2.1 Forest Carbon Partnership Facility

Launched in 2008, the Forest Carbon Partnership Facility (FCPF) is a global partnership of governments, businesses, civil society and indigenous peoples' organizations centred around REDD+[1]. This initiative enables countries to effectively coordinate their REDD+ activities. The FCPF works with 47 developing countries: 18 from Africa, 11 from Asia and 18 from Latin America and the Caribbean. It supports the REDD+ process through two separate, but complementary, funds:[2]

- The FCPF Readiness Fund, which helps countries lay the foundations for the implementation of REDD+;
- The FCPF Carbon Fund, which is piloting performance-based payments. These payments are made to countries that are working to prepare for and implement REDD+, and that have achieved verifiable emissions reductions in their forestry sector and more broadly in relation to land use.

In Central Africa, of the ten COMIFAC Member States, five have fully committed to the Readiness Fund process and three have progressed further to engage with the Carbon Fund (see Table 7.7). Both Cameroon and the Republic of the Congo have expressed their intention to receive payments from the Carbon Fund for measurable emissions reductions in the forestry and other land-intensive sectors. This follows the submission of their Emission Reductions Program Idea Note (ER-PIN). The Republic of the Congo has made more progress than Cameroon, given that it has submitted its ERPD. In addition to submitting its Letter of Intent, DRC has signed an ERPA. Countries have mobilized financial resources for the initiative at different levels and at different times. However, despite these differences, they have a common interest in completing their REDD+ preparations and reaping the benefits of carbon emissions reductions and non-carbon benefits through performance-based payments.

1 https://www.forestcarbonpartnership.org

2 https://www.forestcarbonpartnership.org

Table 7.7: FCPF commitments: Status of Central African countries

No.	Country	Readiness Plan Idea Note (R-PIN)	Readiness Preparation Plan (R-PP)	Strategy	Emission Reductions Payment Agreements (ERPA) Area, tCO_2 and expected amount	Total grants received for preparation (USD)	Comments
1	Burundi*	-	Yes	-	-	-	-
2	Cameroon	Yes	Yes	Yes	2019 Area: 9.34 million ha Carbon: 11,949,000 tCO_2	2010: USD 200,000 2012: USD 3,600,000 for strategy preparation	Letter of Intent signed in 2016 and preparation of an Emission Reductions Program Document (ERPD) planned with USD 650,000 of assistance
3	Republic of the Congo	Yes	Yes	Yes	2018 Area: 12.35 million ha Carbon: 11,700,000 tCO_2	2009: USD 200,000 2012: USD 3,400,000 2015: USD 5,200,000	Letter of Intent signed, ERPD drawn up with USD 650,000 of assistance and ERPD contract signed for the Sangha and Likouala area Tranche A: USD 41,795,000 Tranche B: USD 42,795,000 Each tranche generates 8,359,000 certified emissions reduction (CER) credits
4	Gabon	Yes	Yes	No	Area: 15.09 million ha	2019: USD 1,946,122.50	Gabon is currently the last Central African country to engage in the REDD+ process. Revised R-PP submitted to FCPF and preparation of ERPA in progress (R-PP Gabon, July 2017)
5	Equatorial Guinea*	-	Yes	Yes	-	-	-
6	CAR	Yes	Yes	No	-0	2017: USD 3,600,000	The development of the REDD+ strategy is under way
7	DRC	Yes	Yes	Yes	2018 Area: 12.8 million ha Carbon: 10,000,000 tCO_2	2009: USD 200,000 2010: USD 3,400,000 2012: USD 200,000	DRC received USD 650,000 of assistance for the preparation of its ERPD. ERPD signed. The emissions reductions programme only covers the province of Maï-Ndombe. 5 million received from additional FCPF funds
8	Rwanda*	-	Yes	-	-	-	-
9	Sao Tome and Principe*	-	Yes	-	-	-	-
10	Chad*	-	Yes	-	-	-	-

* Countries that have not committed to the FCPF initiative.
Source: https://forestcarbonpartnership.org/countries

7.2.2 UN-REDD

The UN-REDD Programme is the United Nations Collaborative Programme on Emissions from Deforestation and Forest Degradation. It supports national REDD+ processes and promotes the informed and meaningful involvement of all stakeholders, including indigenous peoples and forest-dependent communities, in the implementation of REDD+[3]. It was launched in 2008 and benefits from the technical expertise of the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP).

In Central Africa, seven countries (Cameroon, CAR, Chad, DRC, Equatorial Guinea, Gabon and the Republic of the Congo) have signed up to this partnership process and some have received targeted support (see Table 7.8).

Table 7.8: UN-REDD commitments: Status of Central African countries

No.	Country	Type of support	Amount (USD)	Expected country commitments	Comments
1	Burundi	-	-	-	
2	Cameroon	National capacity-building on stakeholder participation in forest governance – FLEGT interface, REDD+	35,800	• Awareness-raising among relevant stakeholders on the links between REDD+ and FLEGT and encouraging them to coordinate the processes; • Facilitating regular information sharing between the REDD+ and FLEGT processes and stakeholders.	
3	Republic of the Congo	Programme to support the REDD+ process in the Republic of the Congo	4,000,000	• The national REDD+ process is well managed and fully participatory. • The country is ready for the implementation of REDD+ structural and investment reforms, with safeguards taken into account. • A comprehensive REDD+ information and monitoring system is operational.	Funding for 2012–2015
4	Gabon	-	-	-	Member in October 2010
5	Equatorial Guinea	-	-	-	Joined in May 2014
6	CAR	Support for the REDD+ preparation plan (R-PP)	-	-	Joined in August 2010. Request rejected due to lack of funding

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3 https://www.unredd.net/about/un-redd-programme.html

Table 7.8: continued

No.	Country	Type of support	Amount (USD)	Expected country commitments	Comments
7	DRC	UN-REDD support for the REDD+ preparation plan (R-PP)	7,383,200	• A national strategy under the REDD+ mechanism is being prepared for 2030 with the participation of stakeholders and is ready to launch. • A draft institutional framework for the implementation of REDD+ was drawn up for 2013. • A comprehensive monitoring, reporting and verification system developed under REDD+ is operational.	Financial support in 2009, in partnership with UNDP, the United Nations Environment Programme (UNEP) and the Food and Agriculture Organization (FAO).
		Support for the development, establishment and submission of a forest reference emissions level (FREL) in the DRC	335,354	• Definition of forest: clarifying certain elements of the definition; • Scale: determining which regions will be part of the FREL, based on certain technical and institutional selection criteria; • Scope: (i) including deforestation-related activities; (ii) submitting a conservative estimate of historical emissions from activities related to forest degradation; • Data: centralizing and standardizing activity data and emissions factors; • Approach: studying historical emissions and identifying possible trends; • Adjustment: calculating an adjustment that takes account of certain factors like expected population growth, accessibility and territorial development plans; • Submitting the FREL at COP21.	Financial support obtained in 2015
8	Rwanda	-	-	-	
9	Sao Tome and Principe	-	-	-	
10	Chad	Establishing a Safeguards Information System (SIS)	60,000	• Identifying the activities/work streams needed to develop a tailored approach for Chad that will guarantee REDD+ activities; • Improving understanding of the risks and benefits of REDD+.	
	Total		11,814,354		

Source: https://www.un-redd.org/our-work/partners-countries

More generally, UN-REDD has helped several countries implement REDD+-related activities: FLEGT in Cameroon; a national forest monitoring system (FMS) and Sustainable Development Goal (SDG) 13 in the Republic of the Congo; an R-PP in CAR; a REDD+ strategy/action plan and FMS in DRC; and an SIS in Chad. The range of activities carried out in the different countries illustrates the importance of this initiative for Central African countries.

7.2.3 Central African Forest Initiative

Launched in 2015 via a Joint Declaration,[4] the Central African Forest Initiative (CAFI)[5] is a collaborative partnership that brings together six Central African countries with high forest cover (DRC, Gabon, CAR, Cameroon, Equatorial Guinea and the Republic of the Congo) and a range of donors (Germany, France, the Netherlands, Norway, South Korea, the United Kingdom and the European Union). CAFI works to place Central African forests at the heart of the global climate agenda, supporting strategic and holistic national investments that reconcile forest conservation with low-emissions economic and human development. It aims to recognize and protect the contribution the region's forests can make to mitigating climate change, reducing poverty and supporting sustainable development.

CAFI is a unique initiative that drives high-level political dialogue and increased funding to support ambitious reforms and activities on the ground.[6] These activities are implemented through a steering mechanism designed to mediate intersectoral decision-making within the framework of a country's vision for development.[7] To participate, partner countries are invited to develop National Investment Frameworks (NIFs) that address all the causes of deforestation and forest degradation, and to propose an ambitious multi-sectoral theory of change, aligned with their development objectives.

Letters of Intent, which take the place of agreements between CAFI and partner countries, set out ambitious commitments on priority strategic issues, such as sustainable land management, strengthening land tenure arrangements, redirecting agriculture towards savannah areas, forest management, reducing unsustainable fuelwood consumption, and participatory and transparent governance of the mining and hydrocarbon sectors.

To date, three Letters of Intent have been signed with DRC, Gabon and the Republic of the Congo and USD 465 million has been pledged for these three countries (see Table 7.9). Preparatory grants have also been allocated to Cameroon, CAR and Equatorial Guinea to help them draw up their National Investment Frameworks.

CAFI also seeks to support countries through results-based payment mechanisms. An unprecedented agreement on payments for forest preservation in Gabon, amounting to USD 150 million, was reached at the UN Climate Action Summit in 2019. It aims to stimulate and reward the achievement of the country's ambitions.

4 www.cafi.org/content/cafi/fr/home/our-work/how-we-work/the-cafi-declaration.html

5 www.cafi.org

6 https://www.cafi.org/content/cafi/en/home/our-work/our-portfolio.html

7 The Heads of State and Government of the partner countries, such as President Tshisekedi of the DRC or Prime Minister Mouamba of the Republic of the Congo, have personally committed to make the partnerships a success, assuring their international partners that they are determined to achieve the results promised (www.cafi.org/content/cafi/en/home/events/side-events/takeaway-from-the-climate-action-summit.html).

Table 7.9: CAFI commitments: Status of Central African countries

Country	Current situation	Expected amount (USD million)	Net amount financed (USD million)[a]
DRC	Letter of Intent (LoI) signed in April 2016 for 2016–2020 Implementation of a portfolio of 16 programmes Discussions on the continuation of the partnership post-2021 under way	**220** 190 (LoI, 2016) + 30 additional	152
Gabon	LoI signed in June 2017 for 2017–2021 Implementation of three programmes (one approved in 2018 and two approved in 2020) Amendment to the LoI signed in 2019 covering a results-based payment partnership for 2016–2025	**180** 30 (LoI, 2017) + 150 (results-based payments, addendum to the LoI, 2019)	14.4
Republic of the Congo	LoI signed in September 2019 for 2019–2025 Programming framework adopted in January 2020 and investment framework decision adopted in October 2020 Nine programmes under preparation	**65** 45 (CAFI funds, LoI 2019) + 20 (parallel funding)	1
CAR	National investment framework drawn up for 2020–2025 Programme to support the development of the LoI under way	Not applicable	1
Equatorial Guinea	National investment framework drawn up for 2020–2030	Not applicable	1.2
Cameroon	Finalization of the national investment framework under way	Not applicable	0.6

Source: https://www.cafi.org/what-we-do/countries-and-topics

a Net amount funded by the CAFI trust fund as at September 2020 (source: http://mptf.undp.org/factsheet/fund/afi00)

7.3 Other climate change-related commitments

7.3.1 Convention on Biological Diversity and Convention to Combat Desertification

Beyond their commitments directly related to combating climate change, Central African countries have mobilized under the other two Rio Conventions – the Convention on Biological Diversity (CBD) and the United Nations Convention to Combat Desertification (UNCCD) – enabling them to link up and strengthen their climate initiatives.

Efforts made under the Burundi National Biodiversity Strategy and Action Plan (NBSAP) to preserve protected forest areas, for example, contribute to maintaining forest carbon stocks. This is beneficial to the local climate and supports both mitigation and adaptation efforts (REDD+). Several Central African countries have made efforts to maintain the natural landscape of a proportion of their territory. Similar to reforestation efforts, initiatives to restore degraded areas in desert zones to combat desertification contribute to both climate change mitigation and adaptation.

7.3.2 AFR100

Only seven COMIFAC countries have signed up to the AFR100 landscape restoration movement (see Table 7.10). Rwanda and Burundi are working to restore more than 70 percent of their territory, Cameroon a quarter, and CAR, Chad, DRC and the Republic of the Congo less than 10 percent. Countries do tend to recognize the link between this commitment and early commitments on climate and the management of natural resources. Actions taken on climate change adaptation and/or mitigation are usually included among countries' commitments.

Table 7.10: Central African countries' commitments under the AFR100 process and links with other commitments (including climate-related commitments)

No.	Country	Commitments		Alignment with national objectives
		in millions of ha	Percentage of country area	
1	Burundi	2	72 %	– Vision Burundi 2025 – Burundi National Strategy and Action Plan for Land Degradation Control – Burundi National Biodiversity Strategy and Action Plan (NBSAP) – Burundi National Climate Change Strategy and Action Plan – Burundi National Agriculture Strategy – National Strategy and Action Plan for reduction of disaster risks and management of disasters – National Forest Landscape Restoration Programme – National REDD+ Strategy and intended NDC of Burundi – National Poverty Reduction Strategy and Action Plan
2	Cameroon	12	25 %	– Cameroon's forest landscape restoration process is linked to Cameroon's commitment to the 2030 Agenda (SDGs) and the three Rio Conventions (UNFCCC, CBD, UNCCD). – Successful restoration in Cameroon's Nationally Determined Contributions (NDC) would aim to reduce greenhouse emissions to mitigate and adapt to climate change. – Restoration and reforestation were key areas identified in Cameroon's development strategy to reduce emissions from deforestation and forest degradation (REDD+) – The Government of Cameroon is involved in the Land Degradation Neutrality (LDN) process and is defining LDN targets – Through the signature and national validation of the FLEGT Voluntary Partnership Agreement (VPA), Cameroon has committed to combating illegal logging and to the sustainable management of forestry concessions through management plans (including restoration activities) – Several national plans and strategies aim to restore degraded land and forests, such as the National Plantation Strategy, the National Plan to Combat Desertification and the National Emergency Plan to Combat Deforestation and Forest Degradation – The cross-sectoral, multi-stakeholder land-use planning process has been identified as a promising approach to the coordination of various land-related political interests.

Continued on the next page

Table 7.10: continued

No.	Country	Commitments		Alignment with national objectives
		in millions of ha	Percentage of country area	
3	Republic of the Congo	2	6 %	– Alignment with COMIFAC Convergence Plan on sustainable forest management, protection, resilience and achieving the Aichi Biodiversity Targets/CBD – Alignment with the affordable energy strategy – Alignment with the National REDD+ Strategy and climate response mechanisms
4	CAR	3.5	6 %	– International commitments on climate and sustainable development – Intended NDC targets under the UNFCCC, focusing mainly on land-use change and forestry and to a lesser extent on agricultural and energy development
5	DRC	8	3 %	– International commitments on climate and sustainable development – National programme on the environment, forests, water and biodiversity (PNEFEB-2) formulated in 2011, which constitutes the guiding strategic document on natural resource management – CAFI under which it aims to reduce the loss of forest cover from the current 300,000 ha/year to 200,000 ha/year by 2020 – Four programmes will focus on the key reforms needed in the areas of land-use planning and a national land-use plan – A tenure policy to better secure tenure in the rural sector – Investments will enhance existing actions at the provincial and territorial level in high-deforestation REDD+ areas (Orientale province and Sud Ubangui province) where local communities and territorial entities will be supported to sustainably manage and use resources
6	Rwanda	2	76 %	– Widespread implementation of landscape restoration would contribute to Rwanda's Vision 2020, its Economic Development and Poverty Reduction Strategy, the Ministry of Natural Resources' results-based management initiative, its District Development Plan, and its District Forest Management targets. Forest landscape restoration would also contribute to the NDC and multiple SDGs, including monitoring and reporting for SDG target 15.3 on land degradation and indirectly to SDGs 1 and 2 on poverty and food security.
7	Chad	1.4	1 %	Chad's restoration target contributes to the following initiatives: – Vision 2030 Strategy: "The Chad that We Want" (Vision 2030) – Restoration and rehabilitation of ecosystems around Lake Chad covering 4,000 ha – National Action Program to Combat Desertification (PAN/LCD) and land degradation neutrality target – National Biodiversity Strategy and Action Plan (SNPA/DB) – Nationally Determined Contributions (NDC) – Great Green Wall initiative and 3 million ha target
	Total	30.9	6 %	

7.3.3 United Nations Forum on Forests

Efforts to manage forests sustainably within the framework of the United Nations Forum on Forests (UNFF), established in 2000, take account of the three Rio Conventions (CBD, UNCCD, UNFCCC). These efforts also work to combat climate change. Countries are currently being invited to submit voluntary reports on their progress towards the goals and targets set out under the United Nations Strategic Plan for Forests (2017–2030). These goals and targets relate to different aspects of sustainable forest management. For example, Central African countries efforts as part of the REDD+ process are supported by Global Forest Goal 1 ("Reverse the loss of forest cover worldwide through sustainable forest management, including protection, restoration, afforestation and reforestation, and increase efforts to prevent forest degradation and contribute to the global effort of addressing climate change.") and targets 1.1 ("Forest area is increased by 3 percent worldwide."), 1.2 ("The world's forest carbon stocks are maintained or enhanced."), 1.3 ("By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.") and 1.4 ("The resilience and adaptive capacity of all types of forests to natural disasters and the impacts of climate change is significantly strengthened worldwide.").

As at June 2020, no Central African countries have submitted a report to UNFF on their forest commitments for 2017–2030.

7.3.4 Sustainable Development Goals (SDGs)

Some of the commitments made by Central African countries under the SDGs will work to combat climate change. SDG 13 is to "take urgent action to combat climate change and its impacts". A careful review of the indicators under all the SDGs can, however, provide useful information about how a country is responding to climate change.

The most illustrative indicators are: SDG 9.4.1: CO_2 emissions per unit of value added; 9.5.2 Researchers (in full-time equivalent) per million inhabitants; 13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population; 14.5.1 Coverage of protected areas in relation to marine areas; 15.1.1 Forest area as a proportion of total land area; 15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type; 15.3.1 Proportion of land that is degraded over total land area. These indicators show just how many climate change initiatives are linked to development efforts.

Countries can, therefore, implement measures that enable them to meet their development needs, while at the same time avoiding, reducing or absorbing greenhouse gas emissions and building climate resilience.

7.3.5 FLEGT VPAs (progress and link with forest protection)

Forest degradation, largely caused by timber harvesting (legal and illegal), has been shown to be an important contributor to global greenhouse gas emissions (Pearson et al. 2017). In the Congo Basin, timber harvesting takes a diversity of forms ranging from multinational companies operating in multiple forest concessions to individual or small-scale chainsaw logging enterprises operating "informally" (Carodenuto and Cerutti 2014). Although Congo Basin countries have sound legal frameworks based on principles of sustainable forest management, the limited regulatory governance capacity of both state and non-state actors has resulted in widespread illegalities in the forest sector. The problem of illegal logging was considered so severe that the European Union introduced the Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan in 2003 with the aim to harness the power of its timber-consuming markets as an incentive for timber-exporting countries to enforce their own rules and eliminate illegal forest activities within their territories. Through FLEGT, the EU requests Voluntary Partnership Agreements (VPAs) with its timber trading partners whereby both parties outline how capacity will be reinforced and forest governance improved to promote and eventually assure legality compliance across the forest sector. From a global perspective, the Congo Basin has a high number of VPAs, with six countries in different phases of VPA negotiation and implementation (see Table 7.11).[8]

Although the FLEGT Action Plan does not cite climate change as a main objective, the efforts to better regulate unsustainable and illegal logging in Central African countries have significant potential to contribute to climate adaptation and mitigation. This is because the FLEGT approach recognizes the importance of improving governance, which is critical for mitigating climate change through forest sector interventions (Dooley and Ozinga 2011; Levin et al. 2008). More specifically, adherence to legal requirements such as forest management plans has been shown to reduce carbon emissions from forest operations (Cerutti et al. 2017). The full potential of a FLEGT approach to mitigate climate change has not been realized, however, due to the ineffective implementation of VPAs in most of the countries concerned. Based on a recent meta-analysis of institutional capacities of VPA countries, most Central African countries have significant capacity gaps and limited political will to effectively regulate illegal logging through their VPAs, although the Republic of Congo has achieved noticeable progress in information transparency and multi-stakeholder participation (Adams et al. 2020). The central way in which FLEGT-VPAs aim to fight illegalities in the forest sector is through the development of timber traceability and legality assurance systems (TLAS). Although the Agreements include additional mechanisms such as independent forest monitoring,

Table 7.11: FLEGT VPA: Status of Central African countries

Country	Phase			
	1: Information and pre-negotiation phase (period)	2: Formal negotiation	3: Development of traceability system	4: FLEGT licence issued
Cameroon			X	
Republic of the Congo			X	
Gabon		X		
Equatorial Guinea*	X			
Central African Republic (CAR)			X	
DRC		X		

* Note: After a FLEGT workshop in 2016, the VPA process seems to have completely stalled in Equatorial Guinea, as in most countries in the Congo Basin.

8 According to data from the European Forest Institute (EFI) FLEGT programme (https://www.euflegt.efi.int/home), a total of 16 countries are involved in a VPA process. NB: Equatorial Guinea is not on the EFI list and progress seems to have completely stalled there.

they have attracted less attention as compared to the funding and development focus on the design and operationalization of TLAS guarantee systems. However, these systems have proven difficult to operationalize in practice, and no country has been successful in delivering a FLEGT legality certificate to demonstrate compliance with the EU Timber Regulation. For example, Cameroon's VPA traceability system (SIGIF) has never been operational beyond a pilot phase and the whole system has been in « deadlock » since 2018 (CIFOR 2020; EFI 2018).

As we approach the 20-year anniversary of the EU FLEGT Action Plan, it is important to take stock and assess lessons learned, as the European Union is considering a similar approach for regulating deforestation in agriculture supply chains, such as cocoa or palm oil. Although VPAs are lauded for their contribution to improved transparency and stakeholder participation (Hoare et al. 2020), there are serious concerns that the FLEGT-VPA approach in the Congo Basin is leading to power consolidation amongst the already dominant and internationally-financed logging industry while further marginalizing the most vulnerable segments of the sector: the smaller logging companies marketing their products domestically (Carodenuto and Cerutti 2014). More attention should be placed on the critical question of how best to distribute legal access to the last remaining forest resources in the region and which segment of the sector should be prioritized for forest-based economic development and poverty reduction.

7.3.6 Forest Investment Programme

The Forest Investment Programme (FIP), initiated by the World Bank, is one of three climate programmes and trust funds grouped under the Climate Investment Funds (CIF) banner. This programme aims to provide pre-financing for the implementation of REDD+ readiness reforms and other activities that seek to influence forest policies in developing countries. Countries embarking on this process must produce forest investment plans that target priority investment areas with a view to curbing deforestation. Donor-funded projects are then developed for the priority areas identified. Table 7.12 shows the implementation status of the plans and related efforts in Central Africa.

In total, only four countries have produced their forest investment plans: Cameroon, DRC, the Republic of the Congo and Rwanda. The World Bank approved USD 232 million for the development of these plans.[9] Additional funding has been requested from the World Bank, the African Development Bank (AfDB) and other bilateral (AFD, GCF) and multilateral (EU) partners. Cameroon and Rwanda pledged to contribute 7.61 percent and 10.21 percent, respectively, reflecting a clear commitment by both countries. Conversely, DRC and the Republic of the Congo have not made any financial commitments. The remaining Central African countries have not produced forest investment plans (60 percent). Very few countries in the Congo Basin have the capacity to complete this process without the support of external experts (Sufo Kankeu 2019). The countries' differing levels of commitment reflect the different positions taken by politicians and civil society (Sufo Kankeu 2019).

9 https://climatefundsupdate.org/data-dashboard/regions/

Table 7.12: Forest Investment Programme (FIP): Status of Central African countries

No.	Country	Year	Number of projects implemented	Description of projects/programmes + total budget	Funding
1	Burundi				
2	Cameroon	2017	3 projects	– P1. Reducing emissions from deforestation and forest degradation on the southern plateau of Cameroon (USD 130,177 million) – P2. Climate change resilience and adaptation in northern forested areas (USD 115 million) – P3. Watershed management in the western uplands (USD 70 million)	USD 315,177 million of which USD 24 million from the Government of Cameroon
3	Republic of the Congo	2018	2 projects	P1- Project to support the establishment of agroforestry plantations in north Congo (USD 11 million) P2- Community agroforestry and fuelwood programme in the departments of Pool and Plateaux (USD 8 million)	USD 24 million
Or P4	Gabon				
5	Equatorial Guinea				
6	CAR				
7	DRC	2011	5 projects	P1- Kinshasa supply basin programme (USD 13.7 million) P2- Karanga and Mbuji-Mayi supply basin programme (USD 11.7 million) P3- Kisangani supply basin programme (USD 99.8 million) P4- Programme for private sector engagement in REDD+ (USD 5.05 million) P5- Small grants programme in support of innovative and high co-benefit initiatives (USD 18.15 million)	USD 60 million No government contribution
8	Rwanda	2017	3 projets	– Development of agroforestry and sustainable agriculture (USD 60 million) – Sustainable management of forests and landscapes (USD 21.5 million) – Wood supply chain, improved efficiency and added value (USD 12.5 million)	USD 94 million of which 9.6 million from the Government of Rwanda
9	Sao Tome and Principe				
10	Chad				
	Total				USD 493 million

Source: GoR (2017), GoC (2017), GOC (2018), GoRDC (2011)[a]

a GoC: Government of Cameroon, GoR: Government of Rwanda, GoRDC: Government of DRC, GOC: Government of the Republic of the Congo

7.3.7 Congo Basin Forest Fund

The Congo Basin Forest Fund (CBFF) is a multi-donor fund created in 2008 and managed by AfDB. A total of EUR 123 million in funding was provided by the United Kingdom, Norway and Canada.[10] Activities are mainly implemented in Central Africa (see Table 7.13). The CBFF seeks to work with a wide range of development partners and its main objective is to *"alleviate poverty and mitigate climate change by reducing the rate of deforestation in the Congo Basin through sustainable forest management"*. The 2018 assessment found that, while the overall performance of the CBFF was satisfactory, projects were not implemented effectively and yielded results that are unlikely to be sustainable, particularly in the absence of complementary funding.

Table 7.13. Congo Basin Forest Fund (CBFF) commitments: Status of Central African countries

No.	Country	Last document submitted	Amount received (EUR millions)	Target period	Comments	Number of national projects	Number of multinational projects
1	Burundi		0.12	2009-2014		1	3
2	Cameroon		4.18	2009-2015		9	8
3	Republic of the Congo		1.92	2009-2016		1	7
4	Gabon		4.11	2009-2015		1	6
5	Equatorial Guinea		0.51	2009-2016		1	3
6	CAR		0.21	2012		2	6
7	DRC		22.79	2009-2017		13	5
8	Rwanda		4.35	2009-2017		1	3
9	Sao Tome and Principe		-	-		0	1
10	Chad		-	-		0	3
	Total					29	45

Source: GoR (2017), GoC (2017), GOC (2018), GoRDC (2011), https://cbff.afdb.org/fr/pays-partenaires, https://www.afdb.org/fileadmin/uploads/afdb/Documents/Policy-Documents/Congo%20Basin%20Forest%20Fund%20-%20Operational%20Procedures%20FR.pdf

10 https://www.afdb.org/fr/topics-and-sectors/initiatives-partnerships/congo-basin-forest-fund/topics-and-sectors/initiatives-partnerships/congo-basin-forest-fund/climate-change

7.3.8 Initiatives of High Forest, Low Deforestation countries

Da Fonseca, Rodriguez et al. (2007) define High Forest, Low Deforestation (HFLD) countries as those with forest cover above 50 percent in 2015 and an annual deforestation rate below the world average of 0.22 percent over the 1990–2000 emissions period. This classification was originally developed to identify which countries could potentially qualify for REDD+ and the Clean Development Mechanism (CDM). This definition, which was used at that time (2007), crystallized the debate on the subject and excluded countries that did not meet these criteria. It divides forested developing countries into four quadrants: countries with low forest cover and high deforestation (LFHD); countries with low forest cover and low deforestation (LFLD); countries with high forest cover and high deforestation (HFHD) and countries with high forest cover and low deforestation (HFLD). The last group, HFLD countries, is of particular interest to many donors, who are now focusing on how to prevent deforestation. Megevand et al (2013) put all countries in the Congo Basin in the HFLD category. However, the literature and the dynamics of Central African countries show that very few can really claim to belong to this category, because the rate of deforestation in these countries is still fairly high. Considering the categorization used by Da Fonseca, Rodriguez et al. (2007), we find differences between countries in terms of forest policies, deforestation rates and forest cover, as shown in Table 7.14.

With the advent of REDD+ and the new definitions of forest adopted over the last decade, most countries in the Congo Basin still fit the profile of HFLD countries. Nevertheless, there are clear signs that these forests are under increasing threat. Indeed, these countries are now in a precarious position due to growing pressure from different sources, including: mining, road development, agrifood and biofuels, in addition to expanding subsistence agriculture and charcoal collection (Megevand et al. 2013).

Gabon was the first Central African country to be admitted to the HFLD group. It is also the first HFLD country to sign a Letter of Intent with CAFI for results-based payments for reduced emissions, amounting to USD 150 million.

Table 7.14: High Forest, Low Deforestation (HFLD): Status of Central African countries

No.	Country	Forest cover	Deforestation rate	Category
1	Burundi	16.8%	9%	LFHD
2	Cameroon	66%	0.16%	HFLD
3	Republic of the Congo	65.52%	0.1%	HFLD
4	Gabon	89.3%	0.05%	HFLD
5	Equatorial Guinea	93%	0.3%	HFLD
6	CAR	45.6%	0.26%	HFHD
7	DRC	67%	0.20%	HFLD
8	Rwanda	29.8%	0.02%	LFLD
9	Sao Tome and Principe	9.8%	1.6%	LFHD
10	Chad	11.1%	1.55%	LFHD

Source: https://www.fern.org/, https://www.cafi.org/what-we-do/countries-and-topics, https://www.fao.org/countryprofiles/en/

However, given the significant controversy over recent years regarding the redefinition of 'forests', most Central African countries have chosen to use the default definition provided by FAO. They have done so because, for them, it is important to show that forests cover over 50 percent of their territory and because some donors have set up specific programmes that these countries can benefit from. A case in point: Rwanda is in the LFLD quadrant and Cameroon in the HFHD quadrant, yet both countries' governments claim that they are HFLD countries under the new definition of forest.

7.3.9 The Ramsar Convention and peatland-related trends

The recent discovery/rediscovery of peatlands along the border between DRC and the Republic of the Congo has highlighted the important role played by specific wetland ecosystems as carbon sinks (see Chapter 9 on Peatlands). Mangroves are also known to store significant amounts of carbon, mainly in the soil. The different carbon reservoirs in these wetland ecosystems need to be conserved and/or sustainably managed, as part of both adaptation and mitigation efforts. Properly managing these wetlands offers a nature-based solution and the valuation of these ecosystems and their biodiversity is regularly highlighted as one of the best ways to combat climate change. At the international level, the Ramsar (or Wetlands) Convention governs wetland ecosystem management. All ten COMIFAC countries have signed up to this convention. Two countries, DRC and the Republic of the Congo, have joined the International Tropical Peatland Center, so they can benefit from the experience of other tropical countries with peatlands.

7.4 Other trends with the potential to impact countries' UNFCCC commitments

7.4.1 Reducing or eliminating deforestation in private sector value chains

Many companies, mainly timber and agrifood multinationals, source their raw materials from Central Africa. To reduce their carbon footprint, these industries are working to ensure that their value chains stop contributing to the destruction of the environment, and of forests in particular. Other than timber, the moist forest-based sectors most affected are cacao and rubber. Given their willingness to act, the issue then becomes what type of responses countries should put in place with regard to their climate commitments.

In Central Africa, the private sector has barely engaged with the REDD+ process, the main mechanism for coordinating the fight against deforestation as part of countries' response to climate change. On the other hand, cocoa companies have begun to participate in certification processes, albeit gradually. These processes are not, however, specifically concerned with the sector's carbon footprint. Moreover, production in this sector tends to be the remit of small farmers. In Cameroon, IDH, The Sustainable Trade Initiative- and WWF-led initiatives have been launched.

It may be possible to optimize Central African countries' commitments under the REDD+ process by taking proactive steps to harness this private sector commitment.

7.4.2 Reducing or eliminating imported deforestation

Many Western countries are trying to reduce their carbon footprint. To this end, the EU and European countries are working to reduce imported deforestation and are making some progress. Deforestation has, therefore, become a cross-border issue and Central African countries need to decide how to manage the requirements placed on their timber and agricultural product exports.

These requirements relate mainly to REDD+ and the arrangements for coordinating between countries, the private sector and various other stakeholders must still be defined to meet these new requirements.

So far, there has been little response from countries in the region on this issue.

Conclusions

The principle of common but differentiated responsibility has enabled Central African countries, which have low greenhouse gas emissions in comparison with other countries, to sustainably manage their forest resources as a way to support international efforts to limit climate change. However, their ambitions do not necessarily translate into commitments that are effectively implemented at the national level and that would enable them to better fulfil their obligations under the UNFCCC. While international funding is available to developing countries, including those in Central Africa, these countries' failure to submit the required national documentation at the international level means their access to certain funding is severely curtailed.

CHAPTER 8

Addressing imported deforestation and zero deforestation commitments

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Photo by Olivier Girard/CIFOR

Introduction: The challenges of zero and imported deforestation

> **Over a quarter of deforestation (27 percent) is caused by land use change attributed to the production of commodities (Curtis et al. 2018). Estimates of tropical forest lost attributed to expanding cropland, pastures and forest plantations range from between 62 to 80 percent (Pendrill et al. 2019, Hosonuma et al. 2012) with 26 percent of tropical forest loss attributed to the international demand for commodities (Pendrill et al. 2019). Deforestation has thus been seen as a worldwide responsibility, since products linked to deforestation in a specific location are sold and consumed worldwide. It has been estimated that 10 percent of deforestation is linked to the consumption of unsustainably sourced commodities within member countries of the EU, caused by imported commodities since deforestation within Europe is negligible (Cuypers et al. 2013). This phenomenon results in what is currently known as *forest-risk commodities* and *commodity-driven deforestation*. Commodities associated with imported deforestation produced in Central Africa are palm oil, cocoa, coffee, natural rubber, timber and cotton.**

The concept of "*zero deforestation*", which implies that no forest areas are cleared or converted to other land uses, originated at the end of the 2010s. Civil society organizations began linking the production of agricultural commodities entering international trade - such as palm oil, soybeans, paper and cocoa - with deforestation, and pressuring large companies producing these commodities to eliminate deforestation from their value and supply chains.

The similar term "*imported deforestation*" is defined as the production of imported agricultural goods that drives tropical deforestation. A considerable share of agricultural commodity production intended for export results in countries such as those in the European Union (EU) "importing deforestation" (IDDRI 2017) as imports of raw materials or processed products whose production has contributed, directly or indirectly, to deforestation, forest degradation or the conversion of natural ecosystems outside the national territory (Gouvernement France 2017).

Direct drivers include the production and extraction of commodities when production involves land-use change and so directly affects forest cover.

Focusing on direct drivers in decision-making process and policy design – shown in Figure 8.1 – can be pragmatic but can limit the vision and the success of policy implementation, and needs to be contextualized within debates about indirect drivers, commodity value chains and their impacts. *Indirect drivers* of deforestation include multiscale social, economic, political, cultural and technological processes affecting commodity production and extraction (Kissinger, Herold, and De Sy 2012; IPBES 2018).

National economies in Central Africa exhibit little diversification and are heavily dependent on the export of agricultural commodities and mining products. Strategies to combat imported deforestation, most of which are designed by importing countries, therefore risk negatively affecting the development trajectories planned and implemented by countries in the subregion, if due care is not taken. While strategies to combat imported deforestation are expected to have positive environmental impacts on forest ecosystems in Central Africa, their potential socioeconomic impacts on the region's people and governments are less well understood. Commodities like cocoa, whose production involves hundreds of thousands of small farmers, are of particular concern.

This chapter aims to better inform stakeholders in the value chains of the Central African products affected (palm oil, cocoa, coffee, wood, rubber and cotton) about ongoing efforts to combat imported deforestation and their current and potential impacts. It also explores the feasibility of different approaches to implementing strategies to combat imported deforestation in Central Africa.

8.1 Technical concepts related to zero deforestation and imported deforestation

Debates around zero and imported deforestation embrace diverse disciplines and concepts which use different terms and methodologies, leading to diverse definitions. The main concepts used here are defined below (see also Chapter 1).

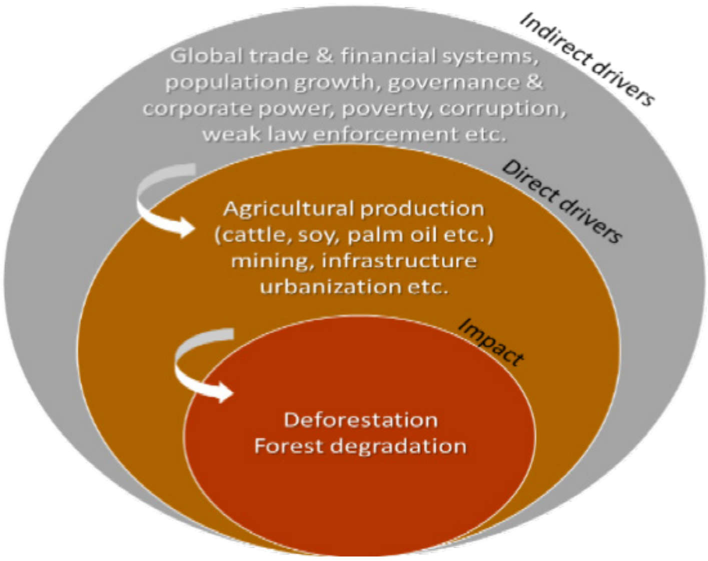

Figure 8.1: Direct and indirect drivers of deforestation and forest degradation

Source: Ingram et al. 2020b

8.1.1 Defining forests and deforestation

In the sense often used by the Food and Agriculture Organization (FAO), a forest is not necessarily a forest as we might ordinarily understand it; rather it is the carbon stock and a set of environmental services (see also Chapter 1).

Since its creation in 1945, the FAO has carried out a Forest Resource Assessment every 10 years and since 2000, every 5 years. Given that definitions of 'forest' differ over time and by location, the FAO has developed its own definitions over the years. It eventually adopted a single definition based on the 2000 Forest Resource Assessment, which it still uses today. This definition has been adopted by several stakeholders.

It is based on four variables: (1) the percentage of the ground area covered by the projection of the tree crowns (canopy cover); (2) the minimum area used to calculate this percentage; (3) the minimum width of the area used to calculate this area; 4) the minimum height of the trees (in adulthood). According to the FAO definition, a forest must have: a canopy cover of 10 percent (previously 20 percent for forests in Western countries) over at least 0.5 ha, with a minimum width of 2 m, and a minimum adult tree height of 5 m (Gold 2003).

Other definitions are however used at the international level. The United Nations Framework Convention on Climate Change (UNFCCC) definition was adopted in 2001 as part of the Marrakesh Accords on the Clean Development Mechanism (CDM). This definition is based on ranges rather than specific values for three of the four variables: canopy cover of 10–30 percent over at least 0.05–1.0 ha, with a minimum tree height of 2–5 m (UNFCCC 2002).

The EU definition (Joint Research Centre – JRC) was adopted as part of the Global Land Cover 2000 project. It is based on remote sensing and specifies that forests must have: canopy cover of at least 15 percent and a minimum tree height of 3 m. This definition has been relaxed in later work by the JRC, which claims to use a 'flexible' interpretation of the UNFCCC definition (subject to technical constraints). A team from the University of Maryland working with remote-sensing data has developed a configurable tool that allows users to measure the area covered by tree formations depending on the percentage tree cover required by their chosen definition of forest.

In parallel, many countries have adopted their own definitions. A 1999 compendium listed 69 countries that had quantified one of the four variables used by the FAO. By 2011, a further 16 countries had adopted a definition of forest and 10 had either refined or modified their existing definitions. Since 2007, countries wishing to participate in the UN REDD+ process have been required to adopt a national definition of forest (COP13 2007, Bali Action Plan). To date, 58 countries have signed up to the process and around 20 have adopted a quantified definition for the first time. Another 30 or so have reviewed and/or modified their definition, while the rest are still deliberating. In Central Africa, only four countries have defined their forests (Cameroon, the Democratic Republic of the Congo (DRC), Equatorial Guinea and the Republic of the Congo), with the remaining seven countries still deliberating.

The numerous challenges.....

Depending on the definition used by an organization or a country, a forest might be physically present when the data is collected ('land cover') or physically absent, but counted in an area legally designated as forest ('land use'), making comparisons difficult. Even when a clear definition has been established, forest cover estimates for a given country can vary widely depending on whether they are primarily based on forest inventories conducted on the ground, satellite imaging or a combination of the two.

Oil palm plantations are usually excluded from these definitions, as (to a lesser extent) are most tree plantations whose primary purpose is to produce a commodity other than wood, such as cocoa or rubber. Nevertheless, the area they cover is sometimes included as forest area, because it is difficult to distinguish on the satellite imagery widely used to support or replace field inventories.

This satellite imagery provides highly variable information depending on its spatial resolution, the spectral bands used by the sensors, the spectral indices that they make it possible to calculate and analyse, and the time series available.

.... make it difficult to define and quantify deforestation. So what is deforestation?

The ambiguities that cloud the definition of 'forest' find their parallels in the definition of 'deforestation'. Indeed, deforestation can only be quantified with careful reference to the chosen definition of 'forest' and the method used to estimate forest area. Deforestation as estimated by the FAO for each country will not match that estimated by the University of Maryland using satellite data, nor indeed that estimated by the approximately 75 percent of countries whose national definition differs from the FAO's.

It is especially important to consider the concepts of 'land cover' and 'land use'. Taking a land-cover approach, deforested describes an area from which the forest has disappeared, regardless of the reason. This could be due to clear-cutting followed by the establishment of a new tree plantation or farmland, or due to the natural disappearance of the forest after a storm, which will be followed by natural regrowth. Following the land-use approach, using the same examples, only land on which an agricultural crop has actually been planted would be classed as deforested. However, land that is still covered with forest may also be described as deforested, if its land-use designation has changed and it is explicitly destined to be transformed into farmland or a built-up area. The land-use approach is also tied up with questions around the existence and demarcation of permanent and non-permanent forest domains, and issues related to legal and illegal logging. While legal logging in the permanent or non-permanent forest domain might not be considered deforestation, illegal logging would be considered deforestation, except perhaps in the non-permanent forest domain.

'Gross deforestation' and 'net deforestation' are two more key concepts in discussions on deforestation. Gross deforestation describes the area of forest cover that has disappeared, whereas net deforestation refers to the (negative) difference between the forest area destroyed each year and the forest area planted or that naturally grows. Reducing net deforestation will certainly have a positive impact on forest carbon stocks, but will not prevent biodiversity loss. Current discussions aimed at achieving "zero imported deforestation" in countries producing and consuming products like soybean, palm oil, cocoa, rubber, beef, wood or paper pulp tend to focus more on net deforestation, whereas, ecologically speaking, gross deforestation should be of greater concern.

Towards a standardized definition?

Each country currently uses its own definition of forest (and therefore of deforestation) to justify and quantify its international commitments, without any real consideration of their ecological relevance. The four Central African countries that have adopted their own definition of forest have not opted for the same rules, despite their forest formations being very similar in terms of their structure and floristic composition. The same intensive logging activities might be termed deforestation in DRC, but only degradation in Cameroon, with different consequences for the countries' deforestation statistics and the funding mobilized in response.

Adopting a standardized definition based on the recognized ecological characteristics of these forests should be a priority for the region, where population growth is increasing demand for farmland. Considering the risk to exports to countries committed to zero deforestation, the Economic Community of Central African States (ECCAS) deemed this a matter of urgency and, in 2021, the ECCAS secretariat organized a regional discussion workshop on the definition of the terms 'forest' and 'deforestation'.

8.2 Commodities driving deforestation in Central Africa

Currently, coffee, cocoa and cotton are the main export crops that continue to be linked to imported deforestation from Central Africa, and whilst palm oil is not a major export crop, its production in mono-plantations is associated with deforestation. The following short descriptions show how these cash crops are associated with significant, historical deforestation and continue to embody imported deforestation. The increased production of timber, cocoa, coffee and rubber is expected, in both large scale and smallholder systems, which given previous trends and current land use, is expected to take place in lowland, moist forest zone, and cause deforestation directly and directly.

8.2.1 Timber

Timber is both an export and domestic commodity, with the majority of tropical hardwood in Central Africa currently extracted from natural forests and forest concessions (Nasi, Billand, and van Vliet 2012; de Wasseige et al. 2014). In this section the focus is on planted timber as an agro-commodity. In colonial times, large-scale planted timber plantations were developed on savannahs around Pointe-Noire in Congo (Feintrenie 2014) and in Cameroon (Kollert and Cherubini 2012). Since the 1990s there has been renewed interest and national and international investment in timber plantations for wood and as carbon sinks for the carbon market in **Cameroon** (Ayous in Batouri, teak in Bazzama), **Congo** (eucalyptus in Brazzaville and EFC in Pointe Noire), **DRC** (acacia in Goma and plateau Bateke) and **Gabon** (Rougier/Lignafrica/Okume in Plantations Forestières de la Mvoum), mainly on degraded and already deforested land, and as part of afforestation programs (Marien and Gourlet-Fleury 2006; Hawkins and Wigglesworth 2018). Stable timber production is expected from the region in general.

8.2.2 Palm oil

Palm oil has been produced for centuries in Central Africa from the indigenous oil palm (*Elaeis guineensis)*, primarily for domestic consumption. Oil palm plantations cover less than 0.5 million ha, mainly located in the DRC, Gabon and Cameroon. Oil palm grown in agroforestry systems is not included in these figures. In plantations, productivity is quite low: the highest rates in Cameroon are around 14 tons of fruit per hectare and 6 t of oil per ha, compared to average productivities of 16 to 18 t of fruit per ha in Asia[1] (FAOStat 2021). The main palm oil exporting countries are the DRC, Gabon,

1 https://www.fao.org/countryprofiles/index/en/?iso3=CMR accessed June 2021

Cameroon. Gabon and Cameroon export to Europe, and to West African countries Côte d'Ivoire and Benin. Regional production does not meet demand, shown by the import volumes with CEEAC countries (COMIFAC plus Angola) being net importers of palm oil: in 2018, they exported 19,000 t and imported 375,000 t mainly from Malaysia and Indonesia. **Gabon** is a net importer of palm oil from Malaysia and Indonesia and over time it has imported less and exported more. In 2018, Gabon exported 7,200 t and imported 8,900 t of palm oil. The size of plantations in Gabon have increased over the past decade and it is possible it will become a net exporter in the future. In 2018, Cameroon imported 31,700 t of palm oil from Southeast Asia and exported 3,700 t to Europe. **Cameroon's** palm oil production is insufficient for its domestic needs. In Cameroon, industrial scale production started around 1907 under German colonization in Littoral region. Today, production continues with a large agro-industrial sector and milling, smallholders in contract with agro-industries and traditional, artisanal independent smallholders with family farms, and rural and urban investors in rural plantations. Smallholders with less than 5 ha of oil palm represent over 75 percent of oil palm growers but account for less than half of national production due to very low yields. However, national production is insufficient to cover domestic consumption. The government considers the oil palm sector (both artisanal and industrial) as important to alleviate poverty and to generate national revenues (Lyabano et al. 2014). The **DRC** is also net importer of palm oil, importing 47,600 t and exporting 6,300 t to Burundi and Uganda, its neighbors and probably also to Rwanda. But cross-border statistics are imprecise and highly likely underestimated. Increased production is expected in the region generally.

8.2.3 Cocoa

Cocoa is mainly an export crop, cultivated in **Cameroon**, the **DRC, RoC,** and **Gabon** since the late 19th century, with larger colonial, larger scale plantations developed directly from forested land in the 1920s and 1930s (Battini 1999; Kaberry 2005; Wessel and Quist-Wessel 2015). **Cameroon** has long been and is currently the main Central African producer, exporting mainly to Europe via the Netherlands. Productivity at 416 kg/ha is the best in the Central African region, but is lower than Ghana (549 kg/ha) and Côte d'Ivoire. Cameroon's objective to increase production from 300,000 to 600,000 tons by 2020 was postponed to 2030 as it was not achieved. As yields per hectare have remained stable, the prospect of expansion into forest areas in response to government and partners support programs is likely. However, except for Cameroon, the cocoa export trade from Central Africa faded into insignificance after independence and has been subject to boom-bust-boom cycles. When coffee growers in **DRC** were hit by disease, many such as ESCO in Eastern DRC switched to cocoa in the 1980s. The Association of Cocoa & Coffee Exporters ASSECCAF estimates that North Kivu and Ituri (estimated 50,000 ha) is now the main cocoa region, with 15,000 ha from Equateur and Bas Congo, where yields vary from 500 to 1,200 kg/ha. Exports have grown from 600 tons in 2000 to 10,000 in 2015, although production maybe higher than official figures, at around 35,000 tons due to smuggling to Uganda where export taxes are lower. Most DRC cocoa is double certified UTZ and organic, or aimed at fine flavor markets via traders such as Olam and specialty chocolate makers such as Theo Chocolate, Japanese Tachibana, Elan RDC and Original Beans. DRC has no large scale grinding capacity, with most exports via Kenya to Switzerland, Belgium and growing US and Asian markets.[2] A few companies, such as Original Beans, produce chocolate in country. In **Gabon**, after independence, the sector was neglected in favor of higher income generating extractive industries. In 1970 over 6,000 tons of cocoa were produced, decreasing to 1,920 in 1990 and by 2010 to 370

2 https://www.reuters.com/article/us-cocoa-congo-chocolate-factory-idUSKBN2425A8

tons.[3] Industrial plantations were introduced in the 1980s. Since then production has been steady at around 500 tons. The decrease in oil prices around 2014 led to an economic diversification strategy, with the Stabilization and Equalization Fund (CAISTAB) investing USD 8.63 million/EUR 7.63 million since 2017 in restarting abandoned cocoa plantations and training new cocoa growers via the Jeunes Entrepreneurs Café-Cacao (Young Coffee and Cocoa Entrepreneurs). In 2018, sales and exports of cocoa fell 38.7 percent and 40.3 percent respectively, despite increased production of 21.2 percent to 115 million tons.[4]With the corona crisis, CAISTAB has sought to protect growers by setting a national purchase price.[5] Global food manufacturer Nestlé has been purchasing Gabonese cocoa via traders since the 2000. Local entrepreneurs and diaspora increasingly produce and export small quantities of specialty chocolate, such as Julies Chocolate. In **Sao Tomé**, cocoa is the nation's largest earner accounting for 79 percent of total exports, with cocoa and cocoa preparations exported to Gabon. Production has decreased from a peak in 2013 of USD 20 million to USD 6 million in 2019 (United Nations COMTRADE database).[6] Increasing cocoa production is expected in most countries.

8.2.4 Coffee

Coffee is primarily an export crop in Central Africa, with some domestic consumption. Around 1 percent of the global coffee (Robusta and Arabica beans) production comes from Central Africa (OCDE 2007) Coffee was introduced in colonial run plantations in the DRC, Congo, Gabon and Cameroon (Clarence-Smith and Topik 2003). All Central African countries produce some coffee except Chad. Small countries like **Rwanda** and **Burundi** hold a relatively important place among the region's coffee exporters. In 2010, **Cameroon** was the region's main coffee exporter, accounting for about 2 percent of global production in 2015 and producing around 32,000 tons in 2015 (Conseil international du Café (ICC) 2015), since then exports have plummeted, exacerbated since 2017 by the conflict in the Anglophone regions. In the **DRC** coffee production was nationalized in the 1970s, and by the early 1980s, coffee was DRC's second-largest export after copper, with coffee production coordinated under the state Office National du Café (ONC). Production peaked in the 1980s with around 250,000 tons and declined significantly in the 1990s due to conflict and instability, a transition to small holder systems, liberalized market and lack of government support, with around 120,000 tons of Robusta a year produced in the mid-'90s (Cafe Imports Europe 2021), accounting for about 1.8 percent of global production in 2015 (Conseil international du Café (ICC) 2015). Export focused production now occurs in the North and South Kivu, and some traditional production in Kongo Central, Equateur, Kasaï and Ituri. About 250,000 coffee farmers produce around 600 tons of Robusta and arabica in mainly smallholder farming systems with varying amounts of shade and intercropping, selling largely to specialist coffee buyers and roasters, some larger scale buyers such as Starbucks (Wilkins 2019) and unrecorded exports to neighboring Uganda and Rwanda (Cafe Imports Europe 2021). An unknown quantity of coffee has been certified since around 2010 under VSS such as organic, UTZ and Fairtrade (Cafe Imports Europe 2021). In 2012, the government launched the Strategy Document for the Recovery of the Coffee Sector 2011–2015 with USD 100 million earmarked in South Kivu province. The private sector has lobbied for looser regulations and market liberalization (Coffeehunter.com 2021). In the **CAR**, internal conflict and the covid pandemic have dramatically decreased production of coffee, one of the country's major

3 https://ressources-magazine.com/focus-en/gabon-breathing-new-life-into-the-cocoa-sector/

4 https://www.cairn.info/revue-geoeconomie-2014-3-page-85.htm

5 https://cemac-eco.finance/cocoa-and-coffee-farmers-in-gabon-reassured-of-good-prices-despite-coronavirus-shocks/

6 https://tradingeconomics.com/sao-tome-principe/exports/gabon/cocoa-cocoa-preparations

export products[7], accounting for about 0.5 percent of gross domestic product in 2010, down from 1 percent in 2000 (Conseil international du Café (ICC) 2015). In general, stable or slightly increased production is expected, among these producing countries.[8]

8.2.5 Cotton

Cotton is produced mainly in smallholder farms, as a cash crop combined with other crops and economic activities in degraded savannah forest areas of the region, and is largely exported. There was a large increase in the land area planted with cotton in Central Africa from 1960 to 2009 mainly in response to market liberalization, falling global yields and to maintain incomes due to the long term downward price trend on international markets (Hussein 2005) and climate change negatively affecting production. **Cameroon** now exports to China, and **Chad** to Turkey. The **CAR** produces some cotton but conflict and the covid pandemic have dramatically decreased production.[9] Before 2005, Central African countries exported to Europe and Asia, thereafter mainly to Asia. The decline in Cameroon's cotton exports in 2018 was quite steep, and the decline in **Chad** slower, producing around 200,500 tons in 2015. It is not expected that cotton production will increase from the region.

8.2.6 Rubber

Wild or **red rubber** (*Landolphia, Funtumia*, etc.) exports experienced a boom in the 1880s particularly in **DRC** followed by a massive drop, as wild resources became over-exploited (Gewald 2006). In 1940s, wild rubber for industrial use and export recommenced and **rubber** (*Hevea brasiliensis*) plantations started in Gabon, Central African Republic, DR Congo and Cameroon. In **Gabon**, despite intercropping experiments (Enjalric and Ngoua Assoumou 1998) most rubber is grown in large scale plantations by government and private companies, with a tendency the region towards privatization of state plantations and joint ventures (Assembe-Mvondo et al. 2016). Prices and expansion in the 1970s were halted by the 1980s financial crisis, and in the 2000s Asian investment became more prominent. In **Gabon** international trader Olam has been active since 1999 and engaged in joint ventures with the government in 2012. In the South, Centre and southwest regions of **Cameroon**, production is dominated by two private agro-industrial entities Hevecam (54,000 ha) and Sudcam (45,000 ha), both owned by Halcyon, with expansion in the Sangha region associated with deforestation (Orozco and Salber 2019; Seale 2019; Assembe-Mvondo et al. 2016). In 2017, 53,000 tons of natural rubber were produced from Cameroon.[10] In Cuvette in **Republic of Congo**, the expansion of plantations in the 1970s and the last decade is linked to deforestation (Orozco and Salber 2019; Seale 2019; Assembe-Mvondo et al. 2016). In the **CAR**, rubber production has steadily increased since a dip due to the financial crisis, to 1200 tons in 2019 (FAOStat 2021).[11] Rubber production in the region is expected to increase slightly.

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7 http://iaco-oiac.org/sites/default/files/docspage/seudieu-session_2-women_youth-iaco.pdf et https://www.worldbank.org/en/news/press-release/2020/11/30/perspectives-economiques-en-republique-centrafricaine-diversifier-leconomie-pour-renforcer-la-resilience-et-favoriser-la-croissance

8 http://www.ico.org/

9 https://www.worldbank.org/en/news/press-release/2020/11/30/perspectives-economiques-en-republique-centrafricaine-diversifierleconomie-pour-renforcer-la-resilience-et-favoriser-la-croissance

10 http://www.rubberstudy.org/Cameroun

11 https://www.tilasto.com/en/topic/geography-and-agriculture/crop/natural-rubber/natural-rubber-production-quantity/central-african-republic

8.3 Initiatives taken by Central African countries to combat deforestation

Faced with this new situation, stakeholders involved in the production and export of forest-risk commodities have taken steps to mitigate the impact of anti-deforestation initiatives on their operations. In counterpoint to this needless controversy, citizens and consumers in the global North are making their own demands, as demonstrated by European countries through the Amsterdam Declaration.

It is extremely reductive to present this initiative as a threat to development in the global South. Deforestation also poses an existential threat to local communities (e.g. ecosystem services, including water and food). These measures, which often involve different types of actors (government, NGO and private sector), range from participation in anti-deforestation initiatives to promoting certification, and from awareness raising to capacity building and regulatory measures.

8.3.1 Central African discourses and public policies on commodity-driven deforestation

To understand the past, current and potential future impacts of imported deforestation and zero-deforestation commitments and initiatives in COMIFAC[12] and Central African countries, we must first consider how farmers, the public and private sectors, and NGOs define imported deforestation and zero deforestation in relation to commodities and their value chains.[13] This can be seen in the public discourses different actors use. A discourse is "an ensemble of ideas, concepts, and categories through which meaning is given to social and physical phenomena, and which is produced and reproduced through an identifiable set of practices" (Hajer 2006). Different actors have different views on if, and how deforestation is caused, if deforestation is a problem and if so, which approach can be used to solve the problem. These discourses shape the approaches actors such as governments, business and NGOs use and justify in their "theory of change" or "impact logic", i.e., why they prefer a certain approach. These determine the interventions they make on the ground, and resulting expected outcomes and long-term, high level impacts of these interventions. The main approaches are described in Box 8.1.

A summary of the impact logics - showing outputs, outcomes and anticipated impacts - for different approaches used in commodity chains perceived to drive deforestation in the Congo Basin, is shown in Figure 8.1.

Shown in Table 8.1, globally six main discourses have been identified driving the approaches and interventions used in forest-risk commodity value chains (Ingram et al. 2020a). In Central Africa, four different discourses can be recognized. Multi-stakeholder initiatives that involve most relevant stakeholders play an important role in reproducing discourses by referring to a common goal and strategy. Discourses are often interrelated and combined together by commodity trading companies.

12 COMIFAC Member States: Burundi, Cameroon, Central African Republic, Chad, DRC, Equatorial Guinea, Gabon, Republic of the Congo, Rwanda and Sao Tome and Principe.

13 The term 'value chain' is used in preference to 'supply chain', as value chain emphasizes the value that can be built into chains (Ingram 2014).

8.3.2 Initiatives by COMIFAC Member States

To better position themselves to combat 'illegal' deforestation linked to the production of agricultural and forestry commodities, Congo Basin governments have signed up to several bilateral and multilateral forest protection initiatives. For timber, these initiatives include Voluntary Partnership Agreements (VPAs) under the EU Action Plan for Forest Law Enforcement, Governance and Trade (FLEGT), the Central African Forest Initiative (CAFI) and the Tropical Forest Alliance (TFA). The Republic of the Congo (2010), Cameroon (2010) and CAR (2011) have signed VPAs with the EU while Gabon and DRC are currently negotiating a similar partnership framework with the EU. These agreements are at various stages of implementation in those Congo Basin countries that have

Box 8.1: Main approaches used to tackle deforestation by actors in Central Africa

1. **Regulatory** - state regulations and government policies governing commodity value chains and the landscapes which the commodities originate from
2. **Landscape & jurisdictional** – refer to initiatives at a scale that match administrative boundaries of local, regional, sub-national or national governments in commodity producing countries or production and ecosystem areas. These approaches tend to cover actors at different stages of one commodity chain, with producers most widely represented numerically.
3. **Voluntary sustainability standards (VSS)** - standards to which producers voluntarily adhere, requiring them to improve their production practices across a variety of sustainability indicators, used in all stages of commodity value chains, such as FSC and PEFC (timber, rubber), RSPO (palm oil), Better Cotton Initiative (cotton), Rainforest Alliance, Organic and Fairtrade (coffee, cocoa, cotton) and the Global Roundtable for Sustainable Beef (GRSB).
4. **Corporate pledges** - corporate social responsibility, self-regulation and declarations, whereby a business (or association thereof) pledges and then monitors and ensures active compliance with the spirit of the law, ethical standards, and national or international norms on CSR. These include actions that appear to further a social or environmental goods beyond the interests of the firm(s) and what is required by law. Often in the trading, manufacturing and retailing stages of value chains.
5. **Public-private partnerships (PPPs)** - Platforms, networks, associations, partnerships and agreements between private sector and public sector, and often also research, civil society (CSO), and non-governmental (NGO) organisations collaborating on a common goal of sustainability with a declared policy or programme and plan of action. Many PPPs include governments in producer and consumer countries, and large companies in trading, manufacturing and retailing stages of value chains.
6. **Due diligence mechanisms** - include individual and joint actions, investigations or the exercise of care by companies to avoid committing an offence. The offence maybe due to a legal obligation or a voluntary initiative on taking responsibility in chains. These include traceability mechanisms, third-party campaigns and investigations, voluntary disclosure initiatives and moratoriums – which commonly occur at the supply and consumer ends of commodity chains.

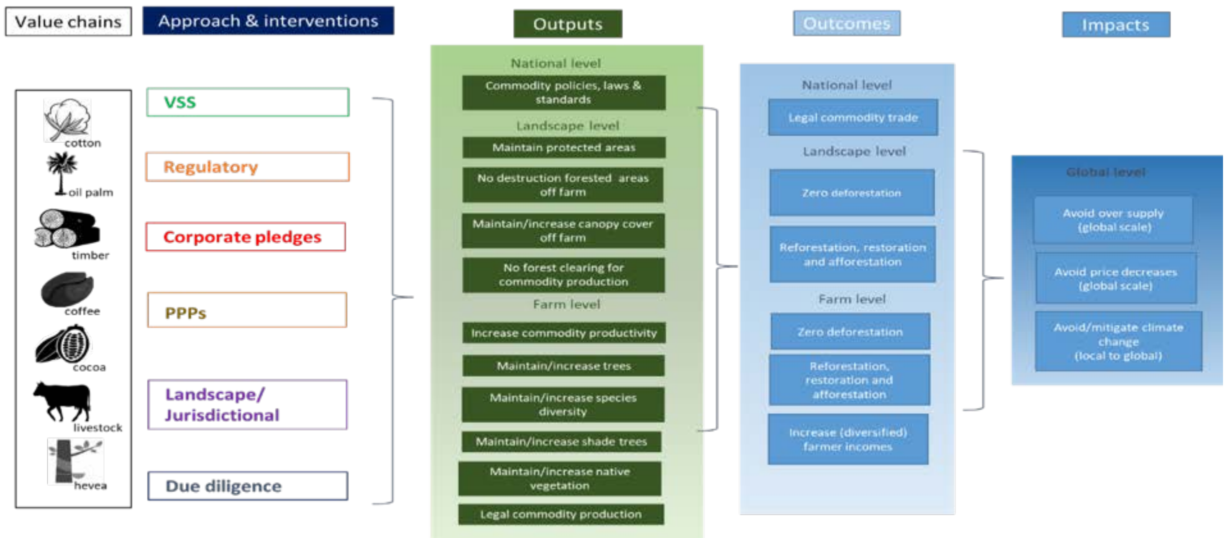

Figure 8.2: Impact logic of zero-deforestation approaches applied to Congo Basin commodity value chains

Source: Ingram et al 2020

signed them. Finally, on the economic front, Congo Basin countries are striving – more so now than before – to diversify the destination of the wood they export. Consequently, over recent years, timber exports from the subregion to China, countries in South Asia (e.g. India and Vietnam) and the Middle East[14] are gaining momentum, in particular at the expense of EU countries. It should be noted that apart from tentative efforts to organize the domestic timber market, such as in Cameroon, virtually nothing has yet been done by signatory states to alleviate the problem. Efforts have also been made to raise awareness and build stakeholder capacity as regards the characteristics and requirements of FLEGT VPAs (awareness-raising and capacity building on procedures and traceability, for example).

On the economic front, countries in the subregion appear committed to reducing their log exports and promoting more advanced local wood processing[15] (second and third-stage processing), thereby generating more added value. Moves in this direction include the recent (September 2020) decision by Central African Economic and Monetary Union (CEMAC) Member States to ban log exports from 2022 and to launch special economic zones for wood processing, such as the Nkok Special Economic Zone in Gabon.

CAFI is a partnership that brings together countries in the subregion (DRC, CAR, Cameroon, Republic of the Congo, Gabon and Equatorial Guinea), a coalition of donors (Germany, France, Norway, United Kingdom, EU) and Brazil with the aim of preserving the subregion's forests, mitigating climate change and contributing to sustainable development. Among other things, it supports the measures taken by countries in the subregion to promote:

- Sustainable farming practices with less conversion of forest land,
- Sustainable forest management,
- Land-use planning aimed at preserving forests,

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14 http://www.euflegt.efi.int/fr/web/apv-a-z/qu-est-ce-un-apv

15 See Convergence Plan for the Conservation and Sustainable Management of Forest Ecosystems in Central Africa 2015–2025; measures taken by Cameroon (1990) and Gabon (2010s), for example.

Table 8.1 Discourses on zero deforestation at the global level and in Central Africa

Discourses globally	Discourses in Central Africa	Main focus	Solutions to commodity-driven deforestation	Espoused by
Neoliberal	*Zero-deforestation as a market requirement*	Confidence in the role of markets to find solutions to environmental problems.	Market mechanisms PES schemes, REDD+, emissions trading, carbon caps, voluntary sustainability mechanisms, individual business and sustainable investments.	"Moderate" NGOs, the private sector, and liberal governments
	Productivity for protection	Land sparing via productivity increases. protecting (forested) protected areas.		
Legality and responsibility		Support for the rule of law and proper and careful management of sourcing and procurement practices to reduce the impact of commodity production.	Effective interactions between legal frameworks, corporate responsibility for implementing due diligence principles, active civil society organizations.	Governments, EU, NGOs focusing on corporate transparency and financial organizations
Limits to growth		Calls for global governance, argues against privileging traditional market players and embraces efforts for global burden sharing, and fair and equitable shares in global consumption.	Stronger governments and regulatory approaches to set boundaries to expanding economy, worldwide transformative, systematic change in consumption and production patterns.	"Conscience keeping" NGOs, local agroecological and peasant movements, indigenous associations, some scientists, climate activists, youth activists, and the slow food movement.
Local livelihoods		Recognizes the need for land use practices in forested areas and government support for the development of decent/acceptable livelihoods of local farmers and communities.	Land tenure as legal condition for deforestation free commodities. PES schemes, REDD+, legal protection of farmers, agricultural extension services	Farmers and communities, development organizations and some voluntary standards schemes.
	Commodities for the future	Belief that some commodities can be grown sustainability, supporting needs of future generations	REDD, Climate activism, agroforestry & mixed cropping	
New colonialism	*Learning from mistakes*	Commodity production considered as a development engine threatened by Western sanctions under the guise of nature conservation and environmental awareness. This discourse rejects negative impacts of commodity production as an unfair limiting factor to development.	Consumer behavioral change through information and awareness, regulations, and economic compensation	Governments in Cameroon and Gabon, Brazil, Indonesia, India and among palm oil and meat producers.
		Learn from mistakes made in large commodity supplying countries with now small forest areas, e.g., Ghana, Cote d'Ivoire, Indonesia, Brazil	VSS, agroforestry & mixed cropping	Traders, governments in high forest land cover areas eg Cameroon, DRC and MSP eg IDH, some environmental NGOS eg WWF, CI, researchers

Sources: Ingram et al. 2020a, Masselot 2020

- More secure land tenure, which discourages forest conversion,
- Better governance frameworks, resulting in permit and tax regimes that do not incentivize economic actors to convert forests or carry out illegal activities.[16]

The TFA, meanwhile, is a multi-stakeholder partnership platform set up in 2012 to support key actors in the production of commodities like palm oil, soybean, beef, cocoa and paper to transition to deforestation-free supply chains. DRC, CAR, Cameroon, Republic of the Congo and Gabon have been members of the TFA since 2015, in particular through its flagship initiative, the African Palm Oil Initiative (APOI). The APOI aims to promote the sustainable development of the oil palm sector in accordance with countries' ambitions for emergence, while respecting good environmental and social practices. With technical and financial support from TFA-APOI, these countries have drawn up national principles and action plans for the sustainable production of palm oil, which are now being implemented. Going further, three countries (CAR, Republic of the Congo and DRC) have signed the Marrakesh Declaration (2016), which sets out regional guiding principles for the responsible development of the palm oil sector.

Beyond the initiatives described above, which involve almost all countries in the subregion, there are other country-specific initiatives, such as, Gabon's certification standards initiative and Cameroon's Roadmap to Deforestation-Free Cocoa.

In September 2018, Gabon made FSC certification mandatory for all its forestry concessions from 2022. This shift from a private and voluntary governance instrument to a binding national instrument aims to combat unsustainable logging practices, including deforestation. The approval of the RSPO standard as a national standard for palm oil production by the Gabonese Standardization Agency (AGANOR) in 2019 is also part of the Gabonese Government's commitment to combating unsustainable commodity production practices, including deforestation. Moreover, as part of recent efforts to revise Gabon's national interpretation of the RSPO (December 2019–July 2020), the government has shown political will despite the RSPO being, in essence, a civil society and private sector-led mechanism. Through these initiatives, the Gabonese authorities hope, among other things, to ensure that Gabonese goods have access to markets aware of the need to combat imported deforestation or to avoid Gabonese goods being boycotted by consumers and NGOs. This motive also drives the Cameroonian authorities adoption of the Roadmap to Deforestation-Free Cocoa in Cameroon. This roadmap provides a shared framework for action and was developed by stakeholders in the cocoa value chain from 2019 through a participatory process supported by IDH, The Sustainable Trade Initiative. The objective of this action plan is to promote the production of deforestation-free cocoa that meets the government's production ambitions and sustainability standards, compliance with which is increasingly required to access certain international markets. Through the Standards and Quality Agency (ANOR), the Cameroonian Government is also working to standardize agricultural and forestry commodities. Such standards include APNC 2895-96-97 on sustainable and traceable cocoa and ARSO/AES 2014 on timber, which are currently being revised or adopted and could help the country to adjust to the requirements of deforestation-free value chains.

In addition to the actions taken above, governments in the subregion are engaged in projects or processes not explicitly aimed at mitigating the impacts of initiatives to combat imported deforestation, but that are likely to help them comply with the requirements of deforestation-free agricultural value chains or manage the effects of initiatives seeking to prevent the destruction of forest cover for agricultural purposes. Such initiatives include REDD+ processes (DRC, Republic of

16 https://www.cafi.org/content/cafi/en/home/

the Congo, Cameroon, CAR), diversifying agricultural production (Republic of the Congo, Cameroon, Gabon), promoting climate-smart agriculture (Republic of the Congo), land-use planning (Gabon, Cameroon, Republic of the Congo, DRC) and the decision to focus large-scale agricultural projects on savannah areas (Republic of the Congo).

8.3.3 NGO actions

Imported deforestation is of interest to several international and national environmental NGOs working in the region. Such international environmental NGOs include WWF, World Resources Institute (WRI), Greenpeace, Forest People's Programme, Proforest, Earth Worm Foundation, FERN, Wildlife Conservation Society (WCS) and the Rainforest Alliance. National NGOs include the Center for Environment and Development (CED), Brainforest, Education Environnement Développement Durable (Education, Environment, Sustainable Development – EEDD), Comité Des Droits De L'Homme et Developpement (Human Rights and Development Committee – CODHOD), Femme, Environnement, Santé et Education (Women, Environment, Health and Education – FENSED), Service d'Appui aux Initiatives Locales de Développement (Support Services for Local Development Initiatives – SAILD), Forêts et Développement Rural (Forests and Rural Development – FODER), International Development Research Centre (IDRC) Africa, Muyissi Environnement, ASD and Observatoire congolais des droits de l'homme (Congolese Human Rights Observator – OCDH). Between 2017 and 2020, several international environmental NGOs, often in collaboration with national environmental NGOs, organized or facilitated workshops in a number of countries in the subregion to raise awareness or build capacity among stakeholders involved in producing or trading commodities. They covered different aspects of imported deforestation and the requirements imposed by initiatives to prevent it. Beyond building the technical capacity of these stakeholders, some of these NGOs sought to support stakeholders – including small producers – to build their organizational capacity. These awareness raising and capacity building efforts aimed to help stakeholders avoid or mitigate the negative consequences of measures to combat imported deforestation by enabling them to comply with the requirements of organizations, governments, investors and consumers in buyer countries. They also aim to help these stakeholders to harness the opportunities offered by organizations, governments, investors and consumers in buyer countries as part of efforts to combat imported deforestation.

Key imported deforestation initiatives implemented or supported by environmental NGOs include:

- TFA-APOI facilitated by Proforest, WWF, WRI, CODHOD, EEDD and Brainforest in the subregion.
- The Roadmap to Deforestation-Free Cocoa in Cameroon, facilitated by IDH and supported by around a dozen environmental NGOs.
- The Green Commodity Landscape Programme (GCLP) launched in Cameroon in 2018 by IDH and WWF. The GCLP is a multi-stakeholder programme operating at the landscape level. It aims to support sustainable commodity production while contributing to the protection of forests and improving the livelihoods of farmers and their communities. It uses cocoa production as an entry point into the landscape. The GCLP seeks, among other things, to help growers and the Cameroonian Government to produce commodities in a way that maintains access to major European markets through compliance with the commitments made by private companies (Cargill, Olam, Barry Callebaut, Mars, etc.) and other requirements of consumer countries.
- The Accountability Framework Initiative (AFI) is a collaborative effort to create and scale up ethical supply chains for agricultural and forestry products. Led by a diverse global coalition of environmental and human rights organizations under the leadership of the Rainforest Alliance, the AFI strives to build a 'new normal' where commodity production and trade truly protect

natural ecosystems and human rights.[17] It has been active in the subregion (DRC, Cameroon, Gabon, CAR, Republic of the Congo) since 2019 under the leadership of WWF and the Rainforest Alliance, which handle promotion.

Finally, with regard to voluntary certification initiatives, environmental NGOs tend to focus on three key lines of action:
- Supporting the development of standards. Between 2005 and 2018, WWF supported the regional and national FSC interpretation initiatives; WWF, Proforest, Brainforest, FENSED and other environmental NGOs launched and/or supported Gabon's national RSPO interpretation efforts (RSPO Principles & Criteria 2013 and 2018); WWF, Proforest, the Zoological Society of London (ZSL) and Forest Peoples Programme helped launch and/or support Cameroon's national RSPO interpretation process, which is currently under way.
- Awareness raising among the private sector and producer groups to encourage companies to engage in the FSC (wood), RSPO (palm oil) or Rainforest Alliance (cocoa) certification process. WWF, Proforest and Rainforest Alliance have been highly active in this field for years.
- Technical and financial support for the private sector to undertake the certification process. For example, for several years, WWF has supported a number of forestry companies engaged in the FSC certification process (such as Palisco and Wijma in Cameroon, and CBG in Gabon).

These interventions aim, on the one hand, to help stakeholders to defend against the negative consequences of measures to combat imported deforestation by enabling them to comply with the new requirements and, on the other, to help them to harness the opportunities offered by organizations, governments, investors and consumers in buyer countries as part of efforts to combat imported deforestation.

8.3.4 Private sector initiatives

Policies on imported deforestation adopted by countries in the global North impact commodity-producing countries, and private sector companies that produce and sell raw materials in particular. The private sector in Central Africa has responded to these policies in two main ways. Companies either take steps to comply with the requirements of the deforestation-free production and sale of commodities through sustainable production commitments or they circumvent them and reorient themselves towards alternative markets. These commitments to sustainable production mainly take the form of corporate sustainability policies, on the one hand, and the certification of their forestry and agricultural operations, on the other.

Commitments to greater sustainability in forestry and industrial agriculture operations in Central Africa remain modest, as illustrated below. In response to the introduction of increasingly strict anti-deforestation policies by countries in the global North, some companies (especially forestry companies operating in Central Africa) are diversifying their markets and shifting to more permissive markets in Asia, in particular China, India and Vietnam. This trend has been fuelled by, among other things, the intensification of multisectoral cooperation between Congo Basin countries and China over recent years and the massive influx of Chinese capital into the Central African forestry sector. A case in point: between 2005 and 2019, the number of Chinese-owned forestry companies in Cameroon increased from 4 to 12 and the forest management unit area controlled by them increased

17 https://accountability-framework.org/about/about-the-initiative/

from around 50,000 ha to 110,000 ha (Zongang 2019). This shift means that countries in the global North can ease their conscience by not importing products that contribute to deforestation, while not actually doing anything to prevent it in producer countries.

8.4 Initiatives taken by importing countries to tackle imported deforestation

In response to increasingly vocal pressure from NGOs, civil society and consumer groups, a number of public policies and market-based, private sector initiatives (including voluntary sustainability standards for agricultural commodities and timber) have emerged at the international level, especially in Europe, North America and China.

European countries are currently considering several possible ways to implement a policy to combat imported deforestation. They range from government regulations enforced by national or supranational public bodies to private governance mechanisms under which companies voluntarily work to produce commodities without causing deforestation or severe forest degradation.

Over the past 20 years, private sector actors have increasingly defined and monitored their own performance when it comes to sustainability, either via certification standards or by developing their own procedures and criteria. These voluntary approaches have often been criticized for only covering a minority of companies and failing to reach other producers who supply markets that are less sensitive to the sustainable production of agricultural commodities. These voluntary private approaches are also criticized because a large number of companies fail to fulfil their commitments, particularly when they commit to deforestation-free production practices. Year after year, multinationals make little to no progress towards the goals set by the New York Declaration or the Bonn Challenge.

Companies' lacklustre performance on combating imported deforestation should not, however, overshadow the significant progress made by certification standards over the past 15 years as regards their operational content on sustainability. The place of standards is relatively settled in some sectors, such as FSC and PEFC certification for wood and Rainforest Alliance certification for coffee and cocoa. This has not however been the case for other tropical agricultural products. Though now accepted, standards and certification procedures applicable to such products were largely absent over the past decade and often controversial. The overarching goal of private standards is sustainability. But so far they have failed to incorporate substantial provisions to prevent deforestation or limit forest degradation. Moreover, some standards underperform on a number of social criteria, the implementation of which is often criticized.

As importing countries consider how to implement policies to combat deforestation, it is useful to examine how far existing sustainability standards could help them move towards this goal. To this end, Table 8.1 presents four sectors that have a worrying impact on Central African forests (palm oil, cocoa, rubber and wood) and, by way of example, the requirements set out in the French Strategy to Combat Imported Deforestation (SNDI). These requirements are grouped into three categories: (i) environmental impacts, such as forest and peatland degradation, the use of the High Conservation Value (HCV) and High Carbon Stock (HCS) approaches; (ii) social impacts, such as labour law, free, prior and informed consent, respect for the legal and customary status of land; and (iii) how the standard is applied, including access to certification for small producers.

8.4.1 European Union public policy

Deforestation and forest degradation contribute to some of the major global sustainability challenges such as biodiversity protection, climate change, human rights, peace and security, good governance and the rule of law. The European Union (EU) has made tackling these global challenges one of its priorities, to ensure that EU meets its international commitments and contributes significantly to solving and mitigating the problems.

The Amsterdam Declaration of December 2015 – with separate declarations on **deforestation and palm oil-** was made on the sidelines of the COP21 Paris Agreement on Climate Change. Since 2021, the Amsterdam Declaration Partnership includes Belgium, Denmark, France, Germany, Netherlands, Norway, Spain, Italy and the United Kingdom and advocates political commitments and public policies **to achieve sustainable and deforestation-free agricultural commodity supply chains in Europe and facilitate national level multi-stakeholder initiatives**, working in partnership with private sector companies and producer countries. Eliminating deforestation associated with agricultural product value chains was made a point of political dialogues and trade negotiations with producer countries (Karsenty, 2019). **These efforts have driven policy changes and commitments among partner countries and at EU-level.** The French Strategy for the Fight against Imported Deforestation (Stratégie nationale de lutte contre la déforestation importée, SNDI), uses the term imported deforestation. The national territory in this case is France or any other European country, and outside implies countries in Central Africa or other tropical country since it is considered that deforestation occurs mainly in tropical regions.

On a European level, following an analysis of the impact of EU consumption on deforestation (European Union 2013), and complementing to the EU Timber Regulation (EUTR) (Regulation (EU) No 995/2010) and the Forest Law Enforcement, Governance and Trade (FLEGT) Regulation (Council Regulation (EC) No 2173/2005), in 2018 a feasibility study[18] on EU options to step up action against deforestation was published. In July 2019, the European Commission adopted the EU Communication on Stepping up EU Action to Protect and Restore the World's Forests.[19] Five priority areas for action were set out: EU demand side measures, partnerships with producer countries worldwide, international multilateral cooperation and redirecting finance and advancing information. The proposals for action were developed as an integral part of the overall EU initiative of a European Green Deal (2019)[20] linking this set of actions on forests to other relevant initiatives, such as the European Biodiversity Strategy[21] and the Farm to Fork Strategy[22]. In 2019 the European Commission considered how to step up EU Action to protect and restore the world's forests and set up an open public consultation on "Deforestation and forest degradation – reducing the impact of products placed on the EU market" (European Commission 2019). In October 2020, the European Parliament adopted a resolution with recommendations to the Commission on an EU legal framework to halt and reverse EU-driven global deforestation (European Parliament 2020). This legislative initiative looks at the feasibility and effectiveness of creating mandatory rules based on due diligence, similar to the EU Timber Regulation and Forest Law Enforcement, Governance

18 European Union (2018) *Feasibility study on options to step up EU action against deforestation*. Luxembourg: Publications Office of the European Union. DOI: 10.2779/75460. Available at: https://op.europa.eu/en/publication-detail/-/publication/84b3bef5-2d86-11e8-b5fe-01aa75ed71a1/language-en

19 European Commission, Directorate-General for Environment (2019) *Stepping up EU Action to Protect and Restore the World's Forests*. Available at https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52019DC0352

20 https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

21 https://environment.ec.europa.eu/strategy/biodiversity-strategy-2030_en

22 https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/farm-fork_en

and Trade (FLEGT) Voluntary Partnership Agreements (VPAs) system, for forest risk commodities in addition to timber, as well as promoting voluntary third-party certification and labels.

Since the launch of the communication in 2019, the focus and discussions have been centered around the preparation for additional measures related to the EU demand side, particularly regarding measures to minimize the risk of deforestation and forest degradation associated with products placed on the EU market, including mandatory labelling, certifications schemes, legality standards, country benchmarking, carding systems, et cetera. Based on experiences with the EU Timber Regulation, a more comprehensive understanding has been gained of how the due diligence approach can be applied on a wider range of commodities, such as cocoa, coffee, palm oil, soy, beef and timber. A legislative proposal to minimize the risk that products linked to deforestation be sold in the European market was published in 2021.

As the European Commission carried out a fitness check of EUTR and FLEGT Regulations in 2021, the experiences from Central African countries are of critical importance to help evaluate the functioning of both regulations to combat illegal logging and to provide insights into how a similar system can be applied for commodities other than timber. The demand side public policy making in Europe should be ensured to contribute to impacts on the ground and reflect, service the needs of producer countries.

8.4.2 Public policy in the United States

The United States is a major consumer of forest-risk commodities, such as beef, soybeans, palm oil and wood products, although compared to Europe and China, the total imported volume of these commodities from tropics is less significant.[23]

Since 2008, the U.S. Lacey Act, which previously applied only to wildlife trade, was amended to include the banning of imports and the trade in illegal timber and wood products from foreign countries. The imported volume of wood product has declined and prices for tropical hard wood has increased, as the country shifts to domestic wood sourcing. In the meantime, since the Lacey amendments took effect,[24] China has become a major exporter of timber to the United States. However, the amount of tropical wood in these imports which originated from China has dropped. Research has shown that the impacts of Lacey Act mainly result from avoiding high-risk area and high-risk products.[25] Hence the exact effects on the ground in tropical timber producer regions is unclear. More global measures and research have to be carried out to better understand its global impacts on solving illegal logging and protecting world's forests.

Another relevant action was the enactment of the Tropical Forest Conservation Reauthorization Act (TFCA) of 2019,[26] which is a debt-for-nature swap initiative (established in 1998) that mobilizes funding for tropical forest conservation. A USD 15 million fund was made available in 2020 and USD 20 million is expected to be provided in 2021. Several TFCA agreements have been signed

23 See import volumes in Beckman, Jayson, Ronald D. Sands, Anne A. Riddle, Tani Lee and Jacob M. Walloga. International Trade and Deforestation: Potential Policy Effects via a Global Economic Model, ERR-229, U.S. Department of Agriculture, Economic Research Service, April 2017. Available at: https://www.ers.usda.gov/webdocs/publications/83299/err-229.pdf?v=1569.1

24 UCS (2015) The Lacey Act's Effectiveness in Reducing Illegal Wood Imports. Available at: https://www.ucsusa.org/sites/default/files/attach/2015/10/ucs-lacey-report-2015.pdf

25 ibid.

26 https://www.usaid.gov/tropical-forest-conservation-act

with several governments since 1998. According to the Congressional Research Service,[27] USD 233.4 million has been used in 14 countries for 20 forest projects, and more than USD 339 million has been leveraged through congressional funds and donations for tropical forest conservation. Approximately 67 million acres (around 27 million hectare) of tropical forest were conserved in countries such as Indonesia, Brazil, Paraguay, Botswana and Peru.[28] Nonetheless, so far little systemic academic research on the effectiveness and impacts of TFCA has been conducted.

8.4.3 Public policy in China

The sustainability agenda in China has been slow moving in the last decades. However, although still in nascent stage, in the past few years, enabling factors in both public and private sectors emerged which create a promising environment to speed up and scale up current efforts to address deforestation linked to commodity imports. China is the largest importer for tropical timber, soy and beef, and second or third largest importer of palm oil.[29] Hence the sustainability of commodity trade and related forest protection agendas cannot be discussed without looking at the huge Chinese market.

In 2017, China included 'ecological civilization' into its constitution as the framework for its pathway to sustainable development.[30] The government committed to be a responsible power on tackling climate change and biodiversity loss. Some green supply chain policies and guidelines[31] have been enacted. The ongoing formulation of the China green value chain strategy combined with the South-South cooperation and partnership through Green Belt and Road Initiatives could have positive implications for Central African Countries. China's intention to ensure legal timber imports and future deforestation-free palm oil imports could create synergies and align with global efforts.

In June 2020, the draft of an updated "Green Bonds Endorsed Projects Catalogue" was published by the People's Bank of China, the National Development and Reform Commission, and the China Securities Regulatory Commission for public consultation. This draft includes the recognition of sustainable agricultural commodities certified by international certification schemes, such as Roundtable on Sustainable Palm Oil (RSPO), Round Table on Responsible Soy (RTRS), Forest Stewardship Council (FSC). This marks a significant step for the official regulation to include international standards. It sends a strong signal to the private sector and reflects that the Chinese market actors are changing to align more with international environment as many Chinese companies and investment sector start to expand their operations overseas.

A policy study report to greening China's soft commodity value chains was published by the China Council for International Cooperation on Environment and Development (CCICED, 2020).[32] In addition to a national green value chain strategy, the Council suggested that the government to adopt mandatory and voluntary measures to reduce the import of commodities that are illegally harvested and to strengthen due diligence and traceability systems. This could be built upon the

27 https://fas.org/sgp/crs/misc/RL31286.pdf

28 https://www.nature.org/en-us/about-us/who-we-are/how-we-work/policy/tropical-forest-conservation-act/

29 CCICED (2020) *Global Green Value Chains – Greening China's 'Soft Commodity' Value Chains*. Available at: https://cciced.eco/wp-content/uploads/2020/09/SPS-4-2-Global-Green-Value-Chains-1.pdf

30 Hansen, M. H., Li, H. Svarverud R. (2018) Ecological civilization: Interpreting the Chinese past, projecting the global future, Global Environmental Change, volume 53, pp. 195-203. https://doi.org/10.1016/j.gloenvcha.2018.09.014.

31 Such as the Guiding Opinions on Promoting a Green Belt and Road Initiative (2017), Belt and Road Initiative Green Supply Chain Cooperation Platform (2018), Notice on Supply Chain Innovation and Application Pilot (2018), and other relevant documents and guidelines released in 2019.

32 ibid

latest revision of the China Forest Law,[33] that prohibit the use of illegal timber. Similar regulations could expand gradually to cover other soft commodities.

8.4.4 Private sector commitments

International companies made commitments to move towards Zero Net Deforestation (ZND) through the Consumer Goods Forum (CGF) in 2010. The objective was to eliminate net deforestation from their value chains by 2020. These commitments were reinforced in 2014 by the New York Declaration on Forests (NYDF), through which 190 organizations including 57 multinationals committed to eliminate deforestation from their production and supply chains by 2020.

In the cocoa sector, NGO pressure has stimulated companies to avoid risk, take collective action and mitigate negative publicity. NGOs pressured major traders buying from the region such as Cargill, Olam and Barry Callebaut and the chocolate manufacturers they supply to, to adopt corporate pledges and sustainability programs, and to engage in public-private partnerships, such as landscape approach embodied in a Framework for Action for the **Roadmap to Deforestation-free Cocoa in Cameroon**[34] led by the Dutch Initiative for Sustainable Trade (IDH) in 2019. In 2021 companies operating in Cameroon joined the World Cocoa Foundation's (an alliance of major cocoa and chocolate companies worldwide) Cocoa & Forests Initiative between private and public sector in 2021.

The private sector, as part of corporate social responsibility or sustainability commitments, has made public commitments to sustainable development and, specifically concerning biodiversity, human rights, deforestation and climate change. Many multinational industrial agribusinesses operating in Central Africa have committed to eliminate deforestation from their supply chains, either through certification or through their internal sustainability policies. For example, the Cargill Group, alongside its Cameroonian partner Telcar Cocoa Ltd, has committed to, among other things, reduce greenhouse gas emissions from its supply chains by 30 percent by 2030.[35] Similarly, the Olam Group, which has a major presence in Gabon's palm oil sector and Cameroon's cocoa sector, has set itself the objective to develop responsible and sustainable agricultural supply chains, in which prosperous farmers and producers, flourishing rural communities and healthy ecosystems can coexist.[36] Halcyon, the parent company of SudCam and Hevecam, has committed in its sustainability policy to avoid deforestation in all its operations by applying the High Conservation Value (HCV) and the High Carbon Stock (HCS) approaches.[37] Many multinationals operating in the Congo Basin have committed to combat deforestation, mainly in response to the anti-deforestation regulations and campaigns implemented by governments, international environmental NGOs and consumers in those countries importing the commodities. In a similar vein, private sector companies are also engaging in multi-stakeholder platforms aimed at protecting natural ecosystems and promoting sustainability in the production and marketing of agricultural commodities, among other things. This is the case for several companies that have joined the TFA (e.g. Olam, Socfin, Feronia, Cargill, Nestlé).[38] In committing to this initiative, companies undertake, among other things, to reduce

33 https://www.atibt.org/wp-content/uploads/2020/01/China-Forest-Law-Amendment-2020-20191228.pdf

34 https://www.tropicalforestalliance.org/en/news-and-events/news/press-release-Camerounian-cocoa-stakeholders-sign-a-roadmap-towards- sustainable-and-deforestation-free-cocoa

35 https://www.cargill.com/sustainability/priorities/climate-change

36 https://www.olamgroup.com/sustainability.html

37 https://www.halcyonagri.com/publication/sustainable-natural-rubber-supply-chain-policy-snrscp/ (1 November 2020)

38 https://www.tropicalforestalliance.org/ (21 October 2020)

deforestation in their supply chains. However, it is still too early to assess how effective this commitment has been when it comes to reducing deforestation in practice.

8.4.5 Voluntary sustainability certification standards for commodities

Voluntary sustainability standards are used to demonstrate commitments and sustainable production processes to suppliers and consumers. The Central Africa region has lower coverage of sustainability certification both in terms of volume and hectares certified than other major commodity-producing regions.

There are a number of certification schemes for **wood** that could impact forest conservation. They have emerged on the market in response to increasing pressure from consumers concerned about the environmental credentials of products entering their markets. This is the case for the FSC, PEFC and other certificates of legality (OLB, LegalSource, etc.) for wood and RSPO for palm oil. At present, 3,653,948 ha of forest are FSC certified in the Congo Basin (in Cameroon, RoC and Gabon), while 596,822 ha[39] are PEFC certified and 9,543,857 ha[40] have a certificate of legality. The FSC and PEFC certification systems are also championed by Fair&Precious, a collective and collaborative brand created by the International Tropical Timber Technical Association (ATIBT) and its members, whose objectives include the sustainable management and protection of tropical forests.[41] As regards the certification of other agricultural products, currently only Olam Palm Gabon has an RSPO-certified palm oil plantation (112,455 ha) and the company plans to certify all its operations in Gabon by 2021.[42] In Cameroon, the Socapalm (around 70,000 ha) and Safacam (around 9,000 ha) plantations are in the process of obtaining RSPO certification. In DRC, Feronia (Plantations et Huileries du Congo S.A., with 107,301 ha)[43] has stated that it is also undertaking RSPO certification.[44] Current debates centre on the sustainability and legality of tropical timber and the slow growth in demand for certified tropical hardwood (Tropenbos International 2014).

For **rubber**, only Hevecam (21,140 ha planted), a subsidiary of the multinational Halcyon, is undertaking the FSC certification process. There are no other similar initiatives for rubber in the Congo Basin, but it should be noted that Olam Rubber Gabon (11,000 hectares planted) is working to combat deforestation at its plantation in northern Gabon, in particular by protecting nearly 25,000 ha of HCV land.[45]

For **cocoa** in the Congo Basin, 11 producer groups have been certified by UTZ/Rainforest Alliance,[46] with the support of several buyers/exporters (Olam, Telcar/Cargill, Sic Cacaos/Barry Callebaut, Agroproduce Management Services LTD (AMS)/Theobroma, Ferrero). Certification gives these growers access to a niche market offering premium prices to stakeholders in these value chains. Certification should also enable them to maintain their access to consumer markets where anti-

39 http://pafc-certification.org/gabon/pafc-gabon-intro

40 Programme for the Promotion of Certified Forests (PPECF), Personal communication (Cameroon 3,609,931 ha; Republic of the Congo 3,211,003 ha; Gabon 2,033,627 ha; DRC 689,296 ha)

41 https://www.fair-and-precious.org/en/p/10/managing-and-protecting-forests-to-combat-global-warming (1 November 2020)

42 https://www.olamgroup.com/sustainability/sustainable-supply-chains/sustainable-palm-oil.html

43 https://www.feronia.com/plantations (1 November 2020)

44 https://www.feronia.com/sustainability/view/sustainability-strategy (1 November 2020)

45 https://www.olamgroup.com/locations/west-and-central-africa/gabon.html (1 November 2020)

46 https://utz.org/

deforestation requirements apply. No Rainforest Alliance certified **coffee** is produced, but organic and Fairtrade certified coffee is grown in the Kivu region of DRC.

8.4.6 Voluntary sustainability certification standards: Compatibility with efforts to combat imported deforestation

Existing private certification systems have enabled several sectors to make significant progress towards deforestation-free production. This is the case for timber, for which the PEFC and FSC standards meet most of the demands of France's National Strategy to Combat Imported Deforestation (SNDI), although the application of certain criteria could be improved. The RSPO certification for palm oil is also largely compatible with the SNDI criteria, but there are still issues around product traceability and the treatment of forest degradation. These two shortcomings are also found in the Rainforest Alliance standard for cocoa, but most of the SNDI criteria are covered.

Despite the mixed performance of these standards across these sectors, they share several weaknesses when it comes to compliance with public policies aimed at preventing imported deforestation:
- These sustainability standards are still ill equipped to estimate deforestation, forest degradation or impacts on peatlands;
- The HCS approach is still not used to full effect, unlike the more common approach of identifying HCV areas, although monitoring of HCV areas is still inadequate;
- Most of the social criteria included in the SNDI are also included in most of the standards, but they are poorly monitored in practice, according to NGOs, among other stakeholders;
- Product traceability is almost always a challenge, because it is rarely possible to trace products back to where they were grown;
- The independence and transparency of certification audits are often questioned;
- Small-scale producers in the global South still struggle to access certification.

Private sustainability standards, in their current form, are not therefore able to take a leading role in efforts to stop imported deforestation. Two aspects must be addressed to better equip them to support the implementation of the SNDI policy. On the one hand, in the short term, the content and implementation arrangements must be revised, and many standards are currently in the process of doing this. On the other, their linkages with other approaches that could complement the implementation of this policy should be considered. These approaches could include the negotiation of bilateral or multilateral agreements between producer and consumer countries, the management of geographic risk in production areas, or the territory-level certification of areas that are firmly committed to sustainable development.

8.4.7 NGO actions

Globally, international, national and local NGOs such as Global Witness, Forests 500, Supply Change by Forests Trends, Tropical Forest Alliance 2020 (TFA 2020), CDP Disclosure Insight Action, the Accountability Framework, WWF's Collaboration for Forests and Agriculture (CFA) and SPOTT have developed traceability mechanisms to spotlight and assess negative environmental and social impacts, show legality and forest-risk along value chains and demonstrate the (lack of) exercise of due diligence in commodity value chains. Third-party campaigns and investigations have sought to reveal the (lack of) due diligence at corporate, chain and sector scale (Ingram et al. 2018) disclosing practices based on field research which are published in reports, via the media and on interactive websites.

Specifically focusing on the Congo Basin moist forests, NGO investigations into timber related deforestation have been the most common, often with a focus on illegal logging, such as Global Forest Watch and Obster. In the cocoa sector, the Cocoa Barometers (Fountain and Hütz-Adams 2018) campaign by Mighty Earth (Higonnet et al. 2018) have created negative publicity about the deforestation due to cocoa production in West and Central Africa generally. Campaigns, reports and websites directed at consumers and companies on illegal expansion and deforestation due to palm oil plantations in Cameroon by Greenpeace,[47] CED,[48] Reseau de Lutte contre la Faim (Fight Against Hunger Network – RELUFA)[49] and ICENECDEV[50], and on the rubber sector in Cameroon and Republic of the Congo (Seale 2019, Orozco and Salber 2019) have led to disinvestment, free, prior and informed consent processes and changes to corporate policy.

Conclusions

There appears to be consensus around the need to combat deforestation among different direct and indirect stakeholders involved in land management in Central Africa. Nevertheless, the policies and approaches adopted and implemented to this end can have serious social and economic consequences for producer and exporting countries in this region.

Importing countries in Europe and America adopt binding consumer-side policies under the influence of activist civil society organizations. By the end of 2021, the EU is expected to adopt binding legislation prohibiting the importation of products suspected of contributing to deforestation, the underlying assumption being that deforestation is only a tropical phenomenon, linked to the production of commodities traded on international markets. The products most affected in Central Africa are palm oil, cocoa, rubber, wood and, to a lesser extent, coffee. The technical arrangements for implementing these policies and measures to combat imported deforestation in importing countries are still unclear or not yet defined. Barriers to the development of credible implementation strategies include the lack of consensus on how to define forests and, therefore, deforestation. Nevertheless, the certification approach has been applied to timber products for around 20 years and is increasingly applied to palm oil and cocoa. It offers a technical solution, both in respect of the production units and the territorial entities that have made commitments.

Central African producers and exporters are increasingly aware of and compliant with the new requirements of zero-deforestation policies and measures to combat imported deforestation adopted by developed importing countries. This is all the more relevant, given that Central African countries understand the threat that such policies pose to their national economies. Central African stakeholders have responded in two ways:

1) by diversifying their markets to export more to less demanding markets, and 2) by adopting sustainable management practices for the production of the commodities concerned, by increasing efforts to eliminate deforestation from production chains. Central African approaches are led not just by governments, but also by private sector and civil society actors.

47 https://www.greenpeace.org/usa/wp-content/uploads/legacy/Global/usa/planet3/PDFs/HeraklesCrimeFile.pdf

48 http://www.cedcameroun.org/projets/reducing-footprint-of-palm-oil-on-forests/

49 https://news.mongabay.com/2020/06/if-they-take-our-lands-well-be-dead-Cameroun-village-battles-palm-oil-giant/

50 https://www.icenecdev.org/Land-Grabbing-in-Cameroun.pdf

To limit the negative economic impacts of the adoption and implementation of policies on imported deforestation, particularly in Europe, Central African governments should prioritize negotiation activities, possibly as part of discussions between ECCAS and the EU. Such negotiations should encourage the adoption of more realistic implementation schedules and relevant support measures both for governments and other stakeholders in these commodity chains. The experience of FLEGT in Central Africa could serve as a model (with room for improvement). Given that they share similar ecosystems, Central African countries could, as a starting point, seek to harmonize their technical approaches, for example, by agreeing a definition of forest and how to monitor deforestation.

Emerging issues for Central African forests

PART 3

CHAPTER 9

Peatlands of the Central Congo Basin, current realities and perspectives

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Photo by Axel Fassio/CIFOR

Introduction

Globally peatland ecosystems -- wetlands with an accumulation of partially decomposed organic matter in the soil -- store the largest amount of terrestrial carbon per unit area (Rydin and Jeglum 2006; Leifeld and Menichetti 2018). Globally peatlands cover almost three percent of the global land surface (Yu et al. 2010; Page et al. 2011; Dargie et al. 2017), representing more than the total carbon stored in Earth's vegetation and almost twice as much carbon as found within the world's forests (Crump 2017). Drained and degrading peatlands are a major source of greenhouse gas emissions, annually releasing 5 percent of global anthropogenic greenhouse gas emissions (IPCC 2014), which is expected to increase. Therefore, protection and sustainable management of peatlands and urgent action to restore peatlands including through rewetting can avoid carbon emissions and maintain the carbon stored in the peatland ecosystem (Leifeld and Menichetti 2018; FAO 2020b).

Healthy peatland ecosystems are important to populations everywhere not only for the carbon they store, but also for their significant role in hydrological and nutrient cycling and storage, including the provision of clean drinking water, mitigating flood and climate risks, and supporting the livelihoods of communities living within these landscapes (Crump 2017).

In Central Africa, the Central Congo peatlands are estimated to cover 145,500 km^2, located across both the Republic of the Congo (RoC) and the Democratic Republic of the Congo (DRC), making them the world's largest tropical peatland complex (i.e., near contiguous peatland) (see Figure 9.1) (Dargie et al. 2017). They are estimated to store approximately 30 gigatonnes of carbon (Dargie et al. 2017) which is approximately as much carbon as all of the above-ground forest biomass in Congo Basin (Verhegghen et al. 2012; Saatchi et al. 2011b), or equivalent to 15 years of the carbon emissions from the US economy.

To date, this vast peatland area has remained relatively intact, but several potential pressures threaten to disturb these highly sensitive ecosystems (Dargie et al. 2019). Increases in logging, hydrocarbon exploration, and expansion of agriculture all have the potential to cause degradation and destruction of these critical habits (Dargie et al. 2019). Disturbances and drainage will not only release a large amount of greenhouse gases into the atmosphere contributing to global heating, but can also have severe impacts on the regional climate. Once disturbed, it is challenging and costly to restore such ecosystems, particularly in the tropics, as evidenced by experiences in Indonesia (Suryadiputra et al. 2005; Crump 2017; Hansson and Dargusch 2017).

Given the ecological importance regionally and globally, the sustainable management and good governance of the Central Congo peatlands is of paramount importance. Identifying strategies to protect the peatlands and facilitate low-emission and biodiversity-friendly economic development for the two Congos is essential for the provision of sustainable, long-term community livelihoods and protection of these vast peatland areas and the freshwater ecosystem of the Congo River basin.

This chapter outlines the current state of knowledge of Central Congo peatlands including: their extent and characterization, ecological importance and socio-economic status; current research approaches and gaps; threats; governance and policy frameworks; current initiatives and programs; and key management challenges. This overview aims to help guide future research, investment in, and management of, the world's largest tropical peatland complex.[1]

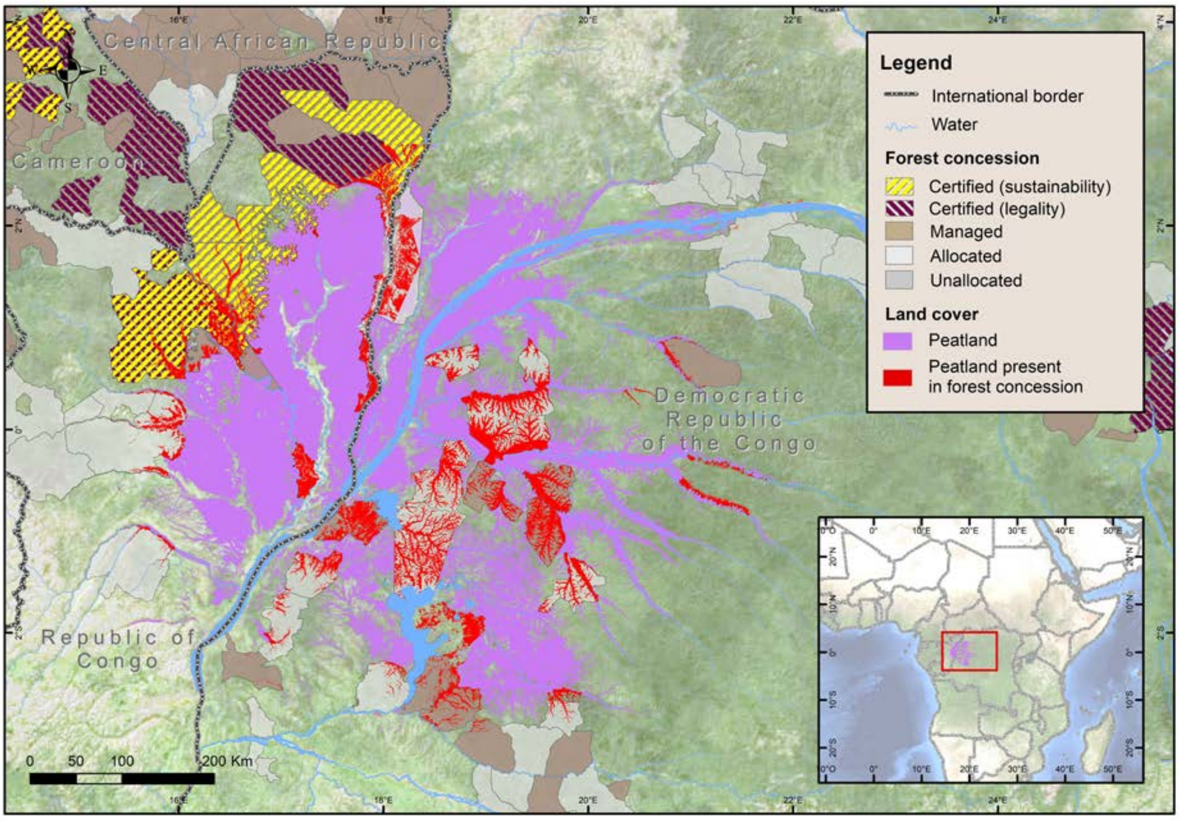

Figure 9.1: Map of the Central Congo peatlands (areas in purple and red) spanning the RoC and the DRC

Source: OFAC 2020; Dargie et al. 2017

1 Indonesia has a larger overall area of peatland, but these are spread across several islands.

9.1 Central Congo peatlands

9.1.1 Characterization and extent

The Congo Basin drains an area of approximately 3.7 million km^2, within which lies a central depression, known as the Cuvette Centrale overlaid mostly by swamp forest, with smaller areas of herbaceous swamp, seasonally flooded forest, *terra firme* forest and savanna (Léonard 1952; Evrard 1957; Kadima et al. 2011; Dargie et al. 2017; Betbeder et al. 2013).

Over this region, the Congo River drops just 115 m over 1,740 km, with year-round waterlogging. Mean annual rainfall in the Cuvette Centrale is just 1700 mm yr^{-1} (varying from 1600 to 2200 mm yr-1) (Mohymont and Demarée 2006), markedly lower than the 2000-3500 mm yr^{-1} and 2000-4000 mm yr^{-1} in the peatland regions of Western Amazonia and South East Asia, respectively (Dargie et al. 2017). Precipitation inside the Cuvette Centrale is an important element of the hydrological balance of the Congo river, accounting for more than 30 percent of its water supply during low water periods (Datok et al. 2020).

The spatial pattern and spatial extent of peat was mapped in 2017, with field samples showing deep peat deposits for the first time (Dargie et al. 2017). This spatially explicit map of peatlands in the Central Congo Basin reveals it to be the most extensive tropical peatland complex (i.e., near contiguous), with a 95 percent confidence interval of 131,900–156,400 km^2. This work builds on past efforts mapping vegetation, from the 1950s onwards (Evrard 1957; Betbeder et al. 2013; Kadima et al. 2011; Dargie 2015; Bwangoy et al. 2010). The peatland area occupies about 40% of the total wetland area of the Cuvette Centrale, using Bwangoy et al. (2010) for wetland area. Maps using satellite data and no ground observations of peat have also been published (Gumbricht et al. 2017; Xu et al. 2018).

Ground sampling shows that the peatlands that occupy large interfluvial basins form modest domes (Davenport et al. 2020), with peatlands beginning to form in the very early Holocene, at least 10,500 years B.P. (Dargie et al. 2017). The peatlands have actively sequestered carbon including the past 2,000 years (Dargie et al. 2017). Peat also forms “corridors” of peat, adjacent to rivers flowing east to west into the Congo River in the DRC (Figure 9.1; Dargie, Ewango, Lewis, *pers. obs.*).

Extensive peat deposits have, so far, been discovered under two common vegetation types: hardwood swamp forest (in which *Uapaca spp.*, *Carapa procera* and *Xylopia rubescens* are common) and a palm-dominated, *Raphia laurentii* swamp forest. Peat was also usually found under a much rarer palm-dominated, *Raphia hookeri* swamp forest that occupies some old river channels (Dargie et al. 2017; Bocko et al. 2017; Bocko 2018). Peat was not found beneath *terra firme* forest, seasonally flooded forest or savanna. The peatlands are largely intact, as local peoples’ impact on this ecosystem is broadly sustainable and is still low at present (Dargie et al. 2019).This large freshwater ecosystem plays a crucial role in provisioning water, nutrients and food locally and downstream.

The vast Central Congo peatland complex contains the highest densities of western lowland gorillas (*Gorilla gorilla gorilla*) in the world, as well as chimpanzees (*Pan troglodytes*), forest elephants (*Loxodanta cyclotis*) and endemic bonobos (*Pan paniscus*) (Fay and Agnagna 1992; Rainey et al. 2010) and Allen’s swamp monkeys (*Allenopithecus nigroviridis*), the latter which is found only in swamp and inundated forests (Gautier-Hion et al. 1999; McGoogan et al. 2007).

These peatlands also harbour a diversity of fish, crabs, freshwater molluscs and other water species such as Odonata (Brooks et al. 2011); it is estimated to shelter more than 200 fish species,

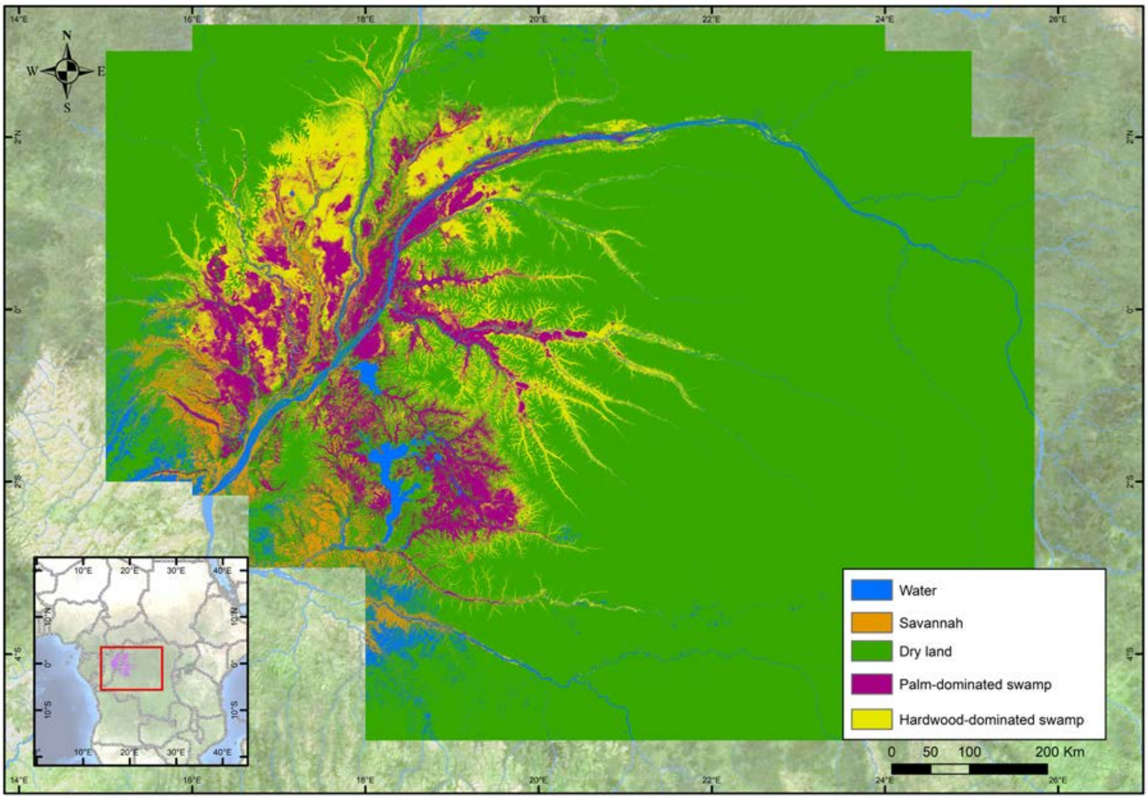

Figure 9.2 : Probability map of vegetation types derived from 1,000 runs of a maximum likelihood classification using eight remote sensing products (three ALOS PALSAR; two SRTM-derived variables; three Landsat ETM+ bands) and jack-knifed selections of training data. Peat is located under palm-dominated swamp and hardwood-dominated swamp, reproduced from Dargie et al. 2017.

Source: Dargie et al. 2017

many of which are endemic (Inogwabini and Lingopa 2013). Characins, Cyprinids, Cyprinodonts, Mormyrids and Catfishes, which are numerous in the forested Central Congo peatlands, require specific ecological conditions known only in large, stable and relatively undisturbed forests (Roberts 1975). Many fish found in these peatland forest ecosystems have developed specialized adaptations such as the emission of electric signals and organs that allow them to breathe air in hypoxic waters (Roberts 1972; Hopkins 1981).

The Central Congo peatlands are also important to crocodiles, turtles, amphibians, and birds though data are scarce due to insufficient inventory efforts, especially in the peatlands (Thieme et al. 2008; Hanssens 2016; Harrison et al. 2016; Diamond and Hamilton 1980; Chifundera 2019). Given the limited data further research is needed to properly characterize this rich biodiversity.

Instruments installed in the peatlands to monitor water table levels indicate that the interfluvial peatlands are predominantly rainfed, rather than receiving flood- or ground-water (Dargie et al. 2017). It is assumed that the DRC riverine peatlands will be impacted by river flooding as well (Lewis S.L., Dargie G.C., Ewango C., Crezee B., pers. obs.), but confirmation of this with instruments is needed. The role of the relatively low rainfall in peatland maintenance is reflected in the peat itself, as it is more decomposed and has a higher carbon density compared to tropical Asian and American peat (Dargie et al. 2017).

In the Likouala Region, in the RoC, the maximum depth found by coring peat is 5.9 m depth, with a median of 2.0 m depth and mean of 2.4 m depth (peat defined as soil containing ≥ 65 percent of organic matter) (Dargie et al. 2017). More recent field campaigns in the DRC, in the process of being published, have also discovered peat deposits with maximum depths > 5 m. Finding peat across the DRC portion of the Dargie et al. (2017) map gives increasing confidence that there is indeed a large area of peatland in the Cuvette Centrale (Lewis S.L., Dargie G.C., Ewango C., Crezee B., pers. obs.).

In the future, better high resolution maps of the peatlands, wider wetlands and surrounding non-wetland land areas will help to better manage the area through improved land use planning. Increased laboratory analyses on field-collected peat samples for peat depth, bulk density and carbon concentration will also help to refine estimates of carbon storage and potential greenhouse gas emissions if peat is drained or disturbed.

9.1.2 Carbon storage

By combining the areas of peatland area in the Central Congo with field measurements of peat depth, bulk density and carbon concentration, Dargie et al. (2017) made a first estimate of the median carbon storage in peat 30.6 gigatons of carbon (Gt C). Total below-ground carbon storage is greater than the peat-only estimates because a layer of organic-matter-rich (<65 percent of organic content) occurs beneath the peat (≥ 65 percent organic content). The carbon stored in the peat is much greater than that stored in the living vegetation overlying the peatland (median, 1.4 Gt C; Dargie et al. 2017), and is estimated to be similar to the above-ground carbon stocks of the entire Congo Basin tropical forests (Verhegghen et al. 2012; Saatchi et al. 2011a).

The Central Congo peatlands are estimated to harbour approximately 29 percent of the total tropical peat carbon stock, and approximately 5 percent of the estimated global peat carbon stock, although additional fieldwork is needed to refine both total tropical peat and Central Congo peat carbon stocks (Dargie et al. 2017). If all the carbon stored in the Central Congo peatlands were released to the atmosphere, this amount of carbon is equivalent to three years of the current annual global emissions of carbon from all fossil fuel use. This stored carbon is vulnerable to land-use change, including drainage for agriculture, roadbuilding, damming of rivers for hydropower, selective logging, plus the impacts of climate change, particularly any future reduction in precipitation (Dargie et al. 2019). See Section 4 on threats.

9.2 Improving the state of knowledge of the Central Congo peatlands

9.2.1 Advancing peatland mapping in Central Africa

Dargie et al. (2017) show that there is a clear relationship between vegetation type and peat presence in the Central Congo peatlands. For the production of peat, areas need to have sufficiently productive vegetation to provide carbon inputs to the soil surface, and condition to inhibit decomposition, typically being inundated most of the year (i.e., in which the water table does not fall far below the surface). To delineate these permanently flooded areas, studies generally use satellite Synthetic Aperture Radar (SAR) imagery (Betbeder et al. 2013; Dargie et al. 2019). SAR data sends microwaves from satellite sensors that penetrate through the canopy to interact with the tree stems and palm fronds, with the amount of radiation returning to the satellite depending strongly on how wet the ground is: wetter ground means more returns to the satellites. However, the use of SAR data has limitations, as some imagery covers only a part of the Cuvette Centrale, and/or a single time period, and its spatial resolution for long-term assessments can be coarse (1 km).

Additional efforts to delineate the Congo Basin peatlands have been provided by pantropical studies. For example, Gumbricht et al. (2017) used a combination of hydrological modelling and soil wetness to map wetland and, by extension through vegetation data, peatland extent across the tropics. While in many locations, particularly in South America, this study predicted peat covering much larger areas than other methods have predicted, over the Central Congo Basin area the Gumbricht's map total peatland area is similar to the total peatland area mapped by Dargie et al. (2017) , despite the different methods used by these two authors. While the total area is similar spatially, there are striking differences in the Gumbricht et al. (2017) map and the Dargie et al. (2017) map, they both together provide confidence that there is a large area of peatland in the Cuvette Centrale.

Efforts to improve the mapping of forest types and peatland areas are currently underway. CIRAD scientists' use of time series imagery acquired using SAR sensors (the Jason-2 Poseidon altimeter SAR sensor, jointly developed by NASA and CNES and the SAR PALSAR-2 sensor from the JAXA ALOS satellite) is allowing a new characterization of the different forest types according to their flooding over time (Betbeder et al. 2013; Frappart et al. 2021). Previous efforts to characterize peats using RADAR data include through detecting dome formation (Siegert and Jaenicke 2008). This approach only guarantees wetland presence and not peatland formation. Thus, peatland mapping requires field data to calibrate and validate remote sensing derived products. Fieldwork, which is the most expensive and logistically complex part of mapping and estimating carbon stocks, remains a necessity.

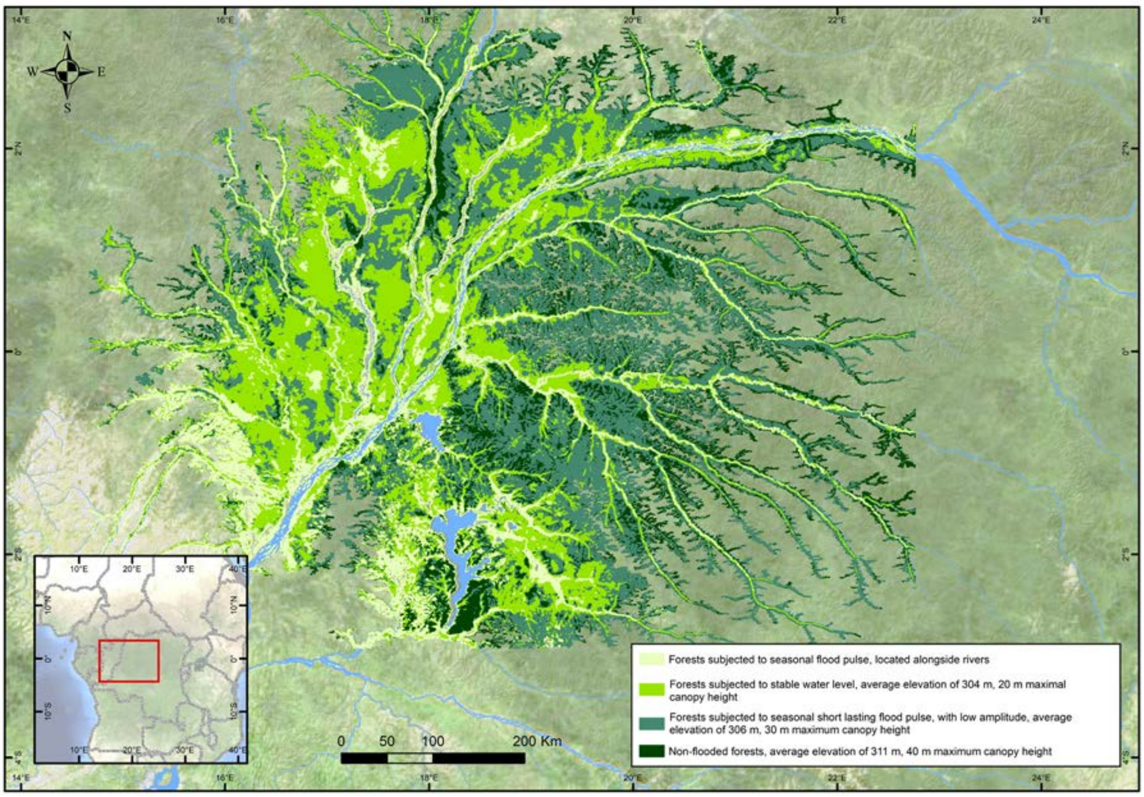

Figure 9.3: Mapping of swamp forest types in Central Africa based on MODIS, PALSAR satellite images and LiDAR data

Source: Betbeder et al. 2013

The CongoPeat project funded by the UK's Natural Environment Research Council, is collecting new field data from sites across RoC and the DRC, to reduce the key limitation on mapping the peatland by greatly expanding the field-based vegetation, peat depth and bulk density data reported in Dargie et al. (2017), which will significantly improve the maps of vegetation types that overlie peat and estimates of peat depth. Beyond this, the project is also using remote sensing data in three new ways to gain additional insights. Firstly, the project collected high-resolution LiDAR data from a drone to reveal peatland topography for the first time, showing that a large interfluvial peatland in this region has formed a dome (Davenport et al. 2020). The project is now expanding these findings across the Central Congo basin using satellite LiDAR data from ICESat-2. Secondly, the project is using JAXA's ALOS-2 PALSAR-2 satellite data to characterize the flooding regime over the basin, to provide improved maps of peat presence/absence and peat depth. This work will also assist in understanding how these dynamics influence peat formation and stability, assessed using field data. Finally, CongoPeat are using new satellite sensors combined with more extensive field data and high throughput cloud computing facilities, to provide a new reference map of the peatlands to supersede the (Dargie et al. 2017) map.

Minasny et al. (2019) have underlined that the proliferation of satellite data available in an open-access format, the availability of machine learning algorithms in an open-source computing environment and the high-performance of available computing facilities could enhance the way peatlands are mapped (see Greifeneder et al. (2019) for a recent Indonesian example). Furthermore, the Norwegian government has agreed with the PLANET/KSAT/AIRBUS consortium for publicly available monthly data high-resolution 3-metres optical data for the period 2020-2024. This dataset will be particularly useful for monitoring changes to the peatland area due to land-use change. Additionally, it may be possible to apply longer wavelength SAR datasets that penetrate the canopy such as ALOS 2, which may improve our capability to monitor soil moisture changes through time, on a very regular (weekly) and fine-scaled (10 m) basis. This has the potential to improve maps of peatland areas when combined with other remotely sensed data and field measurements.

In all of the approaches outlined above, one of the biggest limiting factors is collection of field data, which is costly especially in the difficult to access Central Congo peatlands. Such field data is essential for the calibration and validation of peatland maps to reduce uncertainty as well as providing additional information regarding vegetation typologies, carbon stock stored in the peat soil, biodiversity and local community presence in and use of these areas.

Beyond the Central Congo peatlands, findings in Gumbricht et al. (2017) and Xu et al. (2018) suggest there may be additional isolated peat patches throughout tropical Africa albeit on a much smaller scale than that found in the Central Congo. There is a need to also map and collect field data in these areas to estimate extent and characterize these ecosystems.

9.2.2 Field measurements

To understand the genesis, development, contemporary function and extent of the Central Congo peatlands requires field data. Field measurements to define the peatland area include peat cores to characterize the soil type and peat thickness, characterization of the vegetation (species composition and structure), topographic studies and hydrologic characterization to identify high water tables (Dargie et al. 2017; FAO 2020a). In the Central Congo peatlands, collection of data is costly and time consuming given the difficulty to access sites due to limited transportation infrastructure, the same dynamics which has, in part, resulted in low peatland degradation to date.

Estimating peat carbon stocks requires data on peat thickness, bulk density and carbon content (Dargie et al. 2017; Minasny et al. 2019). These have been obtained by Dargie et al. (2017) from the northern RoC and additionally now from across the DRC, as part of the CongoPeat project.

Some of these peat cores have been sampled and analysed to date the peat. The oldest published age of the base of a peat core is 11,000 years, suggesting the region began accumulating peat in the African Humid Period, when the region warmed and got wetter (Dargie et al. 2017). More dates from the base of peat cores from the region will help understand the genesis of the peatlands of the Central Congo basin.

Vegetation characteristics that have been collected in peatland and adjacent regions show long shallow gradients of changes in species composition within the interfluvial basin peatlands of the RoC (Bocko 2018; Bocko et al. 2017; Dargie 2015; Dargie et al. 2017). New field data on vegetation characteristics from the DRC is being conducted as part of the CongoPeat project to understand if the Congo River is a significant barrier to peat swamp tree species and if tree species composition differs in peatlands on either side of the River.

Understanding the contemporary function of the peatlands can be improved by field measurements of the water table, to show if inundation levels follow rainfall events, or if flood waves from rivers are observed overtopping their banks. Field data collecting water table data every 20 minutes for two years across several locations in an interfluvial peatland in the RoC show that there were no floodwaves and the water table depth both closely followed rainfall events, but also the water budget can be closed by only accounting for rainfall inputs. This suggests that for the interfluvial basin studied, it is a rainfed system, and hence sensitive to future climate change. Measurements under the CongoPeat project are investigating if other peatlands in the region are rain-fed.

Peatlands are important sinks for carbon dioxide and sources of the greenhouse gases methane and nitrous oxide. The CongoPeat project is also collecting *in situ* ground data from both the wet and dry seasons for these key greenhouse gases, in peatlands across the Central Congo region. In addition to investing in local expertise, investment in laboratory facilities in the RoC and DRC for processing peat samples to estimate carbon stocks, and analysing samples of greenhouse gases, could help to further assist in building local research capacity and infrastructure. Some local laboratories already are equipped to complete some of the soil analyses required, which can further be built upon.

Finally, social science data is necessary to understand local communities' relationship to and use of peatland areas as well as the impacts of different sectors' activities impacting ecological functioning and access to peatlands. This detailed on-the-ground research in the region has been limited to date.

9.2.3 Current key research gaps

Despite recent advancement of the knowledge of the Central Congo peatlands (Bocko 2018; Bocko et al. 2017; Dargie 2015; Dargie et al. 2017; Davenport et al. 2020), research still remains limited and many knowledge gaps exist. Maps of the Central Congo peatlands can be improved by collecting additional field data and creating maps at finer resolution. Further field data will allow for improved understanding of peatlands state, if they are drying, drained, or otherwise managed, if they have been disturbed or are pristine, as well as the relationship between vegetation types and peat location, depth and other characteristics.

Box 9.1: Ecosystems services of the Central Congo peatlands

Provisioning services: Peatlands are vital sources of food and income for local communities. Most local populations draw on peatlands resources to feed their families and gain a source of income. This includes harvesting medicinal plants, shrimp, crustaceans, fish, wildlife, firewood and timber and producing charcoal. More than two thirds of the peatland population living in wetland areas source 80 percent of animal protein consumed from fisheries for direct consumption or sold in local markets.

Some compounds derived from peatland ecosystems have antimalarial, antibiotic, antiviral, and antioxidation properties which can provide great value to the pharmaceutical sector. Furthermore, *Raphia sese* fruits pulp, roots of *Lasimorpha senegalensis* are edible and are still eaten by the peatland communities of Central Africa wetlands, and surrounding zones. Some peatland species have long leaves that can be used as raw material for handicrafts. In both Congos, palm species, particularly *Raphia lauretii* and *R. sese*, in addition of providing palm wine, have leaves, which are used for roofing and palm liana species for handicraft products such as handbags, baskets and building raw material. This could be one potential income generating activity that could be further developed with local communities (Quintela et al. 2004).

Regulating services: Peatlands regulate water flows, provide clean water, reduce sediment and erosion events, cycle nutrients and store carbon in the rich organic soils. Peatlands are very important stores of carbon sequestered often over thousands of years, which in the case of the Congo Basin peatlands, help to regulate climate at micro, regional and global scales. Furthermore, the Central Congo peatlands play key roles in water cycling and provision in the region, feeding into the Congo Basin River.

Supporting services: Peatlands accumulate matter and paleo-information within peat layers. Peatlands across the globe are refuge to a multitude of fauna and flora species, with a broad spectrum of morphological forms across various temporal and spatial zones.

Cultural services: Communities living around the Central Congo peatlands have traditional knowledge and cultural practices that should be learned from and protected alongside biodiversity conservation. Such cultural heritage and practices can be attributed, in part for the conservation and protection of these peatland areas. In some villages, peatland areas are declared sacred and constitute an important part of the identity of the people. These sacred spaces represent for the local populations “the cornerstone of the vision of the world, their cultures and philosophies”. Traditional rules, based on local knowledge passed down through the generations ensure their conservation. Some popular beliefs such as the existence of supernatural beings in the wetland forests have also played a key role in conservation of peatlands. It is believed that some mysterious creatures inhabit the peatlands (e.g., *Monama* in the DRC, *Mokelembembe* in the RoC) requiring respect for anyone venturing into the peatland forests.

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Box 9.1 : Continued

Local customary tenure, culture and tradition must be respected and can provide invaluable in efforts to sustainably manage peatland forests. For example, fishermen can have substantial knowledge of the ecology of freshwater fishes and animals, their characteristics, habitats, breeding areas, etc. Thus, like the traditional practices of many indigenous peoples, these practices are an important means of securing and sustainably managing resources (Artaud 2014). Equally, efforts should be made to preserve cultural heritage and knowledge, i.e., oral traditions, traditional methods of landscape management and forestry, and related rural crafts activities.

In addition to advancing mapping and ground truthing efforts to improve understanding on the location and characterization of peatlands in the Congo Basin, better understanding peatland ecosystems' biological functioning can inform the assessment of potential future management decisions within these landscapes. Hydropedology and hydrological functioning need to be better understood alongside structure and floristic and fauna composition of the peatlands. More specifically, a working model of the gain and loss of organic material in the peatlands is needed to estimate change in soil carbon. This requires data on the productivity of the vegetation, how much carbon is transferred from the vegetation into the peat, the decomposition rates of organic matter in the peat, and the environmental drivers of these processes from weather station and hydrological monitoring data, particularly water table data. Modelling these processes can provide projections of different possible future scenarios and provide the basis for establishing both monitoring and early warning systems.

On the social science side, little is currently known about how local communities and indigenous peoples use and interact with these peatland ecosystems. It is essential this understanding is improved and that local communities are properly informed and consulted, in line with Free, Prior and Informed Consent, before any management decisions are made in respect to the land which would fall under customary land tenure. Any change to the contemporary broadly sustainable management of these ecosystems requires the full engagement and support of local populations. Therefore, studies on customary use as well as the development of sustainable livelihood options will be key to inform future approaches and programming in the region. Further understanding of the local populations that live adjacent to the peatlands, and the different types of existing land uses, will be a key prerequisite.

Finally, studies are needed on how to incentivize the protection of peatland landscapes from local to national levels. Given that peatlands are easily impacted by changes to the hydrology of the area where they are located, it is important to manage these areas through an integrated landscape approach (FAO 2020b). Incentives could include further exploration of results-based payments based on their carbon storage and sequestration and/or biodiversity. Policies that protect peatland landscapes should include incentives to ensure enforcement of laws and regulations will be essential. Development of strong cross-sectoral policies are still needed. An initial review of the legal framework for peatland management in the DRC outlines some recommendations for strengthening existing legislation and developing a national peatland policy (SWAMP 2021).

9.3 Threats to peatlands

Across the tropics, peatlands have been subjected to widespread degradation and destruction. Yet the Central Congo peatlands remain largely intact. But as witnessed in South East Asia, where 47 percent of peatlands were deforested in 25 years (Miettinen et al. 2016), the situation can change rapidly and a number of threats to the Central Congo peatlands have already been identified. Peatland drainage alters vegetation cover, threatens wetland biodiversity, decreases water quality, causes land subsidence (and subsequent heightened risk of floods and loss of riverine areas), increases fire frequency and other negative impacts on people, their livelihoods, and the environment. After peatland damage has occurred efforts to re-wet and restore peatlands can be very costly and may not succeed in restoring original levels of ecosystem services provisioning. Therefore, prevention is essential especially in the relatively intact Central Congo peatlands. Threats identified range from climate change to infrastructure development, industrial land conversion to compounding interlinked activities.

9.3.1 Climatic threats

Climate change is one threat which has the potential to destabilise the entire region. The continued accumulation and preservation of organic matter within a peatland is largely dependent on maintaining saturated, anoxic conditions. Any changes in the peatland's hydrological balance which results in a drop of the water table can increase decomposition of the organic matter, potentially transforming peatlands from a carbon sink to a carbon source, releasing carbon dioxide into the atmosphere.

Ombrotrophic (rain-fed) peatlands are particularly vulnerable to changes in climate, whereas minerotrophic peatlands, which receive additional inputs from fluvial or ground waters, are in part buffered against changes in precipitation. Whilst on-the-ground data is available for only a small proportion of peatland sites in the Central Congo, there is evidence that the large peat filled interfluvial basin between the Likouala-aux-herbes River and the Ubangui River are rain fed peatlands (Dargie et al. 2017) and has a shallow domed surface topography, which is a classic indication of ombrotrophic conditions (Davenport et al. 2020).

Even under the moderate Representative Concentration Pathway (RCP) 2.6 scenario of the CMIP6 exercise, mean annual temperatures within the Congo Basin are projected to rise by ~0.85°C by the end of 2050 relative to the period 1980-2010 (IPCC 2021). Increases in temperature can increase rates of evapotranspiration within the peatlands, which would negatively impact the hydrological balance. However, a more dramatic impact would be from a change in rainfall, such as an intensification of the dry season. Yet how climate change will affect rainfall, both in terms of amount and seasonality, is highly uncertain. Lack of meteorological data across the region and the peatlands especially, makes it hard to assess how well the different earth system models represent the present-day climate within the Basin, let alone future projections. However, a number of model ensembles show a slight wetting trend across the basin (Creese et al. 2019). Yet in other model ensembles, the wetting trend is accompanied by an intensification of seasons, with an increase in rainfall extremes and an increase in the intensity and frequency of dry events (Dosio et al. 2019). Meanwhile, analyses at the scale of the whole Congo Basin rainforest show over the past two decades a recent increase in the length of the boreal summer dry season to the northeast, i.e., upstream of the peatlands, hence it is unclear if dry season intensity is increasing or not over the peatland region (Jiang et al. 2019). Over the past four decades, the Congo Basin peatlands have recorded an approximate mean annual temperature of 25.5°C which is slightly warmer than temperatures recorded over open-water areas, but similar to savannah areas (Figure 9.4). According to the most pessimistic scenario (RCP 8.5) of the CMIP5 exercise, temperatures in the Congo Basin peatland area could reach 27°C by the middle of the century, i.e., an increase of about 1.5°C compared to 1980-2010. Such temperatures may reduce the productivity and carbon stocks of the swamp forests (Sullivan et al. 2020), reducing carbon inputs and increasing decomposition which may decrease peat carbon stocks.

Mean annual rainfall amounts (Figure 9.5) as estimated by CHIRPS data (Funk et al. 2015) for the period 1981-2019 are around 1758 mm for peatland. The bimodal annual cycle pictures the SON (September-October-November) rainy season as the wettest one which is concordant with observations at the scale of the Central Africa region. The rainfall annual cycle evolution over the last four decades (Figure 9.5, difference 2011-2019 minus 1981-1990) is characterized by significant decreases in rainfall during the dry seasons especially in July and December (-16 and -24 mm respectively) as well as in September (-33 mm) suggesting a shortening of the wettest rainy season. The RCP6.0 and 8.5 scenarios of the CMIP5 exercise predict much larger rainfall amounts (+300 mm) over the Congo Basin for the three coming decades than what has been observed since the 80's. This is especially marked during the two rainy seasons, with for example ~65 mm gained by the middle of the century in April and ~40 mm in October. These significant potential changes in the regional hydroclimatic cycle could have major consequences on the ecological functioning of peatlands, although there is great uncertainty in this. If dry season trends continue, then a loss of peat may be expected, but if rainfall increases, then continued or even increased peat accumulation could occur. Such changes would also likely change the species composition of the trees of the peatland as they track the changing environmental conditions. Furthermore, policy decisions could exacerbate changes if parts of the Ubangi and other Congo river tributaries are diverted into Lake Chad as has been under discussion, it could result in significant negative impacts in the Central Congo peatlands, particularly those connected to these rivers, due to changes in the water table (Dargie et al. 2019; Inogwabini and Lingopa 2013; Lemoalle and Magrin 2014).

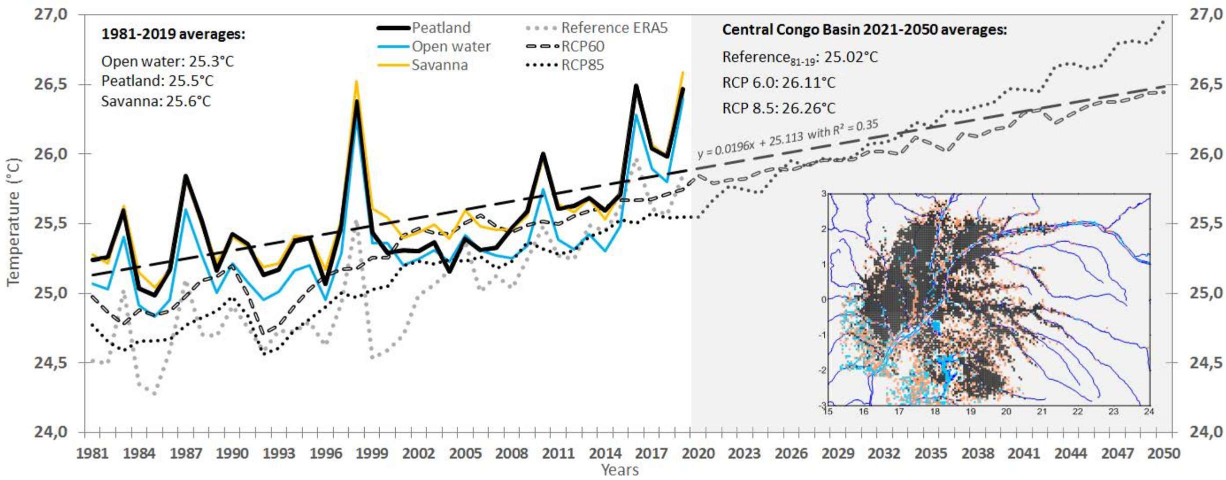

Figure 9.4: Temperature's recent evolution (1981-2019, TerraClimate data at 2 m and ERA5) measured for three land cover types (peatland, open water and savannah, located on the map at bottom right; calculated from ecological data of Dargie et al., 2017) in the Central Congo Basin: the linear trend for peatland is shown as long-dashed line; projections for 2050 according to scenarios RCP 6.0 and 8.5 of the CMIP5 exercise are shown as short-dashed and dotted lines.

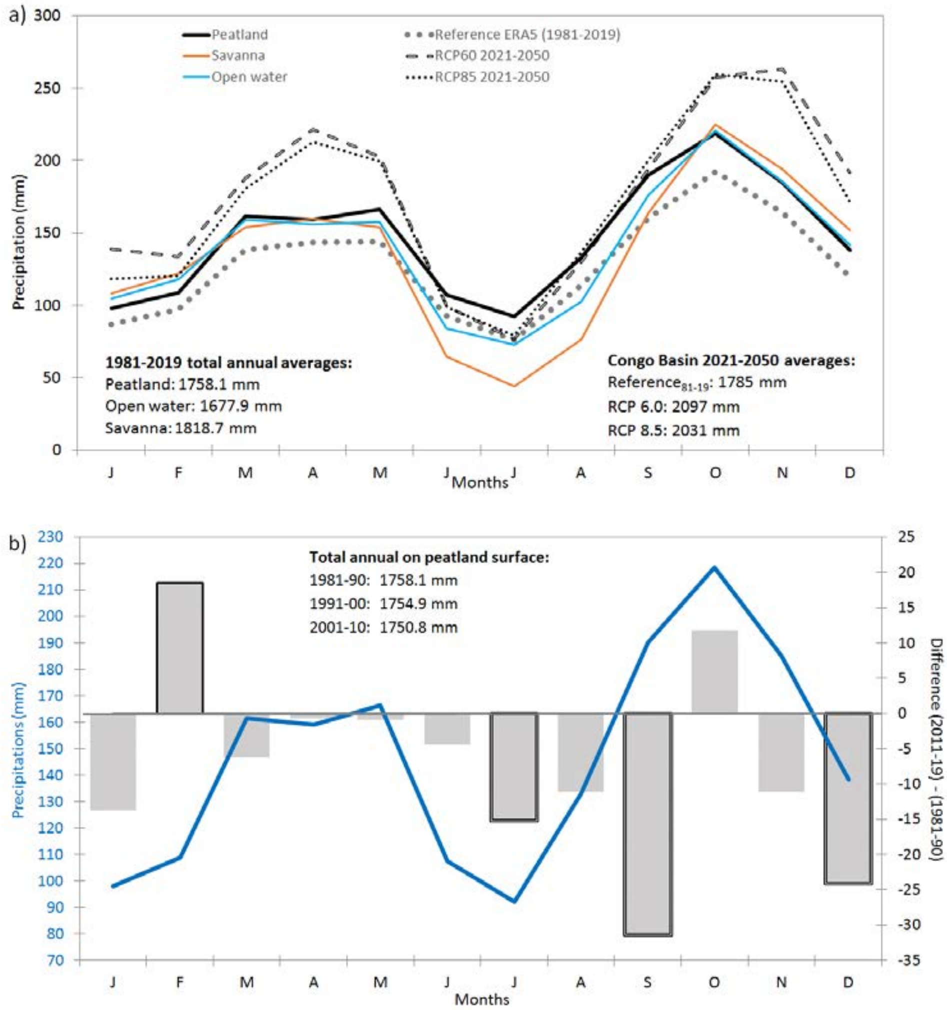

Figure 9.5: a) Comparison of mean annual rainfall regimes (in mm) for the Congo Basin's three land cover types and the period 1981-2019 (monthly totals are calculated using CHIRPS data; the 1981-2019 reference average for the entire Congo Basin, as well as those for Representative Concentration Pathway (RCP) projections 6.0 and 8.5, are also provided); b) mean annual rainfall cycle (1981-2019) of the Congo Basin (line) and differences between decades 2011-2019 minus 1981-1990 (bars); significant differences according to a Student's t-test are indicated by a bold box (90 percent) or a double box (95 percent).

9.3.2 Threats of conversion

There are also more direct anthropogenic threats from socioeconomic activities. Much of the Central Congo peatlands coincide with logging and hydrocarbon concessions (Dargie et al. 2019). These activities themselves pose potential threats, such as deforestation, and, in the case of oil extraction, pollution. But they also require infrastructure such as roads, and a work force, which often requires people to migrate into the region. The roads, if built directly across the peatlands, can impact and interrupt the hydrology of the peatlands, while also permitting access to areas of forest which were previously relatively inaccessible. This in turn could facilitate defaunation and deforestation, especially when combined with an increase in population from migratory workers (Finer et al. 2008; Laurance et al. 2017). That being said, current threat of conversion is relatively low given the challenges in operation and access, but this context can always rapidly change.

Roads

Forestry concessions cover a much larger area of peatlands in the DRC than in the RoC (Gourlet-Fleury et al. 2017; Dargie et al. 2019). In RoC, a limited number of concessions (7) are located on the edge of the Central Congo peatlands, whereas in the DRC about 30 concessions entirely or partially cover around 4.5 million hectares, i.e., 26 percent of the peatlands in the country (Gourlet-Fleury et al. 2017), though not all are operational at the time of writing. In both countries, the law authorizes the inclusion of peatlands in forest concessions, but officially no logging is allowed in permanently waterlogged areas, and peatlands must be incorporated into a "protection series". However, logging can occur in inundated forest, which is periodically waterlogged, during the dry season, though these areas are generally not preferred for extraction and have not been exploited to date. This provides a critical loophole, as in the dry season the water table in the peatlands is below the surface, so could be argued to be inundated forest. The potential risk of logging, whether legal or illegal, in these forests is opening access to the peatland area, possibly disrupting the natural water drainage network. Furthermore, there are potential risks that are yet to be studied, including how the removal of the trees will result in opening the understorey to sunlight, more evaporation, and potentially slowing or reversing carbon accumulation. See Interlinked challenges below.

Hydrocarbon concessions

Both the governments of the DRC and the RoC have opened hydrocarbon (oil and gas) concessions within the Cuvette Centrale for bidding (Goodrich 2019; Ministère Des Hydrocarbures 2019). Oil deposits have long been known and researched for extraction in the Cuvette Centrale (Cornet 2012). First commercial oil explorations were conducted between 1970 and 1984 by SHELL, TEXACO and the Japan National Oil Company (Kadima et al. 2011). In 2019 the RoC (re)announced that oil had been found beneath one of the peatland hydrocarbon concessions (Le Monde/AFP 2019). One controversial industry calculation suggested that this oil field has the potential to quadruple national production (Noiraud et al. 2017; Tchoumba et al. 2021). Exploiting this resource has high risks of disrupting the peatland hydrology, polluting the sensitive ecosystem, increasing greenhouse gas emissions and having negative socio-economic impacts, such as the displacement of communities. Examples of hydrocarbon pollution in tropical peats can be found in the wetlands and peatlands of Tabasco in Southern Mexico (Cram et al. 2004), as well as in tropical forests in Peru, where 474 oil spills occurred between 2000 and 2019 (Oxfam Peru 2021). Linked to this is the challenge of the national energy policy, ensuring that the country's energy needs can be met through more renewable or low carbon sources, and whether there will be a large market for oil in the future. It is unclear at this time if and when either government will advance with further exploration and extraction.

Agriculture

Currently across the Congo Basin, present day forestry and agricultural activities, whether industrial or subsistence scale, occur mainly on land that does not flood, known as *terra firme*. Slash-and-burn farming or shifting agriculture is the main technique used on *terra firme* but more intensive raised-field agriculture has been practiced in various open floodplains. While some raised-fields have been abandoned, others are still active. They are more labour intensive than *terra firme* slash-and-burn agriculture or flood recession agriculture, but they produce high yields and decrease flooding risks (Comptour et al. 2020). Currently, communities' activities within the peatland areas consist mainly of hunting, fishing and harvesting of forest products such as palm fronds for roof construction.

Based on the available information, current impact of local inhabitants on or around the peatland ecosystems is minor and relatively sustainable in present form (Dargie et al. 2019), as seen in the very low deforestation rates within the peatlands. That said, population densities have been increasing in and around the Central Congo peatlands, which may result in future degradation. At the moment, a lot of food production for cities such as Mossaka or Mbandaka are coming from outside areas implying: 1) deforestation pressure around more urban areas is transferred elsewhere, and; 2) there is a need for local population to generate income through various activities in order to buy these products. Therefore, efforts to promote sustainable agriculture outside the peatland areas as well as develop alternative livelihood income sources are both important for the protection of the peatlands. Applying landscape approaches for peatland management and preservation can help to address such complex dynamics and linkages.

Palm oil

Another cause for concern is the rise of palm oil production across Africa (Ordway et al. 2017). Globally Indonesia and Malaysia are the two biggest palm oil producers (FAO 2020a) and it is this industry that is responsible for the majority of peatland destruction in South East Asia (Miettinen et al. 2016). It is feared that with increasingly strict regulations and less available land to expand into, the companies will look to expand into central Africa (Ordway et al. 2017).

In order to successfully grow palm oil in peatland areas it is necessary to lower the peatland water table (although palm oil also grows well on *terra firme* land). It is this drainage of the peatlands, which results in peat decomposition through oxidation and an increased vulnerability to fire as the peatland dries out. Whilst the carbon dioxide emissions from oxidation are considerable, with 2.5 Gt C being released over the period of 1990 to 2015 across South East Asia (Miettinen et al. 2017a), peatland fires in some years have released up to 0.9 Gt C in a matter of months.

In the context of the National REDD+ strategy in the DRC, the Letter of Intent on the establishment of a long-term partnership with the Central African Forest Initiative (CAFI) (see Table 9.1), promotes the protection and sustainable management of peatlands, and prevents their drainage and drying out. These provisions will be included in the upcoming investment program, which will encourage industrial agricultural expansion to occur in open and degraded ecosystems on *terra firme* land to prevent destruction of intact forest ecosystems including the peatlands forests.

9.3.3 Interlinked challenges

The above-mentioned threats are unlikely to occur in an isolated context. The extent to which these threats are realised will depend on numerous political and socioeconomic factors, both at a national and international level and synergies between threats can exacerbate the negative impacts on the peatlands. A South-East Asian example of this is the vast peatlands fires in El Niño years. Increased temperatures and reduced rainfall led to fires which are more severe than the average year (Miettinen et al. 2017b; Page et al. 2002). These fires, which were often started as a way to clear an area of land, spread particularly easily through the peatlands which have been deforested and drained (Page et al. 2009), leading to millions of hectares of peatland being burned (Vetrita and Cochrane 2020). Without proper investment to ensure the preservation of the Central Congo peatlands, a scenario where hydrocarbon exploration or industrial agriculture are allowed to expand into the region, against the backdrop of climate change, leading to widespread peatland degradation, is not implausible.

9.4 Institutional arrangements and governance of the Congo Basin peatlands

Several international and regional agreements and conventions exist with implications for the management and service provision of wetlands and peatlands, see Table 9.1. Both Congos are signatories of several international agreements, notably the Ramsar Convention whose mission is "the conservation and wise use of wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world" (Ramsar Convention 2021). Additionally, despite the signature of several regional agreements and commitments from 2016 to present related to the protection and sustainable management of peatlands, concrete action and implementation has, generally, been slow to materialize. There

Table 9.1: Select international agreements, conventions and resolutions with implications for Congo Basin peatland ecosystems.

Agreements / Initiative / Meeting	Document / Detailed plans	Inclusion of peatlands
International		
2030 Agenda for Sustainable Development	Sustainable Development Goals (SDGs)	Relevance of peatlands to address following SDGs: SDG 2 Zero Hunger SDG 6 Clean Water and Sanitation SDG 13 Climate Action SDG 15 Life on Land
IUCN World Conservation Congress, 2016	Resolution 043-Securing a future for global peatlands	Calls for better protection and restoration of the world's peatlands.
Ramsar Convention	COP 6 1996	Recommendation 6.1: Conservation of peatlands
	COP 7 1999	Recommendation 7.1: A global action plan for the wise use and management of peatlands
	COP 8 2002	Resolution VIII.17: Guidelines for global action on peatlands Resolution VIII.11: Additional guidance for identifying and designating underrepresented wetland types as Wetlands of International Importance
	COP 12 2015	Resolution XII.11: Peatlands, climate change and wise use: Implications for the Ramsar Convention
	COP 13 2018	Resolution XIII.13: Restoration of degraded peatlands to mitigate and adapt to climate change and enhance biodiversity and disaster risk education. Resolution XIII.12: Guidance on identifying peatlands as Wetlands of International Importance (Ramsar Sites) for global climate change regulation as an additional argument to existing Ramsar sites.
UN Framework Convention on Climate Change (UNFCCC)	Paris Climate Change Agreement	Two articles are of relevance to peatlands: Article 4 (1): New long-term goal to achieve "a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century." Article 5: (1) Parties should take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases as referred to in Article 4, paragraph 1(d), of the Convention, including forests.

continued on next page

Table 9.1 : Continued

Agreements / Initiative / Meeting	Document / Detailed plans	Inclusion of peatlands
Convention on Biological Diversity (CBD)	Post-2020 Global Biodiversity Framework	Concrete goals under negotiation at the time of publishing; https://www.cbd.int/conferences/post2020
UN Decade on Ecosystem Restoration	Strategy	Highlighting importance of wetland restoration
The Sendai Framework for Disaster Risk Reduction		30 (g) To promote the mainstreaming of disaster risk assessment, mapping and management into rural development planning and management of, inter alia, mountains, rivers, coastal flood plain areas, drylands, wetlands and all other areas prone to droughts and flooding, including through the identification of areas that are safe for human settlement, and at the same time preserving ecosystem functions that help to reduce risks.
United Nations Environment Assembly (UNEA) 4	UNEP/EA.4/RES.16: Resolution for the Conservation and Sustainable Management of Peatlands	The resolution urges Member States and other stakeholders to give greater emphasis to the conservation, sustainable management and restoration of peatlands worldwide. It further acknowledges the contributions of the Global Peatlands Initiative and further requests UN Environment "to coordinate efforts to create a comprehensive and accurate global peatlands inventory."
Regional		
Global Peatlands Initiative 3rd Partners Meeting, 2018	Brazzaville Declaration	The Democratic Republic of the Congo, the Republic of the Congo and Indonesia jointly signed the Brazzaville Declaration on Peatlands to work together to protect the Central Congo peatlands in the Congo Basin from unregulated land use, and prevent its drainage and degradation.
Central Africa Forest Initiative (CAFI)	Letter of Intent: France and Republic of the Congo	Signed by heads of State from France and Republic of the Congo on September 3, 2019, the LOI constitutes a strong commitment to protection and sustainable management of RoC's peatlands by prohibiting all drainage and drying.
	Letter of Intent: CAFI and Democratic Republic of the Congo	The LOI in the Democratic Republic of the Congo was signed in April 2016 establishing a cooperative partnership for the implementation of the DRC's National REDD+ Framework Strategy and REDD+ Investment Plan. Increased awareness about peatlands resulted in the inclusion of peatlands in the Country's Investment Plan.
Lake Tele Lake Tumba Memorandum of Understanding (MOU)	MOU and Plan of Action	In July 2017, an MOU and Plan of Action on the sustainable transboundary management of Lake Tele and Lake Tumba, was signed between the Republic of the Congo and the Democratic Republic of the Congo in Kinshasa.
Ramsar Convention	Transboundary declaration	In 2017, three existing Ramsar sites located in the two Congos were joined together to make the Complexe Transfrontalier Lac Télé - Grands Affluents - Lac Tumba, the largest transboundary Ramsar site comprising 45 percent of peatland area in the Cuvette Centrale.
MOU between RoC and Indonesia	South-South collaboration MOU between Republic of the Congo and Indonesia on peatlands	In October 2018, the Republic of the Congo and Indonesia signed the first MOU of collaboration on peatlands between an African and an Asian country. Both countries committed to develop sound management systems for peatlands and cooperate in promoting best practices in sustainable peatland management in this five-year MOU.

are several ongoing regional initiatives (Table 9.2), which ideally will advance knowledge and programming on peatlands in the near future. To-date, there is still much more that is needed to realize stated commitments such as under the Brazzaville Declaration signed in 2018 by the DRC, the RoC and Indonesia, which pledges to protect the Central Congo peatlands from unregulated land use, and prevent its drainage and degradation.

Ideally, the work of various actors and programs should be anchored in national guidelines aligned with clear national agendas on peatlands. Additionally, studies and programs should also be used to inform the development of national policies. Currently both Congos lack an official peatland definition and national policy on peatland management, though both are currently working on putting peatland-specific policies in place. At the same time, given the current status of monitoring, reporting and verification (MRV) in the two Congos, peatlands have yet to be included in most policy frameworks. RoC mentions peatland progress in the enhanced Nationally Determined Contribution (NDC) of 2021, but does not include targets to avoid emissions from peatlands. The DRC is undertaking the NDC enhancement at the time of writing. Other key policy documents to be expected are the long-term strategies (LTSs), which will outline the long-term greenhouse gas emission plans.

As reflected by the range of related agreements outlined in Table 9.1, peatland management is a cross-sectoral issue, which requires inter-ministerial engagement at the national level to effectively design and implement policies for long-term protection and sustainable management of peatland ecosystems. This includes ministries presiding over management of water, biodiversity, wildlife, fish, forest, agriculture, energy and hydrocarbon resources as well as ministries engaged in land use planning, land tenure, rural development and protection of indigenous peoples. At the same time, peatland management has direct implications for local communities across several provinces/departments as well as for the broader Congo Basin. Therefore, it is essential that the framework for peatland governance includes participation, consultation and inclusion of local communities, clearly linking multiple stakeholders and government bodies at local, provincial and national institutions.

In the DRC, a Peatland Management Unit under the Ministry of Environment and Sustainable Development was established in July 2017 to oversee national processes related to peatlands management, including the development of a national peatlands policy and agenda. The DRC has already defined its national vision for peatlands: “to protect peatlands for people and nature.” Currently the country wants to define a national peatland strategy. The Peatland Management Unit is establishing national thematic groups, made up of focal points from different ministries, civil society groups, private sector actors, international institutions and researchers. The thematic groups are the framework for the participation of stakeholders and experts in discussions and decision-making processes related to peatlands.

Both the DRC and the RoC are facilitating technical dialogues within and across technical groups and sectors to advance national processes related to peatlands including capitalizing on ongoing sectoral reforms underway in each country. For example, the DRC has an ongoing land use planning reform process and the forestry code is also being reviewed with an accompanying REDD+ investment plan being drafted. In the RoC, the National Environmental Action Plan is being reviewed. Following the 3rd meeting of the Global Peatlands Initiative partners in Brazzaville in 2018, the President of the RoC held an inter-ministerial dialogue resulting in the proposed decree to establish a “*Comité National pour la Gestion des Tourbières*”, however the committee is not yet established at the time of writing.

Table 9.2: Initiatives related to the sustainable management of the Congo Basin peatlands

Initiatives / Programs	Description
Global Peatlands Initiative (GPI)	The GPI is an international partnership coordinated by the United Nations Environment Programme (UNEP) to save peatlands as the world's largest terrestrial organic carbon stock. Supported by the German International Climate Initiative, forty-four international partner organizations and four key tropical peatland countries of Indonesia, Peru, the RoC and the DRC have come together to improve the conservation, restoration and sustainable management of peatlands globally. GPI works to assess, measure, monitor and preserve peatlands' carbon and biodiversity, sharing knowledge and experience through a South–South and triangular cooperation approach. The GPI brings the best science and practice to inform decisions with notable achievements like the Brazzaville Declaration on Peatlands, the UNEA4 Resolution on Peatlands, the International Tropical Peatlands Center, the GPI Research Working Group, and more. The GPI promotes healthy peatlands through restoration and conservation action as one of the best Nature-Based Solutions to tackle the climate crisis while delivering multiple benefits for water security, biodiversity, people and their health.
International Tropical Peatlands Center (ITPC)	Launched in October 2018, with the support of CIFOR, UNEP and the GPI partners, the ITPC is a hub, which aims to connect different tropical peatlands researchers, practitioners and stakeholders to support international collaboration and exchanges on research. This also includes the collection and sharing of best practices for tropical peatlands management with a strong link to South–South Cooperation and implementation of the Brazzaville Declaration on Peatlands.
CongoPeat	In 2017, the Congo Basin's Cuvette Centrale gained prominence as an important peatlands system, when an international team of scientists estimated, for the first time, its extent making it the world's largest intact, contiguous tropical peatland complex (Dargie et al. 2017). This original research formed the scientific basis of the Brazzaville Declaration was followed by the CongoPeat project, a scientific program also funded by the UK government's National Environment Research Council, which is gaining a comprehensive understanding of the Congo Basin peatlands by combining field measurements, laboratory analysis, big data and modelling techniques to better map the carbon-rich ecosystem, understand how the peatland formed, assess how it functions today, and model its response to human pressures in the future. CongoPeat is a network of over 50 scientists from 15 institutions. CongoPeat works closely with the RoC and DRC governments to provide the latest scientific understanding of the peatlands and is a member of the GPI.
The Congo Basin Sustainable Landscapes Impact Program (CBSL IP)	Supported by the Global Environment Facility (GEF), the UNEP led CBSL IP aims to catalyse transformational change in conservation and sustainable management of key transboundary landscapes in the Congo Basin through landscape approaches that empower local communities. CBSL IP includes projects aiming to support the sustainable management of the peatlands in the DRC and RoC.
International Commission of the Congo-Oubangui-Sangha Basin (CICOS)	CICOS was set up in 1999 as a collaboration framework established amongst the six countries of the Congo Basin, responsible for integrated water resources management and river transport issues of the Congo-Ubangui-Sangha Basin.
Congo Basin Forest Partnership (CBFP/PFBC)	A response to Resolution 54/214 of the United Nations General Assembly urging the international community to support efforts towards conservation and sustainable management of Congo Basin forests, the CBFP has 117 members including 10 Central African countries. CBFP supports "the shared vision of the Central African Heads of State, notably by improving efficiency of measures-including technical and financial assistance to promote biodiversity conservation and sustainable management of forest ecosystems, combat climate change and reduce poverty in Central African countries in line with the COMIFAC Convergence Plan".
Central African Regional Program for the Environment (CARPE)	Funded by the U.S. Agency for International Development (USAID), CARPE provides significant financial and technical resources to support efforts to conserve the planet's second largest tropical rainforest and its threatened biodiversity.
Sustainable Wetlands Adaptation and Mitigation Program (SWAMP)	SWAMP is a technical assistance program of USAID jointly implemented by the Center for International Forestry Research (CIFOR) and the U.S. Forest Service (USFS) which facilitates research to estimate greenhouse gas emissions and carbon stocks of tropical wetlands, builds local research capacity and informs national policy discussions to support development of climate change adaptation and mitigation strategies based on credible scientific information. SWAMP provides technical assistance to both Congos on strengthening capacity for better management, measuring and monitoring of peatland forests.

Both countries, as part of the Global Peatlands Initiative, which brings the best available science and knowledge of peatlands to decision makers and facilitates south-south exchange of lessons with tropical peatland countries, have elevated the importance of peatlands at the national, regional and international levels. Furthermore, each country is taking action to mobilize investment and technical support for both countries to put in place policies, plans and institutions to address threats to peatlands and build the essential enabling environment to improve livelihoods and ensure the sustainable management of peatlands landscapes in the Congo Basin.

9.5 Advancing programming on peatlands in the Congo Basin

There are several programs and initiatives in the Congo Basin region focusing on biodiversity conservation and sustainable management of the second largest region of tropical forest in the world. Peatland-specific programs are more recent whereas other more longstanding programs have recently elevated the importance of peatlands (Table 9.2). Given the recent focus on peatlands, programs and initiatives should be leveraged to improve knowledge of these ecosystems, build technical capacity within the region and implement programming which facilitates both sustainable management and sustainable livelihoods within peatland areas. In parallel, there is a need to strengthen governance from local to national to regional levels as well as understand effective incentives and policy frameworks for the sustainable management of peatlands. Action and implementation will require resources, and while current programming is encouraging, further investment can help to address many existing gaps.

9.5.1 Key implementation challenges

Several key challenges must be considered when implementing programs which aim to protect and/or facilitate the sustainable management of peatlands. Communities are key stakeholders whose customary rights must be respected. Any management decisions at the national level and implementation at the local level should account for communities' rights and interests and a process adhering to Free, Prior and Informed Consent should be facilitated before any implementation or land management decisions are enacted in their lands. Similarly, environmental and social impact assessments (ESIA) should be conducted when undertaking land use planning or designing programs and considering land management and development options. While there are laws requiring ESIAs in Central Africa including guidelines published by COMIFAC on conducting ESIAs in forest environments (COMIFAC 2017), generally such assessments are rarely undertaken or not completed appropriately when undertaken. ESIAs should be integrated into implementation of programming in the Central Congo peatlands, as well as more broadly into land use planning and decision-making toward the sustainable development goals.

Creating incentives at the local level alongside low-emission livelihood development will be key to reduce local-based threats of peatland degradation. Payment for ecosystem services schemes may be part of this process but further development of sustainable livelihood activities should be further explored. Currently the Central Congo peatlands is a source of non-timber forest products, bushmeat, fish, and fuelwood and some timber extraction (See Box on Ecosystem Services). Fishing is a main subsistence and income generating activity including sending smoked fish to markets as far as capital cities, Brazzaville and Kinshasa. While fish provides an excellent source of protein and is the main source of cash for most households (Comptour et al. 2018), and is family-based in the region, the development of intensive commercial fishing could degrade the resource (Inogwabini 2014). Further studies are needed on sustainable livelihood options and other incentives and criteria for investments to prevent peatland degradation and protect these vital carbon stores.

9.5.2 Peatland protection and governance

Currently there are conflicting and overlapping land use zones in the central Congo peatland areas in both Congos (Dargie et al. 2019). Facilitating national multi-sectoral processes will be essential to resolve these potential conflicts and ideally further strengthen protection of peatlands by preventing damaging activities from affecting these intact ecosystems (See Section on Threats).

Development of inter-sectoral and multi-stakeholder consulted land use plans at provincial and local levels are critically also important, land use planning being a key element specifically outlined in the Brazzaville Declaration and the CAFI LOI in the Republic of the Congo (see Table 9.1) to promote the protection and sustainable management of peatlands, and prevent their drainage and drying out.

Protected areas provide the strongest form of conservation and protection from damaging land use change. Establishing protected areas within the Central Congo peatlands area was first proposed 30 years ago, during the preparation of the first phase of the ECOFAC project (Doumenge 1990; Hecketsweiler 1990). Since then, some important reserves have been established: Lake Télé Community Reserve (2001) and Ntokou-Pikounda National Park (2013) in the RoC; and Ngiri Triangle Nature Reserve (2011) in the DRC (Dargie et al. 2019; OFAC 2020). Several sites have also been included in the international list of Ramsar sites: Lac Télé/Likouala aux Herbes (1998), Grands affluents (2007), Sangha-Nouabalé-Ndoki (2009) and Ntokou-Pikounda (2012) in Congo, Tumba-Ngiri-Maï-Ndombe (2008) and Tumba-Ledima Nature Reserve (2006) in the DRC. The transboundary site established in 2017, Complexe Transfrontalier Lac Télé - Grands Affluents - Lac Tumba, is the largest transboundary Ramsar site in the world. However, these protections were to safeguard the wetlands rather than being specifically designed to protect the peatlands.

One option to further strengthen protection of the central Congo peatlands is to create new protected areas by extending the existing network of reserves to specifically protect areas of peatland, especially in the most remote areas and between river basins, for example North-East of Ngiri, on the bank of the Congo River, North of Ruki River and between Lake Tumba and North-East of Lake Maï Ndombe in the DRC, and between the Ubangi and Likouala-aux-herbes rivers in the RoC. While this is one approach, it should not be the only option considered in supporting peatland management programming. For example, Community Reserves, such as the Lac Télé Community Reserve that explicitly include local people as equal co-managers can protect peatlands and help communities increase incomes and develop sustainably. Furthermore, allocation of community forestry concessions may be another way to ensure both protection and community access and sustainable use of these peatland areas. Creation of any kind of protected area should take into account local populations, specifically including them in the process as a key stakeholder, respecting their customary rights.

Both governments have highlighted the need to support local communities with improved, sustainable livelihoods that are compatible with maintaining the peatland ecosystem integrity. Provision of basic needs such as improved access to clean water, healthcare, schooling and better transport while offering equal opportunities to indigenous peoples and other vulnerable groups, is essential to avoid potential negative pressures on peatlands to meet these needs in the future.

Conclusions and recommendations

The central Congo peatlands of the Congo Basin play an important role locally, regionally and globally. Spanning 145,000 Km^2, they store approximately the equivalent of what is found in the above ground biomass of the trees of the entire Congo Basin forest (Dargie et al. 2017; Verhegghen et al. 2012). Despite this, much is still unknown about this important ecosystem. Further research is needed on: mapping peatland extent and depth; identification and characterization of peatland forest types; the biodiversity of the peatlands; potential threats and ecological, hydrological and climate impacts of disturbance/degradation; monitoring systems that can detect change and disturbance in near real-time; local community use and value of these areas; and incentive mechanisms/approaches for their protection (Table 9.3). To advance this research a cadre of experts within both the universities and government is needed in the RoC and the DRC to monitor and sustainably manage the peatlands.

At present, limited disturbance or degradation of the peatlands have occurred largely due to local sustainable use and limited access into these remote areas which has avoided large-scale land-use change. But these ecosystems are especially sensitive to disturbances and can be irreversibly changed resulting in large emissions of greenhouse gases as has occurred in other drained and degraded peatlands, such as in Southeast Asia. Several potential threats exist, including hydrocarbon prospection, road building, logging, agricultural expansion, palm oil plantations, and climate change, but their relative likelihoods are not currently understood. Therefore, more research to inform policies and new inter-sectoral sustainable management plans and actions for urgent conservation of the Central Congo peatlands are paramount to ensure continuing provision of the ecosystem services and stability they provide.

As partners of the Global Peatlands Initiative, the governments of the DRC and the RoC are taking action, through national leadership and support from partners to develop consultative, inter-sectoral and scientifically informed peatlands management policies, strategies and plans. Any peatland policies, plans or investments need to be linked to both countries' commitments to regional and international global environmental agreements reinforced by targets of the Sustainable Development Goals (SDGs) and be drainage-free and deforestation free livelihood sources. Most critical is that the inter-sectoral, inter-disciplinary and multi-stakeholder participatory processes of developing policies, plans and programmes to conserve, restore and sustainably manage these peatlands need adequate financing, innovation, institutional strengthening, and access to knowledge.

Table 9.3 presents a list of specific policy, research and peatland management recommendations for investing in peatland protection by strengthening institutional frameworks, improving knowledge of these ecosystems and implementing programs which facilitate sustainable management of peatland landscapes. While some programs and investments exist (see Table 9.2), significant additional sustainable funding will be required, which should not be underestimated.

Given the very limited disturbance and degradation of the peatlands to date, the Congo Basin presents a unique and important opportunity to take preventative measures versus reactive approaches for conservation and sustainable management of the central Congo peatlands. Conversely, if action is not taken today to protect and sustainably manage these irrecoverable carbon stores (Goldstein et al. 2020) at all scales, from international, national to regional, it may be too late tomorrow.

Table 9.3: Recommendations for policy, research and management actions across all actors to strengthen peatland protection and facilitate sustainable management of peatland landscapes.

Policies, laws and regulations
– Develop national peatland definition agreed between different stakeholder groups to harmonize maps – Create national peatland agendas/strategies/policies and land use plans – Include peatlands in national monitoring and reporting systems, including the climate transparency frameworks and their greenhouse monitoring and reporting, the Nationally Determined Contributions (NDCs), and the Long-term low greenhouse gas emission development strategies (LTSs) – Promote good governance and transparent information sharing, e.g., through accessible and up-to-date information platforms – Strengthen existing legislation for peatland protection – Provide a system of incentives to land managers developing sustainable livelihood sources (that do not cause logging nor drainage), e.g., through small- and medium-sized enterprises – Prohibit logging, hydrocarbon and agriculture concessions within the peatland areas and ensure monitoring and law enforcement – Extend the protected area zone to include the peatlands – Seek to mitigate climate risks
Research and monitoring
– Continue to develop and build national research expertise and capacity in fields related to peatland forest ecosystems and peatland management – Further map peatland extent and depth including identification and characterization of peatland forest types – Build a model of peatland development and function to assess the ecological, hydrological and climate impacts of disturbance/degradation from the major potential threats to the peatlands – Create a hydro-climatic observatory collecting long-term in-situ and remote sensed data allowing the simultaneous monitoring of the vegetation cover and productivity, peat accumulation, as well as the water balance (rain, infiltration, aquifer recharge, surface runoff, evapotranspiration) to understand the remotely forced intra-seasonal to inter-annual climate fluctuations potentially impacting the peatlands and conversely those locally forced that is induced by peatland conversion – Develop early-warning, early-action monitoring tools and approaches in collaboration with national and private entities that can detect change and disturbance in near real-time – Understand, document and quantify local community use and value of these areas – Analyze incentive mechanisms/approaches for peatland protection – Monitor and understand the emerging threats and trends in regional climate
Peatland management/program implementation
– Protect community rights and respect principles of Free, Prior and Informed Consent in peatland management decisions – Leverage community reserves and community forestry concessions as mechanisms to facilitate peatland protection and community access and management – Further explore incentive mechanisms for local, regional and national levels for peatland protection, including deforestation-free and drainage free sustainable land use investments and ecosystem results-based payments – Empower civil society to take action to maintain the socio-economic systems and environmental services – Facilitate inter-sectoral and multi-stakeholder land use planning at local, regional and national levels that ensure peatland protection through sustainable landscape management reconciling current conflicting zoning – Pilot initiatives to promote sustainable management that provide income for local communities – Ensure personnel and financial resources are available to meet Multilateral Environmental Agreements including the Ramsar Convention requirements and recommendations and implement robust and sustainable peatland programs – Strengthen institutional capacity for effective application of environmental and social impact assessments (ESIA) in land use planning and management processes, including monitoring – Support local communities in identifying and further developing sustainable livelihood means that do not threaten the peat integrity and ecosystem services – Document and share best practices and lessons learned and invite other French-speaking and other peatland countries to exchange knowledge

CHAPTER 10

Emergence/Re-emergence of Infectious Agents and Epidemic Risks in Central African Forests

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Photo Axel Fassio/CIFOR

Introduction

The years 2020–2021 will always be marked by the COVID-19 crisis. This pandemic was triggered by the coronavirus SARS-CoV-2, which broke the species barrier between a (still unknown) wildlife species and humans, somewhere in China in 2019 (Andersen et al. 2020). Above and beyond the number of deaths directly caused by COVID-19, this crisis will have an impact on our societies over the long term. Yet, this pandemic is not the first of its kind in modern times. The 2014–2016 Ebola virus disease epidemic in West Africa (and its resurgence in 2021) has also been a major warning sign of the threat posed by the transfer of a pathogen from wildlife to human populations (Heymann et al. 2015). A long list of emerging animal pathogens has already threatened to reach – or succeeded in reaching – epidemic or pandemic proportions after interspecies transmission (known as "spillover"). These include HIV, SARS-CoV-1, MERS-CoV, Nipah virus and Rift Valley fever.

Today, emerging infectious diseases (EIDs), defined here as "diseases that have recently increased in incidence or geographic range [and] recently moved into new host populations," (Daszak, Cunningham and Hyatt 2000; Tompkins et al. 2015), are one of the main risks to human health and societies. In fact, these EIDs have been increasing in recent decades (Binder et al. 1999; Woolhouse and Gowtage-Sequeria 2005). More than 60 percent of known EIDs are due to an animal pathogen (Morens, Folkers and Fauci 2004; Jones et al. 2008), and it is estimated that 75 percent of these infectious diseases that have emerged in the past three to four decades have been caused by wildlife (Woolhouse 2002; Wolfe, Dunavan and Diamond 2007).

These zoonoses are diseases that are based on transmission from animals to humans and triggered by complex interactions between humans, domestic animals and wildlife (Cleaveland, Laurenson and Taylor 2001; Karesh et al. 2012). In order to design and implement surveillance and control systems for these EIDs, it is essential to understand the mechanisms and factors that lead to this spillover.

Jones et al. (2008) have attempted to identify the factors that cause these diseases. Human density associated with anthropogenic and demographic changes is one of the main drivers of EIDs. The wide range of host wildlife is also an important factor to consider. Their predictive model indicates that low-latitude developing countries are the most exposed to EIDs, from wildlife or transmitted by vectors. In 2017, Allen et al. (2017) refined the Jones et al. (2008) model for wildlife-derived EIDs. This new model suggests that the risk of emergence is higher in tropical forest regions with high mammalian biodiversity and subject to changes in land use due to encroachment by human populations and agricultural activities.

These global studies therefore point to African tropical forests as a hotspot for EID emergence. In this chapter, we will detail the known emergence mechanisms of pathogens that cause EIDs at human/wildlife interfaces in the forest environment. We shall do so through i) a summary of knowledge on biodiversity-health relationships in the context of Central African forests and global drivers of EID emergence; ii) a focus on the human/animal interface as occasions for emergence; iii) a presentation of the recent major viral EIDs in these systems; iv) an analysis of the strengths and weaknesses of EID surveillance systems in Central Africa; and v) a reflection on the risks related to EIDs in the framework of global changes and the COVID-19 pandemic.

10.1 Central African biodiversity and the factors/mechanisms behind the emergence of infectious agents

10.1.1 Biodiversity and emerging diseases

Of all terrestrial ecosystems, tropical forests are home to the greatest number of species. They alone are home to nearly 50 percent of the Earth's biodiversity (Mayer, Tesh and Vasilakis 2017; Wilson 1988). This includes wild animals (over 1,200 species of fish, 400 species of mammals, 1,000 species of birds and a still unknown number of insects) and flora, with about 10,000 vascular plant species (Harrison, Brummett and Stiassny 2016). All these animal and plant species are potential reservoir hosts, intermediate hosts or vectors for a very large number of known or unknown bacteria, parasites and viruses. The number of pathogenic micro-organisms increases the closer the latitude is to the equator (Guernier et al. 2004). This biodiversity therefore makes the forests of Central Africa significant sources of new infectious agents compared to other types of habitat.

Currently, the Congo Basin is still relatively well preserved compared to other African ecosystems, but it is undergoing transformation related to human activities. These activities destroy or transform forest habitats and exert impact on biodiversity (Harrison, Brummett and Stiassny 2016). From a theoretical point of view, the impact of this loss of biodiversity on the risks of emergence and transmission of EIDs can be positive or negative (Keesing et al. 2010). But the relationship between biodiversity loss and EIDs is complex. The loss of species has a direct impact on the structure of the interspecific biotic network and the functioning of ecosystems (Cardinale et al. 2012). This modifies the food webs and, as a result, all the mechanisms of infectious agent spillover (Morris et al. 2016; Rulli et al. 2017).

The dilution effect is often put forward to explain the effect of biodiversity loss on EID increase (Wood et al. 2014). It is based on the fact that host individuals in a community characterized by a high level of biodiversity have a lower risk of being contaminated by a given pathogen, simply because of the lower probability of encounter between the pathogen and the individual (Wood et al. 2014). However, the dilution effect, which has been observed on small spatial scales for some diseases, is being challenged by studies performed at various scales (Randolph and Dobson 2012; Wood et al. 2014; Halliday and Rohr 2019). Indeed, host species represent the habitats and resources of pathogens: if these latter are host-dependent, then in the event of loss of this main host, these pathogens will disappear at the same time as their host species (Wood et al. 2014). Conversely, in the event of biodiversity loss that spares efficient reservoir or intermediate host species, an amplifying effect may increase the risk of transmission of a pathogen carried by these host or reservoir species (Pongsiri et al. 2009). The consequences a loss of biodiversity may have on the risks of disease transmission will thus differ according to the pathogen, its hosts and the environments in question. Pathogens, like all other animal species, undergo changes (anthropogenic or not) and have different intrinsic adaptive capacities that will make them “losers” or “winners.”

Often, habitat modifications lead to selection of so-called generalist species, which are more likely to host pathogens and put more specialized species at a disadvantage. Thus, the densities of large mammals are often impacted first in the event of biodiversity loss, while the density of micromammals, which are privileged carriers of pathogens, tends to increase (Young et al. 2014). Some EIDs may also pose major risks to biodiversity and in particular to the conservation of the Congo Basin’s iconic species. For example, an outbreak of Ebola virus disease severely reduced great ape populations in some areas of the Congo Basin during the 2000s, and in several months ruined years of work and massive investments in the protection of chimpanzees (*Pan* spp) and gorillas (*Gorilla* spp) (Walsh 2003; Bermejo et al. 2006).

10.1.2 Emergence factors

Emergence of a zoonotic infectious disease, which usually results in an epidemic in the susceptible host population, is due to a combination of intrinsic and extrinsic factors (Daszak, Cunningham and Hyatt 2000; Morens, Folkers and Fauci 2004; Woolhouse and Gowtage-Sequeria 2005). First of all, some factors are related to the characteristics of the pathogen itself, the reservoir and/or intermediate hosts, and the vectors (if any). Other factors are related to the environment (or climate) more or less favourable to the circulation of the infectious agent. Territorial factors are the product of human activity and the risk behaviours of human populations (Ludwig et al. 2003). Examples are a lack of or poorly performing disease surveillance systems, ineffective programmes for monitoring vectors or other carrier species, and failed water supply systems. Additional factors include human-induced environmental changes, such as deforestation, agricultural practices, loss of biodiversity, logging and mining. Mention should also be made of all human activities that increase contacts between people and wildlife or that facilitate the circulation of infectious agents outside their natural habitats: hunting, consumption and trade of bushmeat, transportation and tourism.

10.1.3 Emergence mechanisms

For emergence of a zoonotic disease, several steps are required: invasion, establishment and persistence of an infectious agent in new host populations (Anderson and May 1986). First, when there is contact between a reservoir animal and a human, the pathogen must be transmitted successfully and be able to multiply and then be transmitted from human to human. Finally, the epidemic must shift from a local to a national or international scale.

A number of natural barriers must be overcome in order for spillover to occur. These barriers are variable in time and space. The probability of transmission of an infectious agent from its reservoir to a human being actually depends on a variety of factors:

1. The distribution and density of the reservoir species: greater presence of the reservoir species in the habitat used by humans increases the probability of encounter and contact between the two.
2. Pathogen dynamics in the reservoir host: greater prevalence in the reservoir species makes human-animal contact more of a risk.
3. Human exposure to the pathogen: if the animal is infected, the intensity of the infection will determine transmission probability. The main transmission routes of the infectious agent as well as the behaviours of the human and/or the vector (if involved in the transmission mechanism) are decisive: transmission may come from the skinning of hunted animals or from repeated stings of a vector insect. The more the human or vector is in contact with the body fluids or organs in which the infectious agents are concentrated, the greater the risk of transmission.
4. Internal factors of the person in contact will determine their susceptibility to infection. These include genetic, physiological and immunological characteristics (Plowright et al. 2017). If these characteristics enable multiplication of the infectious agent in the contact case, the latter can then become the index case of the epidemic and contaminate other people, as was the case of the Ebola virus disease (EVD) epidemic in Luebo, the Democratic Republic of the Congo (DRC), in 2007 (Leroy et al. 2009b).

All these various steps are barriers that must be overcome for transmission of the infectious agent from a reservoir host to a recipient host (Plowright et al. 2017). For disease emergence to occur, all these barriers must be breached one after the other, at the right time and place. This “alignment of breaches” in the barriers is ultimately very rare for viruses such as filoviruses (Ebola and Marburg) and coronaviruses (SARS-COV, SARS-CoV-2 and MERS-CoV), but more or less permanent for other zoonotic diseases such as trypanosomiasis, for which incidence is high in Africa due to almost permanent exposure to infected animals and vectors (tsetse flies) and low-level resistance in humans (Simarro et al. 2012). This chain of low-probability events suggests that observed emergences represent only a small portion of spillover events, most of which do not result in the infectious agent staying in the human population (Wolfe et al. 2005a).

10.2 Health risks at the human/animal interface in Central Africa

More than half of the new infectious diseases that appeared between 1996 and 2009 occurred in Africa (Wood et al. 2012). Spillover of these EIDs in large human populations is facilitated by anthropic activities and the processes of globalization, urbanization, movement of goods and people, and climate change. Various factors further this spillover: land use and transformation, fragmentation of natural habitats and the ensuing loss of biodiversity, hunting, and agricultural and customary practices (Wood et al. 2012; Lloyd-Smith et al. 2009; Morse et al. 2012).

10.2.1 Climate change, deforestation and forest fragmentation

Climate change is going to exert wide-ranging impact on ecosystems and their inhabitants (both human and non-human), including on pathogens (Chidumayo et al. 2011). However, the consequences of climate change on the dynamics of spillover are difficult to predict. It can alter the dynamics of diseases caused by pathogens that spend part of their life cycle outside their hosts and that are thus exposed to the effects of environmental variations. This concerns pathogens transmitted by vectors (insects and ticks), by water and by food (Baylis 2017). Climatic conditions also alter the population dynamics of hosts and vectors, and thus indirectly those of pathogens (McMichael and Lindgren 2011). In Africa, several examples of emergence or re-emergence associated with climate change have been described: Rift Valley fever (Linthicum et al. 1999; Rweyemamu et al. 2000), malaria (Nchinda 1998; Gunda et al. 2017) and chikungunya (Paupy et al. 2012; El-Sayed and Kamel 2020).

Deforestation in Central Africa is the result of human activities. In order of severity, these are 1) land clearing for subsistence agriculture, firewood and charcoal extraction; 2) logging; and 3) mining (Bogaert et al. 2008; Abernethy, Maisels, and White 2016). Each of these activities can lead to a health risk (Epstein 2001). Deforestation and forest fragmentation influence the behaviour and abundance of wildlife, including both small and large mammals (Jones et al. 2013). They are modifications that alter biological interactions between living organisms and that may promote the alignment of events required for infectious emergence in humans (Guégan et al. 2020). For example, deforestation affects habitat use by frugivorous bats (Zhang et al. 2005), and there is a link between destruction of natural bat habitats and transmission of their viruses to other animals and humans (Jones et al. 2013). Several studies suggest that the likelihood of an outbreak of EVD in a given site is linked to recent deforestation events there (Olivero et al. 2017; Rulli et al. 2017).

Furthermore, meta-analysis based on PREDICT data[1] shows that rodent species known to be disease reservoirs were significantly more abundant in modified habitats, while non-reservoir species were more abundant in unmodified habitats (Mendoza et al. 2020). The same is true with bacteria. When forest fragmentation disrupts the ecology of non-human primates (NHPs), it influences bidirectional spillover of bacteria within those fragments (Goldberg et al. 2008). These findings confirm that deforestation and habitat fragmentation generally have an impact on biodiversity that may involve a higher risk of transmission of zoonotic pathogens.

10.2.2 Subsistence and commercial hunting

In rural Central Africa, bushmeat is an important source of protein and income for local people. Bushmeat consumption was estimated at between 1 and 5 million tonnes in the Congo Basin in the 2000s (Wilkie and Carpenter 1999; Fa, Currie and Meeuwig 2003; Fa, Ryan and Bell 2005) with an estimated hunting pressure of between 23 and 897 kg/km^2/year (Van Vliet and Nasi 2008). In Central Africa, bushmeat is often more accessible and affordable than farmed meat. Bushmeat is also an integral part of the culture of the rural and urban populations of the Congo Basin, and demand for it increases along with household purchasing power (Wilkie et al. 2005; Fa et al. 2009). To meet this growing demand for bushmeat, hunters hunt and harvest throughout the year to feed their families and their village (subsistence hunting) and to feed urban centre markets (commercial hunting) (van Vliet and Mbazza 2011). Growing demand from cities is leading to higher selling prices. Consequently, hunters prefer the bushmeat value chain to target urban markets or other countries rather than rural areas.

1 https://www.ecohealthalliance.org/program/predict

Over the past two decades, this commercial hunting, even though informal, has developed at national, regional and international levels to such an extent that it furthers the circulation and emergence of known or unknown zoonotic diseases in the Congo Basin and the rest of the world. For example, the scales and flesh of pangolins (*Smutsia gigantea*, *Phataginus* spp), which are hunted in Central Africa, can be found in Asia, where they are used for traditional medicine and meat consumption (Zhang et al. 2020; Ingram et al. 2018). Further, to increase hunting success and meet demand, hunters are using new technologies such as hunting rifles, flashlights and even GPS, thereby increasing the number of catches and the pressure on a greater number of animal species (Bowler et al. 2020).

Hunting and more specifically the capture, handling, preparation and transport of carcasses generate direct contact with potentially infected wild animals (Wolfe et al. 2005b; Mitman 2014; Magouras et al. 2020). But as these activities target rodents, bats and gorillas alike, their level of risk depends on the wildlife species hunted and handled. Bats, for example, are suspected to be reservoirs of filovirus (Marburg and Ebola) and coronavirus. Great apes (chimpanzees and gorillas), on the other hand, are phylogenetically closer to humans (Wolfe et al. 2005a) and may be carriers of a large number of zoonotic pathogens. Risk increases when the hunter kills a sick animal or picks up a fresh carcass of an animal that died in the forest (Pourrut et al. 2005; Guégan et al. 2020).

The risk of transmission of consumption-linked diseases is likely to be lower, as cooking can destroy pathogens. On the other hand, little is known about the effects of bushmeat preservation methods on pathogen survival. Salting, drying or smoking the meat is likely to be damaging to some of these infectious agents, but their effect remains little known. Some studies suggest that these methods are not 100 percent safe, as several species of viruses have been detected by biomolecular analysis in thoroughly smoked bushmeat cuts (Smith et al. 2012).

10.2.3 Logging and mining

Central Africa's rich and considerable natural resources (chiefly mining and forestry resources) are heavily exploited. The mining sector in Africa has invested heavily and intensified exploitation. In some Central African countries, such as Cameroon, gold mining is dominated by artisanal mining (Aoudou Doua, Narke and Layen Ndiong 2018). More and more people have been engaging in this smuggling activity over the past few decades, leading to massive influxes of migrants. This increase in population is generally accompanied by a pioneer front of farming and mining, leading to serious environmental consequences. "Gold fever" has developed to the extent that small isolated camps of artisanal workers have turned into small but well-structured villages (Aoudou Doua, Narke and Layen Ndiong 2018). These mining and forestry activities in the Congo Basin lead to the opening up of trails and human settlements in previously untouched forests, thereby facilitating access to new hunting areas (Wolfe et al. 2005b; Chomel, Belotto, and Meslin 2007). The result is that new interfaces between humans and wildlife are created. Most of the health risks associated with mining and forestry are due to the creation of these new interfaces and to the hunting that always accompanies them – not only to feed the workers, but also to develop the bushmeat trade. However, some disease re-emergence has been linked directly to mining, as seen by the Marburg haemorrhagic fever epidemic in a gold-mining village in the DRC in 1998, where 52 percent of cases were miners working in an underground mine. The epidemic ended when the mine was flooded (Bausch et al. 2006).

10.2.4 Agricultural practices

Subsistence agriculture is one of the main causes of forest degradation in the Congo Basin (Tyukavina et al. 2018). Small-scale land clearing leads to significant fragmentation of forest cover and enlarges the areas of interface between humans and wildlife. There is an increase in direct and indirect contact with wildlife which are a potential source of pathogens. In addition, newly formed forest edges are subject to changes in biodiversity as well as to changes in the abundance and communities of wild species (Pfeifer et al. 2017). All these factors can impact the risk of zoonotic transmission of infectious agents circulating in the forest.

The crop and secondary forest areas associated with agriculture are attractive food resources for wildlife. This is the case for the frugivorous bat ***Hypsignathus monstrosus***, which prefers to use these areas near forest villages for food and is suspected of playing a role in the natural cycle of the Ebola virus (E. Schloesing, forthcoming). When wildlife uses these habitats which are in close proximity to humans, it promotes direct and indirect contact between wildlife, livestock and humans, thereby increasing the risk of spillover. Bacterial exchanges between NHPs, domestic animals and humans have been confirmed in fragmented forest areas and are linked, among other things, to the plundering of crops by these primates (Goldberg et al. 2008).

Forest communities raise livestock (goats or pigs) or poultry that move freely. These domestic animals share the same habitats and resources as wildlife, including fruit trees favoured by many wildlife species (including bats and NHPs). For example, domestic pigs can roam distances of several kilometres in forests, making for significant risk of direct contact with wildlife due to their scavenging behaviour (Atherstone et al. 2017). Livestock rearing in forest areas therefore increases occasions for pathogen transmission from wildlife to domestic animals, which can in turn act as an intermediate or amplifying host before transmission to humans.

Finally, a little documented but common agricultural practice in Africa (M. Bourgarel, pers. obs.) is the collection of bat guano from the caves to fertilize fields, which can promote the emergence of infectious diseases. A study conducted in Zimbabwe shows, for example, the presence of coronavirus and paramyxovirus in guano used for this purpose, thereby highlighting the risks associated with this practice (Bourgarel et al. 2018).

10.2.5 Beliefs and customs

The beliefs and customs of people living in the Congo Basin play a major role in the perception of diseases, the risks associated with their activities such as hunting and their interactions with wildlife, and the management of epidemics. In fact, some ethnic groups do not have a biomedical conception of the causes of diseases. There is even a saying in the DRC that "Congolese don't die from germs"[2] (Sabuni 2007). Witchcraft was often cited as the cause of illness among ethnic groups such as the Bira and Nande in the DRC and Gabon during the 2001–2002 EVD outbreaks (M. Bourgarel, pers. obs.).

Customs and beliefs also lead people living in forests to engage in risky behaviours involving wildlife in addition to those involving hunting and handling bushmeat. Several ethnic groups interact with dead animals when hunting or shortly after childbirths, thereby increasing risk of disease

2 "Congolais hakufi na microbe".

transmission. For example, they may put a newborn in the rib cage of a freshly killed gorilla so that the child takes in the animal's strength, or they may practise rites that put them in close contact with dead wildlife to increase their success in hunting (F. Liégeois and M. Bourgarel, pers. obs.).

Finally, beliefs and customs can in fact have an impact on the management and control of an epidemic by health services and governments. Looking again at the example of EVD epidemics, the local population living in epidemic zones can often be seen to refuse to believe in the epidemic, claiming that it is government propaganda and used to obtain foreign funds, control the population or procure human organs (Agusto, Teboh-Ewungkem and Gumel 2015). Added to this is the fact that some infected people refuse to be quarantined and go into hiding in the forest. There is also the fear of not being able to give loved ones an appropriate traditional burial, as the bodies are not returned to the family but cremated by health services. These traditional beliefs and customs incite some families to hide their sick relatives in order to escape the health system, thereby slowing down control of the epidemic significantly (Agusto, Teboh-Ewungkem and Gumel 2015).

This problem of lack of confidence among forest populations in health systems stems in part from a lack of communication and awareness-raising by health system actors. During the 2001 and 2002 EVD outbreaks, these services focused on case management, without really communicating to local populations about the fate of quarantined and deceased patients. This led the public to believe that sick patients placed in quarantine disappeared or were murdered for their organs (M. Bourgarel, pers. obs.). It is therefore crucial to i) take these beliefs and customs into account and to respect them as much as possible, ii) properly communicate to the various people involved in the management of epidemics, and iii) limit the tensions or even social violence which can emerge from these crises (Sabuni 2007).

10.2.6 Other human activities

Every year, millions of live animals are sold around the world, for use as pets. More often than not, these animals are illegally captured to meet the demand for exotic animals. This global black market is estimated at several billion dollars per year (Rosen and Smith 2010). In Central Africa, trade in live animals predominantly concerns certain species such as the grey parrot (*Psittacus erithacus*), the royal python (*Python regius*) and several species of NHPs (Stiles et al. 2013; Martin, Senni and D'Cruze 2018; Devaux et al. 2019a; Norconk et al. 2020).

Beyond the conservation problem it poses, this trade is highly effective in exposing host populations to new pathogens (Karesh et al. 2005; Can, D'Cruze and Macdonald 2019) and is recognized as a potential source of future pandemics. The first outbreak of monkeypox outside Africa occurred in the United States in 2003, following the importation of rodents from West Africa which infected other local mammals and subsequently a total of 47 people (Mackay and Arden 2015). The risk for a country to experience the emergence of a new disease depends on many complex socioeconomic, ecological and biological factors that have already been detailed. The volume of live animals imported into the country is one such factor. Good understanding of this often informal trade is thus crucial to optimize the limited efforts and resources allocated to the prevention of zoonotic disease epidemics (Karesh et al. 2005; Can, D'Cruze and Macdonald 2019).

In the international tourism market, demand for animal tourism has increased sharply over the last decade (Fennell et al. 2012). This type of tourism is a significant source of income for the countries visited and contributes to the conservation of species and habitats. It can also generate educational and socioeconomic benefits for local people (Macfie and Williamson 2010). Today's tourists seek out close encounters and personal experiences with wildlife and are particularly attracted to endangered species in remote and fragile habitats (Macfie and Williamson 2010). However, this activity modifies the behaviour of certain species which, attracted by the frequent supply of food from tourists, lose their fear of humans. This close and regular contact between people and wild animals increases the probability of pathogen transmission between them.

This risk is especially significant between humans and NHPs, which – because of their strong capacity for interaction and their phylogenetic proximity – share a large number of infectious agents (Davies and Pedersen 2008). In several national parks of Central Africa, groups of great apes have become habituated (i.e., made to accept human observation), to improve the quality of tourism products. These parks include Lopé in Gabon, Odzala and Nouabalé-Ndoki in the Republic of Congo, Dzanga-Sangha Special Reserve in the Central African Republic, and Virunga and Kahuzi-Biega in the DRC. There are also many great ape sanctuaries which offer tourists close contact with habituated great apes. Forest tourist camps similarly promote closer contact with wildlife, which are attracted to food and garbage. This proximity facilitates the transmission of infectious and parasitic agents between the two groups (Odeniran, Ademola and Jegede 2018; Devaux et al. 2019b), including rabies, herpesvirus type B, Marburg, Ebola, monkeypox and other pathogens. This tourism of mingling with NHPs can also have an impact on the conservation of these species via transmission of human diseases to the latter (Devaux et al. 2019b). Cases of transmission of respiratory pathogens sometimes leading to death in great apes have been recorded in Africa (Köndgen et al. 2008; Dunay et al. 2018; Grützmacher et al. 2018; Mazet et al. 2020). Beyond indirect contacts, there are also serious risks that tourists may be bitten by wild animals that have lost their fear of humans and come looking for food in the camps (Devaux et al. 2019b). To limit these risks of transmission related to ecotourism, several measures have been proposed by primatologists, such as limiting the frequency and duration of visits, reducing the number of visitors, prohibiting sick tourists from access, banning the consumption of food on-site, determining a minimum observation distance or physically separating animals from visitors, and mask wearing (Macfie and Williamson 2010; Gilardi et al. 2015).

10.3 Emerging/re-emerging diseases in Central Africa: background, epidemiology and health response

10.3.1 Central African haemorrhagic fevers

Haemorrhagic fevers (HFs) are diseases caused by viruses from various families, which affect several organs at the same time. These diseases can be accompanied by bleeding, called haemorrhagic symptoms (CDC 2013). While some HFs are relatively mild diseases, most known HFs (e.g., Lassa HF, Crimean-Congo HF, Rift Valley fever, and the Ebola and Marburg viruses) are extremely serious and deadly. These HFs are present on all continents and are generally zoonotic diseases (CDC 2013). Dengue is the most common HF in the world (100 million cases and 60,000 deaths/year). It is followed by yellow fever, which is transmitted by arthropods and affects about 200,000 people each year. In Central Africa, yellow fever and Ebola and Marburg (filovirus) virus diseases are the most common HFs (Zapata, Cox and Salvato 2014). Ebola and Marburg are the HFs with the highest mortality rate (50 to 88%) along with the Crimean-Congo fever of Africa, which has been detected in West Africa and also circulates in Central Africa.

The yellow fever virus belongs to the family Flaviridae. It was isolated in Africa in 1927 (Fleury 2009) and is endemic in 34 African countries and throughout the Congo Basin (Barrett and Monath 2003). It is an arbovirus (virus transmitted by hematophagous arthropod vectors), whose vector in Africa is a mosquito of the genus *Aedes*. This virus is maintained in the forest through a mosquito-monkey-mosquito cycle in which humans are generally not included. Yellow fever is a very old zoonotic disease whose first major epidemics affected tropical America in the 17th century. Today, Africa is the continent most affected by it (95 percent of the world's cases). The frequency of epidemics and isolated cases has increased in recent years, chiefly in Sudan, Angola, Uganda and the DRC (Institut Pasteur 2021), in places where immunization coverage is insufficient. It is currently possible to prevent yellow fever thanks to a vaccine that is very (99%) effective, safe, inexpensive, and that protects against the disease for life. There is no specific antiviral treatment for this disease, but the treatment of symptoms significantly improves survival rates (WHO 2021). The fight against yellow fever requires vector control in order to reduce the risks of transmission. This involves the elimination of potential larval deposits (stagnant water). The vectors targeted are *Aedes aegypti* as well as other *Aedes* species. While mosquito control campaigns are possible and effective in urban areas, they are much more difficult to implement in forest areas. In these latter, it is necessary to use personal protection strategies (e.g., clothing covering arms and legs, and repellents), which remain the most effective means of prevention (WHO 2021).

Several other arbovirus diseases responsible for major human epidemics have emerged from viruses circulating in forest areas before spreading to different parts of the world (Monath 2001; Mayer, Tesh and Vasilakis 2017). It has been observed that some of these viruses, such as dengue, khikungunya and Zika viruses, undergo sylvatic cycles in Central African forests, where transmission between NHPs occurs via mosquitoes (Valentine, Murdock and Kelly 2019). Depending on the virus, these sylvatic cycles play a more or less significant role in triggering human epidemics in Africa, and so-called urban cycles should be taken into account in surveillance and control strategies for these arbovirus diseases (Valentine, Murdock and Kelly 2019; Vasilakis et al. 2007). In addition, the invasion of Central African regions by invasive vector species such as *Aedes albopictus*, which arrived in Africa in the 1990s (Cornel and Hunt 1991) leads to new risks of emergence of arbovirus diseases there, and in the Congo Basin in particular. *A. albopictus* is a mosquito capable of transmitting several arbovirus diseases. It has already been responsible for outbreaks of dengue, chikungunya and Zika in Africa in anthropized rural and urban environments. This vector could spread to forest habitats and also increase the health risks associated with zoonotic arbovirus diseases and new cases of emergence (Ngoagouni et al. 2015).

The Ebola virus was discovered in 1976 during two successive epidemics in South Sudan and in the DRC (formerly Zaire), near a small river named "Ebola." This virus belongs to the family Filoviridae, which includes five genera (Kuhn et al. 2010; Negredo et al. 2011), three of which are present in mammals: the genera Ebola virus (EBOV), Marburg virus and Cuevavirus. The genus *Ebola* comprises six distinct species (Goldstein et al. 2018): *Sudan ebolavirus* (SUDV), *Zaire ebolavirus* (ZEBOV), *Tai Forest ebolavirus* (TAFV), *Bundibugyo ebolavirus* (BDBV), *Reston ebolavirus* (RESTV) and *Bombali ebolavirus* (BOMBV). There is only one species each of the *Marburg* genus and the *Cuevavirus* genus: *Marburg marburgvirus* (MARV) and the Lloviu virus (LLOV) respectively.

Since the discovery of Ebola viruses, 35 epidemics or cases of infections have been reported to date, including 27 epidemics and 5,980 cases recorded in Central Africa (CDC 2021): 12 in the DRC, 3 in the Republic of Congo, 3 in Gabon, 6 in Uganda and 3 in South Sudan (Pigott et al. 2014). The epidemics in the DRC are mainly due to the ZEBOV virus, except for one BDBV case in 2012. For all but two of these epidemics, the origins are unknown: that of 2007, when contact with a frugivorous bat was described (Leroy et al. 2009), and that of 2014, in which the index case had cut up a tree monkey found dead in the forest (Maganga et al. 2014). In the Republic of Congo, the three epidemics were due to ZEBOV. Contacts with great apes are thought to be the cause. The three epidemics in Gabon were also due to ZEBOV, the origin of which is believed to be contacts with frugivorous bats and/or great apes. In Southern Sudan, only the species SUDV was detected during the three epidemics. While the origin is unknown for the 1976 epidemic, bats and a baboon *(Papio anubis*) are suspected to be the cause of the 1979 and 2004 epidemics respectively (WHO 2005). In Uganda, only the 2019 epidemic due to the ZEBOV virus has a known origin (a case imported from the DRC). The other 5 epidemics due to the SUDV virus (4) and the BDBV virus (1) are of unknown origin.

Although EBOV viruses have not yet been isolated from frugivorous bats, these latter are suspected to be reservoir hosts and to play a role in the ecology of Ebola viruses (Caron et al. 2018). Numerous epidemiological, serological and virological investigations link these animals to Ebola viruses (Leroy et al. 2005; Hayman et al. 2011; De Nys et al. 2018). In addition, filoviruses do not appear to be pathogenic to bats (Paweska et al. 2012). Research projects continue to track Ebola viruses in Central Africa using "One Health" approaches in order to better understand the ecology of viruses and to better target species, habitats and periods during which to take samples from bats and thereby increase the chances of finding the active virus (e.g., the EBO-SURSY project[3]).

EBOV is transmitted by direct contact with body fluids (blood, secretions, biofluids) from infected animals found in the forest (Dowell et al. 1999). Human-to-human transmission occurs as a result of direct or indirect contact with body fluids from a person who has the disease or has died from it. Health workers in the early stages of the epidemic (when health precautions are not yet in place) are particularly vulnerable. Funeral rites during which the immediate family is in direct contact with the dead body play a significant role in the transmission and spread of the disease. The incubation period is 2 to 21 days. EVD patients remain contagious for as long as the virus is present in the blood, but it has recently been shown that genetic material (RNA) from the virus can remain in the semen of surviving males for up to 18 months after recovery (Deen et al. 2017; Mackay and Arden 2015; Sow et al. 2016). Currently, there is still no specific cure for EVD other than symptomatic treatments. However, several treatments (blood products, immune therapies and drug treatments) are under evaluation (Agnandji, Fernandes and Bache 2017) and were tested in a randomized controlled trial setting (WHO 2019) during the most recent epidemics of 2018–2019 in the DRC. An experimental vaccine (rVSV-ZEBOV) developed in 2015 was also used during the epidemics of 2018–2019 in the DRC and 2021 in Guinea. Initial data show that this vaccine is safe and seems to be highly effective (WHO 2019).

The latest EVD outbreaks in the DRC in 2018–2020 and in Guinea in 2021 each suggest that the source of these respective outbreaks is individuals who had been infected during previous outbreaks (more than five years previously in the case of Guinea). If confirmed, these data could force a review of the epidemiology of the disease by taking into account the "human reservoir" of the virus or the possibility of seeing resurgences appear after large-scale epidemics, as happened with the epidemics in Guinea (2014–2016) and the DRC (2018–2020). In addition to the risk of resurgence, which increases with the number of survivors, there is the problem of the stigmatization of these EVD survivors (Keita et al. 2021).

The Marburg virus (MARV) was first identified in 1967 during three simultaneous outbreaks in Germany (Marburg and Frankfurt) and Serbia (Belgrade) (Kissling, Murphy, and Henderson 1970).

3 https://rr-africa.woah.org/en/projects/ebo-sursy-en/

Since 1976, 12 sporadic epidemics have occurred in various sub-Saharan African countries, including several in the Congo Basin (Towner et al. 2006; Bausch et al. 2006; Adjemian et al. 2011). These were in the DRC (between 1998 and 2000), Angola (between 2004 and 2005) and Uganda (three, in 2007, 2012 and 2014). Unlike Ebola, the MARV reservoir host has been identified (the Egyptian roussette bat – *Rousettus aegyptiacus*); this occurred in 2009, 40 years after the first epidemic (Towner et al. 2009; Amman et al. 2020). However, the role of other wildlife species in the circulation and emergence of MARV cannot be ruled out (Bourgarel and Liégeois 2019). Infection of an individual is usually due to a prolonged stay in mines or caves that are home to bat colonies. The incubation period is 2 to 21 days. As with EVD, human-to-human transmission occurs through direct contact with biofluids from contaminated and infectious humans or animals. The mechanisms of transmission and spread of the disease are the same as for EVD, and sexual transmission of MARV has been documented up to seven weeks after recovery (WHO 2018).

10.3.2 Human immunodeficiency virus (HIV): an example of successful emergence

Central Africa has always been associated with the emergence of human retroviruses, such as human immunodeficiency virus type 1 (HIV-1) and human T-cell lymphoma (HTLV). All are the result of spillover of NHP retrovirus to humans. Since the first clinical description of acquired immunodeficiency syndrome (AIDS) in 1981, more than 32 million [24.8 – 42.2][4] people have died of this infection. Human immunodeficiency viruses (HIV) have infected more than 75 million people and continue to infect 1.7 million [1.2 – 2.2][4] people annually. The number of AIDS deaths worldwide for the year 2020 is estimated at 680,000 [480,000 – 1,000,000][4] people, 63 percent of which occurred in sub-Saharan Africa. In 2020, the number of people living with HIV was estimated at 37.7 million [30.2 – 45.1][4] (UNAIDS 2020).

Two types of HIV can be distinguished depending on their genomic organization and phylogenetic relationships: human immunodeficiency virus type 1 (HIV-1), which is the main cause of the AIDS pandemic, and type 2 (HIV-2) (Barré-Sinoussi et al. 1983; Clavel et al. 1986; Chakrabarti et al. 1987).

Molecular study of the various HIV isolates has revealed that they are variants derived from the same virus related to ungulate lentiviruses, the archetype of which is the sheep virus Maedi-Visna (Gonda et al. 1985). Around the same time, viruses with similar characteristics were isolated from several simian species (Chakrabarti et al. 1987). Simian immunodeficiency viruses (SIV) infect a wide variety of NHPs in sub-Saharan Africa (Peeters et al. 2002). Two of these viruses, chimpanzee (*Pan troglodytes troglodytes*) SIVcpzPtt and sooty mangabey (*Cercocebus atys*) SIVsmm, have been transmitted to humans on multiple occasions and generated the human immunodeficiency virus type 1 M and N and type 2 (HIV-2) groups respectively (Boué et al. 2015; Peeters, Jung and Ayouba 2013). The exact conditions and circumstances of these spillovers remain unknown. Human exposure to NHP blood during hunting and skinning activities is the most plausible source of infection (Peeters, Jung and Ayouba 2013). The initial epicentres of HIV-1 and HIV-2 infection are in Central and West Africa respectively, reflecting the natural habitat of the chimpanzee (*Pan troglodytes troglodytes*), the gorilla (*Gorilla gorilla*) and the sooty mangabey (*Cercocebus atys*) (Peeters, Jung and Ayouba 2013; Santiago et al. 2005). The initial genetic diversity of HIV is associated with multiple introductions of simian viruses into humans, and the different groups of HIV-1 (M, N, O and P) and HIV-2 (A-I) are the result of independent spillover events (D'arc et al. 2015; Boué et al. 2015; Visseaux et al. 2019).

4 Confidence interval.

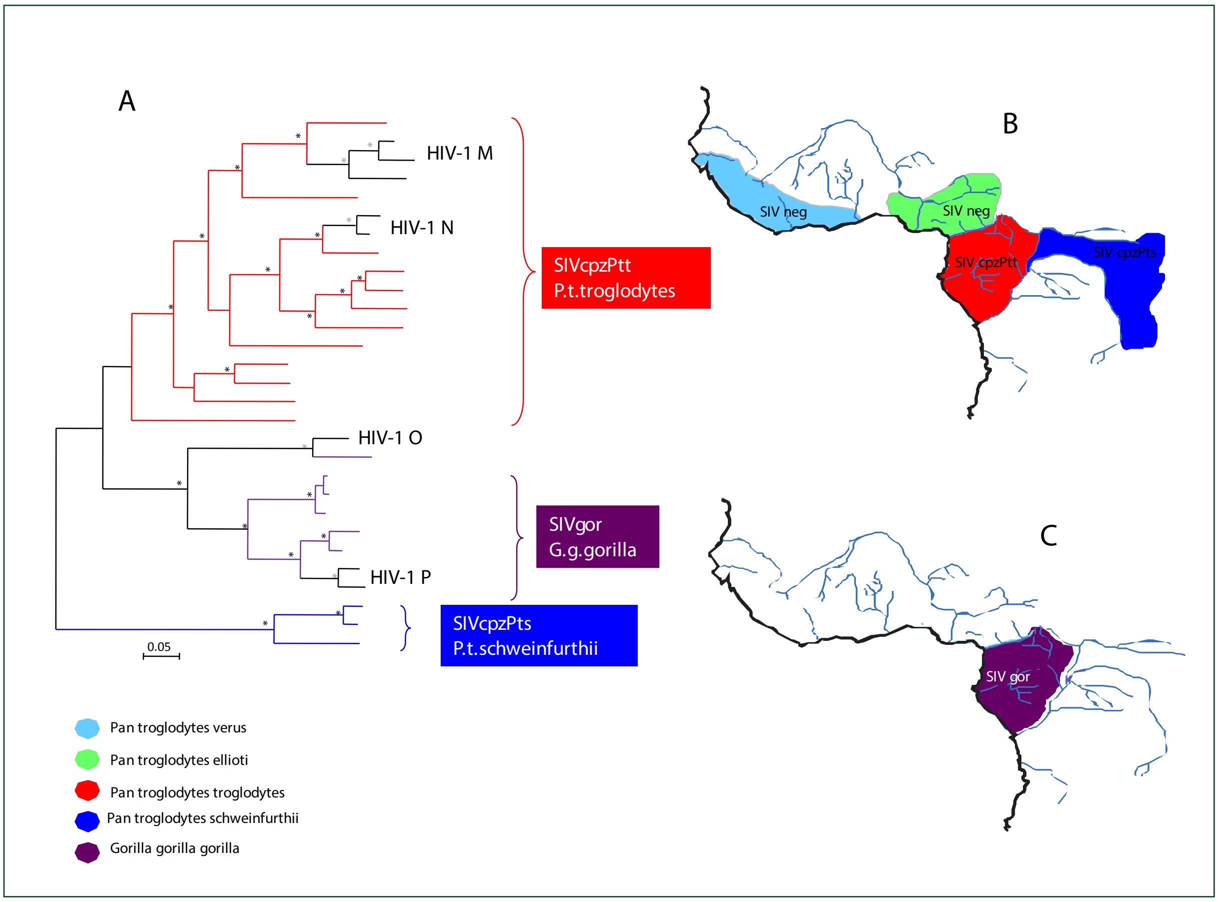

Figure 10.1: Phylogenetic relationship between simian immunodeficiency virus strains in great apes (chimpanzees and gorillas) and the different groups of human immunodeficiency virus type 1 (A. Ayouba)

The close phylogenetic relationship between the SIVcpzPtt strains from West and Central Africa and the HIV-1 strains from the three M and N groups, as well as the great diversity of the M group strains in West Equatorial Africa and their overlap with the habitat of the *Pan troglodytes troglodytes* supported the hypothesis that the HIV-1 M and N group strains originated in the Congo Basin. This hypothesis was confirmed by an analysis of several hundred samples of chimpanzee faeces collected from different locations in Cameroon. It was shown that these wild animals had indeed been infected with SIVcpzPtt with observed prevalence of 30–50 percent (Van Heuverswyn et al. 2007; Keele et al. 2006). Genetic analysis made it possible to characterize the ancestors of the HIV-1 group M and N strains, thereby confirming the origin of these HIVs (Fig. 1). In addition, separate SIVcpzPtt strains in Cameroon and Gabon have been isolated. This suggests that the strains can spill over and give rise to the emergence of a new HIV in human populations (Boué et al. 2015; Van Heuverswyn et al. 2007).

These studies also revealed lentiviral infections in gorillas from the western plains (*Gorilla gorilla gorilla*) in southern Cameroon. These viruses, called SIVgor, are related to HIV-1 of groups O and P. They are the source of these two HIV strains (D'arc et al. 2015) (figure 10.1).

10.3.3 Foamy viruses (spumaretroviruses)

Foamy viruses, also known as spumaretroviruses, are transmitted to humans from NHPs. They are present in several species of NHPs in Central Africa and have been isolated from hunters from Gabon and Cameroon. Simian spumaretroviruses were first described in 1954 in the United States from a cell culture of the kidney of a macaque monkey (*Macaca mulatta*) (Enders and Peebles 1954).

The simian prototype is the "Simian Foamy Virus" (SFV). The prevalence of SFV in naturally infected NHPs is generally high but may vary among animal species (Meiering and Linial 2001; Bastone, Truyen and Löchelt 2003; Mouinga-Ondémé et al. 2010). In captive and semi-free-ranging populations of NHPs, seroprevalence can vary between 75 and 100 percent in adults but is generally lower in younger individuals (Mouinga-Ondémé et al. 2010; Calattini et al. 2006).

Unlike other SIV infections, which are geographically limited, those of SFVs are widespread among NHPs. Most New- and Old-World simian species and great apes are SFV carriers (Meiering and Linial 2001; Hussain et al. 2003; Betsem et al. 2011). Africa is the continent with the most NHP species, and in 2004 Calattini et al. (2004) were the first to describe SFV infection in gorilla, mandrill and drill in the Congo Basin. Subsequently, it was shown that all species of chimpanzees are infected by SFVs (Liu et al. 2008). These viruses can be transmitted within the same species, but also from one NHP species to another, as has been shown between colobus monkeys and chimpanzees in the Tai National Park of Côte d'Ivoire (Leendertz et al. 2008; Morozov et al. 2009).

Transmission of NHP foamy viruses to humans may occur during hunting, mostly through bites or contact with biological fluids from the animal at the time of skinning or preparation. Human infection with SFVs was first described in 1971 (Achong, Mansell and Epstein 1971; Achong and Epstein 1978). It was also shown that this strain is a variant of simian origin acquired during zoonosis (Herchenröder et al. 1994). Other spillovers of SFVs to humans have been documented, mainly in individuals exposed to close contact with NHPs (e.g., animal technicians and veterinarians) and forest hunters (Mouinga-Ondémé et al. 2012; Gessain and Calattini 2008). At present, there is no human prototype of foamy virus, the only strains isolated from humans being those transmitted by NHPs.

As is the case with NHPs, human infection is persistent and asymptomatic and not currently associated with any pathology. In addition, no human transmission of this retrovirus has ever been reported (Gessain and Calattini 2008; Khan 2009).

10.3.4 Other zoonotic diseases

In addition to viruses responsible for haemorrhagic fevers and retroviruses of zoonotic origin such as HIV, which are known to the general public due to their significant and/or global impact on human health, other pathogens continue to emerge or re-emerge. One example is the simian orthopoxvirus, also known as the monkeypox virus (MPV). It is of the same genus as the human smallpox virus and was first discovered in humans in 1970 in the Republic of Congo (Marennikova et al. 1972). Monkeypox is a re-emerging disease in West and Central Africa, where human cases have been increasingly reported for more than 20 years (Petersen et al. 2019). These cases are the result of repeated zoonotic introductions and human-to-human transmission. NHPs can also be infected from it (Radonić et al. 2014). The ecology of this virus is still not clearly understood, but multiple species of wild animals seem to be involved in its zoonotic maintenance and transmission, including rodents (certain squirrel species) that could act as reservoirs (Khodakevich, Ježek and Kinzanzka 1986; Doty et al. 2017). The resurgence of human cases could be linked to the end of vaccination against human smallpox in the early 1980s, as this vaccine probably provides cross-protection against MPV (Petersen et al. 2019). However, changes in habitat, increases in small mammal populations, and practices leading directly or indirectly to increased rodent-human contact may also play a role in the increasing number of cases.

The Central African forests are home to many other infectious agents for which spillover from animals has not yet been reported or whose pathogenicity remains unknown, but which are genetically close to pathogens that have already emerged from wildlife in other parts of the world. Examples include certain viruses that circulate in different species of bats. After the first emergence of EVD, bats in Central Africa have been particularly studied in comparison with other orders of forest-dwelling animals. The many virological sampling and testing campaigns to which they have been subjected have led to identification of other infectious agents. Some species of African bats, for example, are carriers of paramyxoviruses, some of which are similar to the highly pathogenic zoonotic viruses Hendra and Nipah (genus *Henipavirus*) which circulate in bats in Australia and Asia (Weiss et al. 2012; Drexler et al. 2012; Drexler et al. 2009; Field et al. 2001). This is the case of the African bat, *Eidolon helvum*, a frugivorous migratory species whose habitat spreads over three-quarters of sub-Saharan Africa and which is hunted in many regions for its meat (Weiss et al. 2012; Drexler et al. 2009). Henipavirus-positive serologies have been found in *E. helvum*, domesticated pigs (Hayman et al. 2011), as well as in human populations. Observed prevalence was higher in individuals who handled bat meat (Pernet et al. 2014). However, it remains to be determined whether these equatorial African henipaviruses are capable of emerging and causing pathologies in humans and domestic animals (Weiss et al. 2012).

Another example of a pathogen to monitor at the human/wildlife interfaces of Central African forests is coronaviruses. The seven human coronaviruses described to date seem to have originated from coronaviruses in small mammals. Emergence appears to occur via an intermediate host (Cui, Li and Shi 2019). This is the case, for example, of Middle East respiratory syndrome coronavirus (MERS-CoV) and severe acute respiratory syndrome (SARS-CoV1), whose ancestors are bat coronaviruses and which are transmitted to humans by camels and civets respectively (Li et al. 2005; Ithete et al. 2013; Sabir et al. 2016). The same is true for SARS-CoV2, the 2019 coronavirus (COVID-19), which also seems to have originated in bats but whose intermediate host, if any, remains unknown (Zhou et al. 2020). Bats on the African continent are host to a great diversity of coronaviruses, some of which are part of the same phylogenetic group as SARS or MERS viruses (Bourgarel et al. 2018; Markotter et al. 2019; Letko et al. 2020; Lacroix et al. 2020). The risks of interspecies and zoonotic transmission of coronavirus circulating in forest areas are still largely unknown, but they must be taken into account in surveillance of emergence.

10.4 Surveillance and control of infectious and zoonotic diseases in Central Africa

Central Africa is considered a particularly high-risk area for the emergence of zoonotic diseases, due to the convergence of several risk factors. These latter include the transformation of forest ecosystems (Wolfe et al. 2005b); conditions of poverty (Molyneux et al. 2011); and frequent and close contact with wildlife, which occurs through hunting, handling and consumption of bushmeat (Magouras et al. 2020). The setting up of surveillance systems can help to better understand, monitor and control the dynamics of some pathogens at the human/animal interface.

10.4.1 Definition and theoretical objectives of surveillance

A surveillance system is a process whereby information on the presence of a disease or a health event within a target population is systematically and regularly collected for the purpose of managing that disease or a health event. As zoonoses are diseases shared between animals (in this case wildlife) and humans, information can be collected from animals (surveillance performed by veterinary services) and from the exposed human population (surveillance often performed by public health services). Animal health surveillance approaches and systems vary and are fundamentally dependent on the objectives to be achieved and the means available. If the objective is early detection of an emerging zoonosis such as EVD in terrestrial vertebrates in remote rainforest environments, the most suitable option is to set up event-based surveillance. It is from this angle that extraordinary efforts have been made in the Republic of Congo to detect abnormal mortalities among gorillas and chimpanzees and to collect samples to identify the infectious agent causing these outbreaks (Leroy, Rouquet et al. 2004; Leroy, Telfer et al. 2004b).

Today, permanent surveillance of groups of habituated great apes and of animals found dead in the forest, as well as systematic collection of vectors (e.g., meat flies), are carried out at various sites in Central Africa (Dzanga Sangha in the Central African Republic, Nouabale Ndoki in the Republic of the Congo, Campo Ma'an in Cameroon, and Malebo in the DRC). This type of systematic and event-based monitoring relies on a large-scale awareness-raising effort targeting local populations and the staff of NGOs and national parks. This will enable them to detect mortalities and sound the alarm so that scientific teams can be sent to the field to collect samples from the carcasses of great apes or other mammals (Antonation et al. 2016; Grützmacher et al. 2016; Grützmacher et al. 2018; Kuisma et al. 2019). On the other hand, if the objective is to detect zoonotic agents that circulate unnoticed in wildlife or simply to try to characterize the zoonotic pathogens circulating more frequently in the bushmeat value chain, it is necessary to adopt a type of surveillance that targets not a specific pathogen, but rather a species or taxonomic group (e.g., NHPs, bats and rodents) susceptible of hosting zoonotic pathogens (Levinson et al. 2013).

10.4.2 The state of surveillance systems in Central Africa

Zoonose surveillance is heavily focused on the viral emergencies that have struck Central Africa in recent decades (EVD, yellow fever, monkeypox). However, many other pathogens circulate without being tracked (and are thus not detected), even though their impact on public health and their socioeconomic effects on the human populations exposed to them are far from negligible (Asante, Noreddin and El Zowalaty 2019). The problem here is the differential risk between the need for surveillance of diseases that affect local populations and the need to monitor and control pandemic-risk diseases that can affect everyone. The means for each are not the same and are often biased in favour of pandemic-risk diseases.

As zoonoses are diseases shared by humans and animals, they can be monitored in human and animal populations. Ideally, in the context of an integrated health approach (the "One Health" approach), the two should be coordinated. In Central African countries, there is a significant gap between the human health system and the animal health system in terms of their level of organization and the resources allocated to them. Human health facilities monitor a list of five or six priority

Table 10.1: List of zoonotic diseases monitored in various Central African countries by public health facilities

Diseases	Gabon	Republic of Congo	Democratic Republic of Congo (DRC)	Central African Republic	Cameroon
Ebola	+	+	+	+	+
Avian influenza	+		+	+	+
Monkeypox		+	+	+	
Bovine tuberculosis	+	+			+
Rabies	+	+	+	+	+
Trypanosomiasis		+			
Rift Valley fever		+		+	
Salmonellosis			+		
Anthrax					+
Yellow fever	+	+	+		
References	WHO, 2019a	WHO, 2019b	WHO, 2018	WHO, 2019c	WHO, 2017

zoonotic diseases based on human transmission mapping and risk assessment (see Table 10.1). On the other hand, veterinary services (often under the Ministry of Agriculture) generally have very limited resources in comparison to carry out surveillance on the same zoonoses in animals, and such surveillance remains passive and very modest because of the weak capacities of diagnostic laboratories.

Diseases among wildlife are even more rarely monitored on a systematic basis, with the exception of responses to specific epidemic crises such as Ebola or monkeypox when they have threatened great ape populations or caused significant outbreaks among humans. However, in recent years, Central African countries have developed "One Health" strategies to facilitate coordination between the human health, animal health (both domestic and wild), and conservation sectors. These recent strategies are not always operational, or they may lack the human and financial resources to be effective. WHO has conducted health systems assessment missions and identified the priority need to strengthen surveillance and One Health strategies (WHO 2017, 2018a, 2019, 2018b).

10.4.3 Recommendations to improve the surveillance of zoonoses in wildlife in Central Africa

To optimize the detection of zoonotic agents and in particular viruses, it is advised to sample the freshest possible animal carcasses, as a virus has limited survival outside a living host and degrades rapidly (Greatorex et al. 2016). It is therefore necessary to optimize the chances of detecting pathogens by organizing sample collections with the help of hunters or stakeholders in the field who have access to fresh game carcasses, upstream of the value chain.

Box 10.1: Linking the key One Health pillar of biodiversity/ environment to the sustainable development agenda

The possible wild animal origin of the Sars-COV-2 virus has rekindled concerns about the risks of transmission and spread of emerging zoonotic diseases at the various interfaces between humans, domestic and wild animals, and the environment, and in particular throughout the wildlife value chains. Recent reviews of the literature on the subject (Stephen et al. 2021; Kock and Caceres-Escobar 2022) show not only that there is a lack of convincing data to characterize these risks, but also that there is very little information available on what actions to take to prevent, detect and respond to these risks as well as the effectiveness of those actions. Nevertheless, in the light of current knowledge, all reflections on prioritizing future risk management actions at these different interfaces acknowledge two aspects: 1) the importance of factors and stakeholders related to biodiversity and the environment in the implementation of both preventive and reactive solutions, and 2) the need for integrated multisectoral approaches aligned with the sustainable development agenda to address these risks and respond equitably to local and global health issues and challenges (De Garine-Wichatitsky et al. 2021). This is a necessity for human and animal health as well as for the health of complex socio-ecosystems in which conservation issues are greatly at stake (Lindsey et al. 2020).

Since December 2021, this has been reflected in an updated definition of "One Health" proposed by the One Health High-Level Panel (OHHLEP). This definition now speaks of *"an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems. It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and inter-dependent. The approach mobilizes multiple sectors, disciplines and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for clean water, energy and air, safe and nutritious food, taking action on climate change, and contributing to sustainable development."*

Given the information gaps and uncertainties, making the One Health approach effectively operational must rely on productive intersectoral institutional coordination capable of making the complex trade-offs between the different sectoral and geopolitical interests, all the while taking into account the available scientific knowledge and the sociocultural and economic contexts of the countries. A recent review of efforts to implement the One Health approach initiated in 2012 by the countries of the subregion shows that progress varies between countries but is still insufficient overall.

Beyond the need for ownership of the approach, it is essential to strengthen the capacities and resources to meet the priority needs, particularly in coordinating and promoting involvement by the biodiversity/environment sector (de Garine-Wichatitsky et al. 2020). Various initiatives are currently supporting Central African governments in this area, including the REDISSE 4 and EBO-SURSY projects, the SWM and ECTAD programmes, PREZODE,[b] and others.

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[a] Conclusions of the ECCAS-FAO subregional meeting held from 14 to 15 December 2021 in Douala to review the implementation of the recommendations of the 2012 and 2017 workshops on the "One Health" approach for the Central African subregion.

[b] REDISSE 4: Regional Disease Surveillance Systems Enhancement Project in Central Africa; EBO-SURSY: viral haemorrhagic fever capacity building and surveillance; SWM: Sustainable Wildlife Management Programme; ECTAD: Emergency Centre for Transboundary Animal Disease; PREZODE: PREventing ZOonotic Disease Emergence

Ecotourism or research projects in protected areas could contribute significantly to zoonotic disease surveillance through direct observation of wildlife (habituated apes), systematic and event-based sample collection (carcass surveillance or vector capture) and on-site facilities (mobile and/or fixed laboratories, logistics, etc.).

Sample collection can be optimized by using new technologies for collection and storage. There are many logistical and technical constraints to setting up wildlife surveillance systems under natural conditions or at remote sites, including being able to detect diseased animals or fresh carcasses and conserving samples until they reach the laboratory. However, some of these material and logistical constraints have changed considerably thanks to the emergence of new technologies. For example, the collection of samples using filter papers or the availability of buffer solutions that preserve genetic material (RNAlater[5]) greatly simplify the work of collecting field samples.

The development of diagnostic systems based on molecular detection, such as next-generation genetic sequencing techniques (Gardy and Loman 2018), enables the simultaneous detection of multiple pathogens in a single biological sample. This solves, for example, the problems of validating immunological tests, which are often cumbersome for detecting antigens or antibodies in wild species.

The "One Health" approach should be promoted for the control of zoonotic diseases. Information from the detection of circulating pathogens in hunted species would help to identify the risks to which human populations interacting with these hosts are exposed. Systematic monitoring of these same pathogens within these human populations (hunters, breeders, butchers, taxidermists, restaurateurs, consumers, etc., depending on the pathogen) could then be set up by the public health facilities or local health posts.

For logging companies which already have management plans in place, promoting "HEALTH SMART" indicators in their certification systems would help to mitigate the environmental and social impact of their activity, as well as reduce any impact on the health of people exposed to zoonotic risks as a result of their forestry activity. To do so, it is necessary to identify single health indicators that can be measured over time.

Conclusions

Emerging infectious diseases are spreading more and more rapidly not only in Central Africa, but in Africa as a whole and the entire world, as a result of increasingly expanding and rapid national, regional and international trade and travel. The COVID-19 pandemic is a perfect example of these global interconnections and the associated risks of the global spread of EIDs.

Landscape changes affecting Central African forests can have impact on several mechanisms which may or may not favour the emergence and re-emergence of pathogens. Tropical forests are home to a wide diversity of as yet unknown viruses and bacteria that represent a source of emerging pathogens. The transformation of landscapes takes place through human infrastructure development following a temporal sequence: 1) roads, enabling access to areas previously inaccessible to vehicles; 2) settlements or small villages, where wildlife resources can be extracted for local or more distant markets (e.g., urban centres); 3) sedentarization of human populations,

5 RNAlater Stabilization Solution is an aqueous and nontoxic RNA tissue stabilization and storage reagent which rapidly permeates tissues to stabilize and protect cellular RNA.

which may then be accompanied by peasant or small-scale cultivation of certain areas in the forests that still dominate the landscape; 4) possible development of small urban centres, which gradually transform the surrounding landscape, with a gradual predominance of fields and more commercial crops (e.g., oil palm); and, finally, 5) areas where forest which had been predominant a few years or decades previously resembling agricultural land, with a few patches of protected or unprotected forest left.

These gradual landscape changes will have three main consequences:

1. There will be an increase in the quantity and quality of human-wildlife contacts, as well as in hunting, agricultural practices and commercial exploitation of resources.
2. There will be a transformation in the ecology of animal hosts of pathogens, thereby altering the ecology of diseases: some host species will have the behavioural and genetic plasticity to adapt better than others to anthropized landscapes (e.g., the *E. helvum* bat seems to thrive in urban centres that can provide food resources throughout the year, without the need for migration).
3. These modifications/adaptations of species to their environment will directly or indirectly (e.g., via interspecies competition) contribute to the modification of wildlife communities. These changes will impact the dynamics of the sylvatic cycles of multihost pathogens and the risks of transmission between wildlife and humans. Thus, a rainforest bat community in a given area will no longer be the same when the landscape is transformed and will promote or not promote some pathogens at the expense of others.

The situation of Central African forests is therefore very dynamic, with changing landscapes, a growth in human/wildlife contacts, and wildlife communities that are adapting to these changes. The rate of transformation of these forests will have an impact on the risks of emergence. The study of emergence mechanisms and the assessment of these risks are therefore difficult: the observation of the presence of a pathogen in a host, of animal behaviour or of transmission dynamics may only be a transitory state in these ecological systems undergoing transformation. Efforts to establish surveillance systems and health policies are often under-resourced and therefore complicated, yet they are essential in these forest ecosystems which still host a wide diversity of agents that are potentially dangerous to human and animal health. These surveillance systems should make it possible to contain the epidemic as quickly as possible in order to protect local populations, limit the costs of the measures taken and avoid pandemics. In the DRC, the budget required to fight the 2018–2020 epidemic increased from USD 26 million to USD 57 million when the disease spread to an urban centre on a major transport route in the region (WHO 2018b).

Given the importance of wildlife as a source of protein and income in Central Africa, a considerable part of zoonotic risk management in this region involves setting up surveillance systems within the bushmeat value chain, based on countries' One Health strategies. Such surveillance systems could easily be set up upstream of a chain, with the collaboration of hunters and the distribution of suitable collection equipment. This approach, combined with high-performance diagnostic systems, would make it possible to establish an initial health assessment of the main pathogens susceptible of circulating within the most common species among the number of animals bagged. On the basis of this initial assessment, it would then be possible to set up more targeted screening programmes for the detection or monitoring of certain pathogens or species, depending on the risk identified. Information from the detection of circulating pathogens in the hunted animal species would help to identify the main risks to which human populations interacting with these hosts can be exposed. This approach works relatively well in some countries that have skilled human resources and that can effectively utilize well-equipped and efficient research laboratories after EVD epidemics.

Emerging infectious disease outbreaks are occurring with increasing frequency and growing socioeconomic consequences which are difficult for African governments to cope with. The example of COVID-19 illustrates this. Many African governments have established measures to prevent the spread of the pandemic. However, the simultaneous occurrence of disruptions to domestic supply and production combined with weak external demand, sharp declines in commodity prices, and the disruption of key service sectors such as tourism jeopardize jobs and livelihoods for local people (ATIBT 2020a). The pandemic has also highlighted the weaknesses of economies and health systems that cannot cope with such situations and are dependent on donations from rich countries for health equipment and vaccinations.

The COVID-19 pandemic has had an impact on working conditions in the forest sector and disrupted the organization and smooth running of its activities. This has had considerable repercussions on the social, economic and environmental balance, thereby affecting jobs, source of income, raw material resources, etc. (ATIBT 2020b), thereby endangering production and trade of essential forest products as well as seriously jeopardizing the livelihoods of local people.

The intensification of the emergence of infectious pathogens has many underlying reasons, all of which are related to the increasing anthropogenic impact on nature in a context of growing social and environmental injustices and inequalities.

Tackling EIDs in the forests of Central Africa requires both symptomatic treatments (e.g., surveillance and control of emerging pathogens and diseases) and substantive treatments that will limit human impact on forests and biodiversity loss. Both approaches are necessary and essential, and the COVID-19 crisis has been a painful reminder of the need for in-depth changes in the way we manage the planet as a whole.

Table 10.2: History of human Ebola Virus Disease (EVD) outbreaks

Country	Dates	Emergence locations	Virus	Probable source of infection	No. of human cases identified	Mortality rates
First epidemics						
DRC	1976	Yambuku	ZEBOV	Unknown	318	88%
South Sudan	1976	Nzara	SUDV	Unknown	284	53%
		Maridi				
Epidemics in sub-Saharan Africa						
DRC	1977	Tandala	ZEBOV	Unknown	1	100%
	1995	Kikwit	ZEBOV	Unknown	315	81%
	2007	Kasai Province	ZEBOV	Bats	264	71%
DRC	2008–2009	Kasai Province	ZEBOV	Unknown	32	47%
	2012	Isiro	BDBV	Unknown	36*	36.1%
	2014*	Several villages in the vicinity of the town of Boende	ZEBOV	Monkeys	66	74%

Continued on next page

Country	Dates	Emergence locations	Virus	Probable source of infection	No. of human cases identified	Mortality rates
	2017	Likati	EBOV**		8	50%
	2018	Bikoro, Équateur Province	ZEBOV	Unknown	54	61%
	2018–2020	Province du Nord Kivu	ZEBOV	Inconnue	3470	66 %
	2020	Bikoro, Équateur Province	ZEBOV	Spillover from an unknown wild animal and human-survivor transmission (2018 outbreak in Équateur Province)	3,470	66%
	2021	Biena Health Zone, North Kivu Province	ZEBOV	Human/survivor transmission	In progress	In progress
Rep. of Congo	2001–2002	Mbomo District	ZEBOV	Great apes?	57	75%
		Kelle District				
	2002–2003	Mbomo District	ZEBOV	Great apes?	143	89%
		Kelle District				
	2003	Village of Mbomo	ZEBOV	Great apes?	35	83%
		Village of Mbandza				
Gabon	1994	Mekouka	ZEBOV	Bats?	52	60%
	1996-1997	Booué	ZEBOV	Great apes	60	74%
	2001-2002	Mékambo	ZEBOV	Great apes	65	82%
Uganda	2000-2001	Gulu	SUDV		425	53%
	2007-2008	Bundibugyo	BDBV		149	29%
	2011	Nakisimata	SUDV		1	100%
	2012	Kibaale district	SUDV		11*	36.4%
	2012-2013	Luwero district	SUDV		6*	50%
South Sudan	1979	Nzara	SUDV	Bats?	34	65%
	2004	Yambio	SUDV	Baboon	17	41%
		Maridi				

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Country	Dates	Emergence locations	Virus	Probable source of infection	No. of human cases identified	Mortality rates
Côte d'Ivoire	1994	Tai Forest	TAFV	Great apes	1	0%
Guinea	2021	N'Zérékoré Prefecture	ZEBOV	Human/survivor transmission	In progress	In progress
Multicountry	2014-2016		ZEBOV	Bats?		
Sierra Leone		Entire country			14,124	28%
Liberia		Entire country			10,678	45%
Guinea		Entire country			3,814	66%
Nigeria		Lagos			20	40%
		Port Harcourt				
Senegal		Dakar			1	0%
Mali		Bamako			8	75%
		Kayes				
Imported cases						
South Africa						
from Gabon	1996	Johannesburg**	ZEBOV		2	50%
Spain						
from Sierra Leone	2014	Madrid	ZEBOV		2	50%
Italy						
from Sierra Leone	2014	Sassari	ZEBOV		1	0%
United Kingdom		Laboratory	SUDV		1	0%
from Sierra Leone	2014	Glasgow	ZEBOV		1	0%
United States						
from Liberia	2014	Dallas***	ZEBOV		3	33%
from Gabon	2014	New York	ZEBOV		1	0%

According to CDC: https://www.cdc.gov/vhf/ebola/history/chronology.html#anchor_1526565058132
* Laboratory-confirmed cases
**One human-to-human transmission from the index case
*** Two human-to-human transmissions from the index case

Congo Basin forests: Issues and challenges

PART 4

CHAPTER 11

Land Use Planning and Impacts on the Sustainable Management of Forest Ecosystems in Central Africa

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Photo by G. Bouka & C. Doumenge/CIRAD-CEA-Sunbirds-UMNg-IFO

Introduction

Land use planning (LUP) is, generally speaking, a policy that tends to organize human activities in a predetermined geographical area, based on a long-term objective. The aim of this policy is to strengthen the social cohesion of that area at different levels. On a finer scale, the way the territory is organized establishes zones and subterritories, and for each of these it allocates objectives in line with the overall long-term objective of the LUP.

At the national level, LUP is a proactive measure of the government, which produces a framework that must then be adapted and reviewed at different levels of the national territory. There are many definitions of LUP at the national level[1]. In Central Africa, this national objective initially aimed at creating conditions for economic development. However, the need arose more recently to reconcile this economic objective with the demand for sustainable management of the environment and in particular of forest ecosystems.

Although this spatial organization is the result of reflection in each case, it may be formal or informal. Long before the creation of States, patterns of land use already showed forms of organization linked to human activities and values that are part of today's landscapes, such as sacred forests.

Forests are affected by environmental issues such as deforestation, climate change, bush fires and health crises. The impact of these factors on the environment means that we must reconsider the relationships between humans and nature. But the question remains of how to reconsider these relationships. In response, the need for new forms of LUP is frequently mentioned: they would have the simultaneous aims of mitigating threats to economies, improving the well-being of societies and the environment, and stimulating long-term development dynamics. Global phenomena have led to new environmental issues and the emergence of new players and power games, thereby broadening the scope of LUP analysis. More recently, a certain model of LUP has been encouraged by donors to reconcile local development with global issues: LUP that is multi-scale (from local to national and sometimes supranational) and that combines participatory approaches based on the principles of good governance and sustainable development (Buttoud et al. 2016).

Central Africa, a region which kept its forests unspoiled for long, is now increasingly subject to deforestation (FAO 2020). Indeed, in Central Africa, the drivers of deforestation are tending to race out of control. For example, the population is growing rapidly; and among the corollaries of sprawling cities there is an ever-increasing demand on domestic markets for agricultural and forest products such as wood fuel; and new road networks are facilitating the exploitation of forest resources, not only for wood but especially for access to land and the development of agriculture

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1 Example: "Policy consisting in seeking, within the national geographical framework, the best distribution of economic activities according to natural and human resources. In land use planning, the State takes proactive action to harmoniously distribute people, activities, educational tools and transport infrastructure over its national territory. This policy is therefore in opposition to the economic laws of the simple market game. It seeks to correct geographical imbalances between regions, between cities and the countryside and between dynamic areas and deprived areas.

(*Larousse* online encyclopedia, 2022, "Aménagement du Territoire". Available (in French) at: https://www.larousse.fr/encyclopedie/divers/aménagement_du_territoire/20390

(Marien et al. 2013). A new organization of spaces would be required to meet food, timber and energy production needs while preserving the ecosystems that provide water and regulation services essential to the resilience of productive spaces and people's well-being (Nyström et al. 2019).

In some countries, such as Cameroon, LUP policy is clear; in others less so. We can nonetheless often note the existence of a set of public or private actions aimed at facilitating economic development, social cohesion and environmental protection in spaces. These actions are ultimately forms of LUP.

In practice, for Central Africa we propose to distinguish two types of action. First, those decided on by central governments (i.e., "land use planning" or *aménagement du territoire* as it is known in French) or by very large regions which have structuring objectives characterized by top-down decision-making processes. Second, local actions (which can be characterized by the term "territorial development") carried out at the initiative of various stakeholders whose decision-making processes are more bottom-up. These two decision-making processes are not compartmentalized, and the quality of LUP policy implementation depends largely on the relationship between these two approaches, which in particular influences the involvement of stakeholders and the way natural resources are effectively managed. It is also at this level of relationship that a clash occurs between custom and law and where long-term social peace and the sustainability of renewable resources are at stake.

The aim of this chapter is to take stock of the forms of LUP in four Central African countries: Cameroon, the DRC, Burundi and Rwanda. Using a comparative approach, we will identify the dynamics, opportunities and challenges of forest resources in Central Africa. Before analysing the forms of LUP in the four countries under study, we will first provide some data on land management in Central Africa.

11.1 Data on land management in Central Africa

The countries of Central Africa vary greatly in size: compared to the huge DRC, which covers 2.3 million km^2, Burundi, Rwanda, Equatorial Guinea and Sao Tome and Principe (STP) are all less than 30,000 km^2. Densely populated countries have modest forest cover (Rwanda 28 percent and Burundi 16 percent), while others such as Gabon and Equatorial Guinea are more than 80 percent forested. Some countries are situated predominantly in forest areas (e.g., Congo and Gabon), while others have arid climates (e.g., Chad and the northern part of Cameroon).

11.2 Forms of land use planning in Central Africa

11.2.1 Land use planning in Cameroon

Land use planning during the pre-colonial period in Cameroon

The forms of land use during the pre-colonial period created the customary forms still alive today. Historically, Cameroon is the only country in the CEMAC zone to have been under the colonial administration of Germany (1884-1913), Great Britain (20 percent of the territory, 1919-1961) and France (80 percent of the territory, 1919-1960). This led to a strong political and administrative impact on the adoption of the land-tenure system.

Table 11.1: General data by Central African country

Country	Area (km²)	Population	Density (inhabitants /km²)	HDI	GDP (USD billion)	Life expectancy (years)	Forest cover (km²)
Burundi	27,834	11,759,805	422.50	0.423 / 1	3.08	61.20	4,537
Cameroon	475,650	23,799,022 (2018)	50.03	0.563 / 1	38.50	58.90	220,000
Congo	341,821	5,279,517	15.45	0.608 / 1	11.26	64.30	239,874
Gabon	267,667	2,074,656 (2020)	7.75	0.702 / 1	16.66 (2019)	66.20	235,900
Equatorial Guinea	28,051	2,015,334	71.85	0.588 / 1	13.32	58.40	26,912
CAR	622,984	5,745,135	9.22	0.381 / 1	2.38	52.80	269,030
DRC	2,345,410	95,784,841	40.84	0.459 / 1	47.23	60.40	1,500,000
Rwanda	26,338	12,089,721	459.02	0.536 / 1	9.51	68.70	7,247
STP	1,001	201,770	201.57	0.609 / 1	0.42	70.20	890
Chad	1,284,200	16,818,391	13.10	0.398 / 1	11.32	54.00	NA

NA: Not available.
Source: https://www.populationdata.net

Table 11.2: Land cover in million ha and % by country according to the main categories of the OFAC Atlas

Country	Area in million ha	Forest cover in million ha	Forest cover as % of national territory	Protected areas in million ha	Protected areas as % of national territory	Concessions in million ha	Concessions as % of national territory
Burundi	2.78	0.45	16%	0.15	5 %	0.00	0%
Cameroon	47.57	22.00	46%	4.05	9 %	6.25	13%
Congo	34.18	23.99	70%	3.89	11 %	14.50	42%
Gabon	26.77	23.59	88%	9.39	35 %	14.69	55%
Equatorial Guinea	2.81	2.69	96%	0.59	21 %	NA	NA
CAR	62.30	26.90	43%	12.31	20 %	3.02	5%
DRC	234.54	150.00	64%	33.61	14 %	12.32	5%
Rwanda	2.63	0.72	28%	0.23	9 %	0.00	0%
STP	0.10	0.09	89%	0.03	35 %	0.00	0%
Chad	128.42	NA	NA	NA	NA	NA	NA

NA: Not available.
Source: OFAC 2020

Table 11.3: Land use in Cameroon during the pre-colonial period

Periods	Key pre-colonial historical events of land occupation in Cameroon	Institutions
Between the 16th and 19th centuries	• Cameroon was the site of large-scale migrations and population movements. Historians and sociologists generally agree that these migrations, coming from three different directions, met in Cameroon. • The first migration was most likely that of Bantu tribes. The Bantu progressively advanced to the south of the country, spreading as far as Gabon and the Congo. They mixed with the Fangs during the second great migration movement, which seems to have followed the Nile and the Congo rivers divide, moving clearly from East to West. • The third direction is North-South and reflects, at least in broad terms, the desire of the neighbouring peoples of the Sahara to advance towards the fertile regions of the Sudan.	Migrating indigenous peoples
Pre-colonial era	• Land was managed by clan chiefs or land managers in the grassroots communities. • Land could not be alienated by sale, for fear of depleting family or village assets. Any member needing land for farming or cultivation had to make a request to the traditional authority or head of the family controlling the land, to ask for a portion of land, which belonged to them for the generations to come. • Land security was not a concern, and people could take full advantage of their land when it was fully occupied.	Clan leaders and communities

Table adapted by Liboum Mbonayem, based on Kenfack Essougong and Teguia (2019)

LUP during the post-colonial period in Cameroon

Cameroon's territorial organization has historically been strongly structured by the presence of several urban centres: Douala, Buea, Yaoundé, Edéa, Ebolowa, Lolodorf, and Eséka. The Government realised the need for planning to build sustainable cities based on a decentralized development plan. The country established a system of delineation that integrates all layers of administrative organizations. The country currently has 10 regions and 58 administrative districts (*départements*), 360 rural municipalities, 14 city municipalities and the major cities, which include Douala, Yaoundé, Bertoua, Limbe, Buea, Bamenda, and others. Each municipality corresponds to a group of villages headed by traditional leaders. The exploitation of natural resources has been and remains the driving force of the economy.

Spatial organization was thus made up of a progressive construction of large territorial aggregates and roads to facilitate the exploitation of natural resources, linking the cities to areas of logging and mining or areas dedicated to agriculture or hunting.

The ambition of conserving nature started with the creation of parks and nature reserves as early as the colonial period and more recently under the impetus of international NGOs. This phenomenon, which is particularly characteristic of the southern forest area of Cameroon, is also common to other forest areas in Central Africa. This process began before independence via the allocation of land to large, mainly forestry and agro-industry concessions. This trend continued after independence, when the Government created new concessions, particularly for mining and agro-industry.

A large body of private land belonging to the State was created in this way. In the south of Cameroon, these were mainly forestry concessions and the various forms of natural parks. Meanwhile, in the residual national property, where subsistence farming was allowed, a zone was created between these large blocks of private land belonging to the State. As roads developed in the forest area, Bantu populations cleared land for agriculture and at the same time formed a territory by lineages according to rights of clearance. In Cameroon, this phenomenon is still ongoing. The establishment of private land belonging to the State and the occupation of land by farming populations have limited the rights of indigenous forest populations to resources and spaces.

Table 11.4: Land use in Cameroon during the colonial period

Periods	Colonial period: the loss of customary land rights	Institutions
German colonial period (1884–1916)	• During the German colonial period, most indigenous people were deprived of their land, which could be acquired by Germans only. • In 1896, the Germans enacted a law converting all unoccupied land throughout the territory into German overseas domain property. • They then introduced a registry in which all land transactions were recorded. • German control ended with the German defeat during the First World War.	German colonial administration
French colonial period (1919–1960)	• After the First World War, under the Anglo-French Declaration, Cameroon was divided into two unequal parts, with France controlling 80 percent of the territory and Britain 20 percent. • Three land-tenure systems were in force: the transcription system, the customary-land-rights recognition system and the land-registration system. However, no land certificates were issued under these three systems. • Further, despite having committed to respect local land customs, France enacted a decree converting all land that was neither individually owned nor properly registered into French State property. • To increase its control over areas, the French administration enacted another decree stipulating that all land left unused or unoccupied for a period of 10 years was the property of France. • In June 1959, the registration system was established, allowing each Cameroonian to have their customary rights recognized following a procedure which led to the issuance of a document called a "land-registration book" with probative value. In reality, however, these rights were not recognized.	French colonial administration (French Governor and Prefect)
British colonial period (1919–1961)	• Great Britain, on the other hand, applied a system of indirect rule. Its main land law (Ordinance No. 1 of 1927) provided that all land, except for estates registered and recognized by the British, was indigenous land under the control and at the disposal of the prime minister, who was to hold and administer it for the indigenous peoples. • No use of indigenous land was valid without the consent of the British Government, and indigenous property rights to ancestral lands were converted into customary rights of occupation. • Under the statutory right of occupancy, non-indigenous people were given certificates of occupancy on land they acquired illegally. Unlike the Germans and the French, however, few expropriations were recorded under the British. • The British colonial administration tried to respect indigenous people's rights to land, and the only expropriation they suffered was the conversion of 264,000 acres of land, once administered by German farmers around Mount Cameroon, into the property of the British colonial government of Nigeria. • After the expropriation of German farmers, two ordinances were signed in 1946. The first authorized the incumbent colonial governor "to acquire and use the land as he [saw] fit for the promotion of the common good of the indigenous inhabitants of Southern Cameroon," and the second established the Cameroons Development Corporation (CDC) as the statutory body in charge of assuming control of the plantations. • In 1956, all land became the property of customary authorities, with the exception of private land known as "free land" and "leased land." The rights of indigenous peoples were from that time protected by traditional leaders. • In addition, the British representative, the "Commissioner," was responsible for enforcing the law and protecting all indigenous rights, but a decree authorizing the Government to acquire land for "public purposes" was also signed at that time. This measure left a possibility for taking away land from communities.	British colonial administration (British prime minister)

Table adapted by Liboum Mbonayem, based on Kenfack Essougong and Teguia (2019)

Table 11.5: Land use in Cameroon during the post-colonial period

Periods	Post-colonial period: LUP and land reforms without recognition or protection of customary rights	Institutions
From 1961 to 1974	• At independence, the two parts of Cameroon inherited two separate legal and administrative cultures, those of France and Great Britain. • Following reunification in 1961, the “francophone” leadership in the federation became dominant. For this reason, all governance subsystems from the British colonial domination were replaced by those rooted in the French political and administrative tradition. • Decree No. 63-2 of January 1963 annulled all laws that gave powers to traditional authorities to manage land issues and related institutions, and it annulled all claims to land rights supported by customary instruments. • After unification in 1972, an attempt was made through the Land Ordinances of 1974 to harmonize all existing land laws into one law applicable throughout the country. The 1974 ordinances made the State the owner of all land in the country.	Cameroonian administration in charge of property
Summary of laws and strategies with a direct or indirect impact on land security since 1974	• Ordinance No. 1974-1 to establish the rules governing land tenure. • Law No. 1976-25 to establish regulations governing cadastral surveys and records. • Decree No. 1976-165 to establish the conditions for obtaining land certificates. • Ordinance No. 1974-2 to establish the rules governing public tenure. • Decree No. 1976-166 to establish the terms and conditions of management of national lands. • Decree No. 1976-167 to establish the terms for the management of private land belonging to the State. • Decree No. 1976-165 to establish the conditions for obtaining land certificates Law No. 1980-22 to repress infringement on landed property and state lands. • Decree No. 1984-311 to establish the conditions for the application of Law No. 1980-22 on the punishment of infringements of land and property rights. • Law No. 1985-09 to establish the procedure for expropriation in the public interest and the conditions for compensation. • Decree No. 87-1872 to implement Law No. 1985-9. • Law No. 1994-1 to lay down forestry, wildlife and fisheries regulations. • Decree No. 1995-146 to amend and supplement certain provisions of Decree No. 1976-167 to establish the terms and conditions of management of the private property of the State. • Law No. 96-12 on the Framework Law on environmental management. • Decree No. 1997-116 to lay down the terms and conditions of implementing law n°96/14 of 5 August 1996 governing the transportation by pipeline of hydrocarbons originating from other countries. • Law No. 2001-1 to establish the Mining Code. • Law No. 2002-003 to establish the General Tax Code. • Law No. 2002-13 to establish the Gas Code. • Law No. 2004-017 to lay down guidelines on decentralisation. • Decree No. 2005-481 to amend and supplement some provisions of Decree 1976-165 to establish the conditions for obtaining land certificates. • Law No. 2011/008 of 6 May 2011 to lay down guidelines for territorial planning and sustainable development in Cameroon. • The National Programme for Sustainable Territorial Development (SNADDT) (2016). • Methodological guide for developing the Local Land-Use Management and Sustainable Development Plan (PLADDT) (2019). • Law No. 2019-024 on the general code of decentralized local authorities. • Law No. 2004-003 regulating urban planning.	Ministry of the Economy, Planning and Regional Development (MINEPAT) Ministry of Decentralization and Local Development (MINDDEVEL), Ministry of Forestry and Wildlife (MINFOF), Ministry of the Environment, Protection of Nature and Sustainable Development (MINEPDED) Ministry of State Property, Surveys and Land Tenure (MINDCAF) Ministry of Mines, Water and Energy (MINEE) Ministry of Finance (MINFI)

Table adapted by Liboum Mbonayem, based on Kenfack Essougong and Teguia (2019)

In 2016, the National Programme for Sustainable Territorial Development (SNADDT) enabled Cameroon to undertake a process of spatial organization and rational development of its national territory at different levels and scales on the basis of its "Vision 2035" (MINEPAT 2016). Vision 2035 is based on five priorities: (1) development of human capital; (2) governance; (3) transformation of agricultural systems to ensure food security; (4) development and better use of resources; (5) development of information and communication technologies, for integration into a globalized world; (6) national integration through the development of basic infrastructure in the transport and energy sectors, etc.; and, finally, (7) regional and local development and decentralization. Climate and environmental issues are not explicit here but are covered through agriculture and management of resources (MINEPAT 2019).

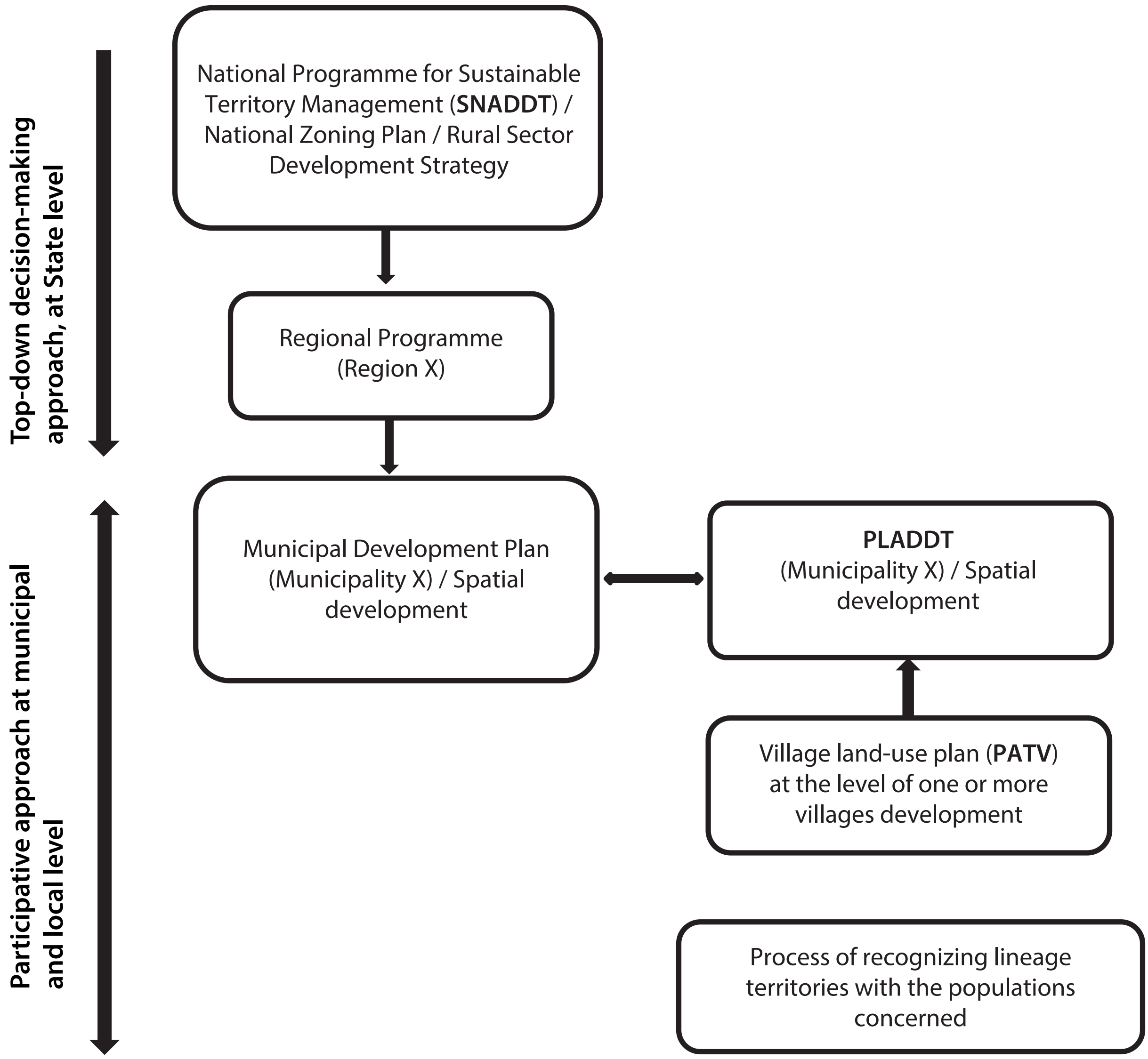

Figure 11.1: Recognition of lineage territories, or how to integrate local populations into the SNADDT process in Cameroon. A way for LUP to link a bottom-up participatory process and national planning.

Source: Adapted from the "Methodological guide for the development of the Local Land Use and Sustainable Development Plan - PLADDT" (MINEPAT 2021)

New large aggregates have been created at the impetus of international NGOs. These include protected areas as well as State-owned community forests. Decentralization leads to the creation of property owned by decentralized State property, such as municipal forests. All this reduces the space legally available for subsistence agriculture, which becomes limited to the interstices between these large aggregates. It is in these interstices that social tensions are concentrated. In practice, community and municipal forests are often occupied by subsistence farming based on customary law. Various types of rights consequently overlap on the same spaces, thereby generating conflicts, between sectors, for example. Mining or agro-industrial concessions can overlap with forest concessions, all the more so because each ministry tends to work in silo with little interministerial coordination. Conflicts between customary law and formal State law may emerge, as the customary constitution of territories by lineages is not recognized by formal law dating from the colonial period and may be challenged by the creation of private land belonging to the State (Kenfack Essougong and Teguia 2019).

In this context, the ongoing efforts to better organize Cameroon's LUP are crucial and offer hope to find solutions to mitigate these potential conflicts due to the way the current territory is organized. The State relies on its national LUP and sustainable development scheme (SNADDT) approved by the MINEPAT in 2016, which provides a comprehensive and large-scale overview of planning to meet the legitimate development requirements of the country.

The smallest LUP level is the Municipal Development Plan, revised every five years now since 2006 as part of the National Community-Driven Development Programme. This Municipal Development Plan could become law locally, and its implementation should be based, at village level, on Local Land-use and Sustainable Development Plans (PLADDT). Recognition of the customary organization of land in the Municipal Development Plan via the PLADDT would make it possible to integrate custom into the law and prevent land conflicts. As the territory of the municipality includes several villages, each of which corresponds to one or more lineages, the local Municipal Development Plan should be preceded by a process of recognizing the territories of these lineages, carried out with the

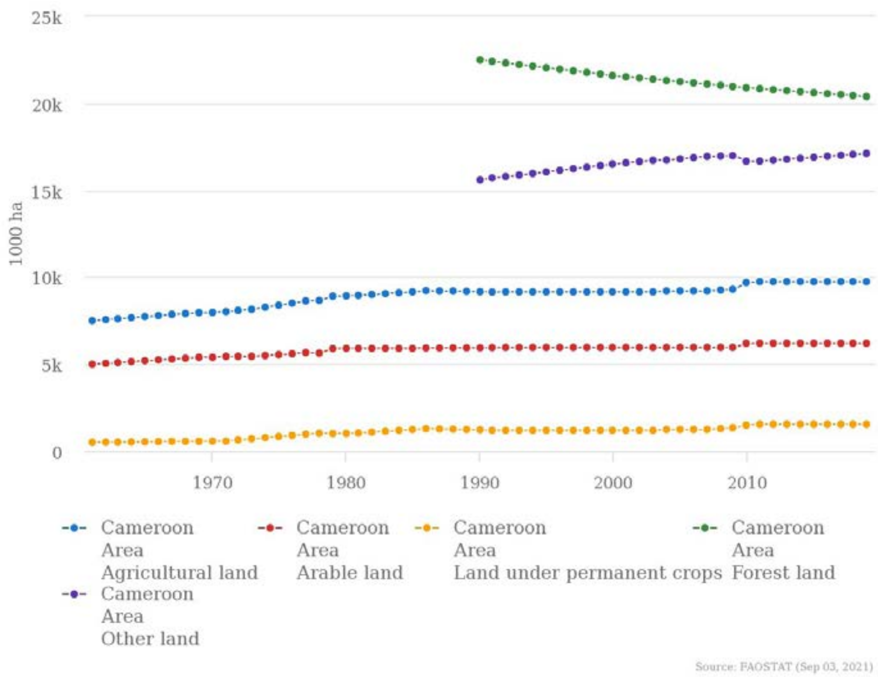

Figure 11.2: Curve chart of land-use allocation areas in Cameroon

Source: Curves generated online on this website: http://www.fao.org/faostat/en/#compare (2021)

Box 11.1: From lack of land use planning coordination to conflict

Ampel Village is located in the municipality of Mindourou, in eastern Cameroon, on State-owned land. The farmers there are angry. They are wedged between two blocks of a forestry concession (a forestry logging unit). They have limited space, yet their cultivation practices consist in opening up fields in forests or old fallow land. They need to "break the forest" to eat, because there are no more available spaces and because fallow land is getting less and less rest, and then becomes very poor in nutrients and therefore less and less suitable for agriculture.

In 2019, the future of the farmers was bleak, before an event gave them hope. Bulldozers from a company commissioned by the Ministry of Public Works began to upgrade an old road that once connected the municipality of Mindourou to Eschou Village, located in the district of Abong-Mbang. This road had not been usable for a long time because it had been partly covered again by the forest. For the local people, this road-upgrading project meant they could create fields along the road and – for a while – no longer worry about lack of space. But the roadwork was stopped right away by the Ministry of Forests and Fauna (MINFOF) on the grounds that the road would cross a forestry logging unit, which is against forest law. This halt to the bulldozers provoked fury among the local people; it led to demonstrations broadcasted on television, some pushing and shoving, and strong resentment among the local populations towards the forest concession holder, who was deemed responsible for the situation. The lack of coordination between two ministries had harmful effects at the local level.

In the end, construction work on the Ampel-Eschou road resumed, and a decision was reached in favour of the local people, against the advice of the MINFOF. This decision was taken at a meeting chaired on 17 May 2021 in Yaoundé by the MINFOF Secretary-General, in the presence of the mayors of Messamena and Mindourou, the coordinator of the programme for the Integrated Development and Planning Programme of the Dja Mining Loop and the Adjacent Border Area (PADI DJA), operators of the forest sector, and some senior staff at the MINFOF.

populations concerned. The PLADDT is the decision-making process which should make it possible to determine the right relationship between customary rules and the Municipal Development Plan, by involving the village populations. Implementation of the PLADDT is in its start-up phase.

11.2.2 Land use planning in the DRC: a giant awakens

Describing LUP in the largest country in the Congo Basin, the Democratic Republic of the Congo (DRC), is a challenging task given the long and complex path the country has taken in its territorial organization. Nevertheless, it is possible to summarize the key points on this topic by starting with a brief historical analysis of LUP in the DRC before discussing interactions between forest ecosystem management and LUP.

Brief historical analysis of LUP in the DRC

The development of LUP in the DRC has experienced ups and downs. In 1949, before independence, the goal of the initial LUP attempts was to increase the profits of mainland Belgium. More than 70 years went by without LUP being organized by a policy or a new law. Since 2015, some progress has been made, leading to the production of a draft legislation and a draft LUP policy is under discussion in Parliament. Table 11.6 gives an overview of LUP organization in the DRC, with periods, key events and institutions involved in the process.

In a huge country like the DRC, LUP is a challenge. For a long time, the DRC lacked a harmonized overall LUP policy. The many usage conflicts in the use of space and resources are due to several shortcomings: the absence of a law on LUP and of a sectoral legislation (land or mining code) developed in a cross-cutting way, lack of tools such as a national development plan or provincial plans –at all administrative levels (national, provincial, local). In addition, a poor sharing of responsibilities and a lack of coordination among ministries went counter to consistent LUP management (Ministère du Plan DRC 2019; Ministère de l'Aménagement du Territoire DRC 2020).

As part of the implementation of its development strategy, the Government intends to carry out a series of actions to ensure more coherent national LUP and to make production and residential areas less isolated. This will give people the opportunity to live in decent housing and provide economic activities with adequate means of production, transport and communication. To this end, three objectives have been assigned to the strategies under consideration (DRC 2019):

1. Strengthen the institutional capacities of the Ministry of Land Use Planning (*Ministère de l'aménagement du territoire*) through (i) the establishment of a framework for interministerial consultation on LUP and (ii) the development of an institutional and legal framework, including a framework law on LUP, etc.
2. Provide the country with legal and regulatory frameworks as well as planning tools in the field of LUP. These would include: (i) the development of the national LUP programme and sectoral maps, (ii) the development of legal and regulatory texts, and (iii) support for the development of provincial plans.
3. Improve living conditions and provide more balance for spaces through (i) the construction of social housing and (ii) the delimitation of strategic and housing spaces.

The preparation and submission of a draft legislation and a national LUP policy is arguably one of the most significant advances in this sector. In fact, the DRC has never reached this level of LUP before. In principle, in the near future the DRC will adopt a law and a national LUP policy, broken down into national and provincial plans.

The absence of such a policy and law has long been one of the causes of the great number of conflicts related to the use of space and resources. Competition among the various sectoral ministries responsible for land use had increased owing to a lack of alignment of sectoral legislation (on land, mining, forestry and agriculture). In addition, the critical lack of data and data exchange had led to conflicting views on land use and many conflicts in the use of space and resources. For example, there has been much overlap among usage for mining, forestry and agricultural activities.

Making LUP a reality requires not only preparing a draft law and a national policy, but also implementing them. Successful implementation is undoubtedly not without risk, given that this will be the first time the DRC adopts a law and national policy on LUP. The essential aspects to be taken into account for optimal LUP are its technical and cross-cutting nature, the success of the country's decentralization, the effectiveness and efficiency of the monitoring and evaluation system promoted in these draft laws and policies, and the financial and human resources. In this regard, the UNDP has identified several operational, strategic, political, financial and organizational risks (MECNT 2017).

The DRC has several assets that can help it make LUP a reality. These include involvement by the institutions that worked together in the way land use planning is organized, the work on the implementation of REDD+, the existence of draft legislation and draft national policy on LUP, as well as the past experiences in trying to organize land use planning.

During the past decade, environmental issues have been included in an LUP, which was originally designed to better exploit the country's resources (e.g., agriculture, mining and timber). With the adoption of the national REDD+ framework strategy in 2012, LUP has become enshrined as one of the seven pillars of this strategy. It goes without saying that forest degradation, deforestation, and the restoration or sustainable management of forest ecosystems can be negatively or positively impacted depending on the organisational quality of the LUP in the DRC.

LUP is indirectly recognized as the main underlying cause of deforestation and degradation of forest ecosystems (MECNT 2017). At COP26 in Glasgow, on 2 November 2021, the DRC and the Central African Forest Initiative (CAFI) signed a second letter of intent covering the 2021–2031 period; it takes LUP into account among the 10 key sectors. The main political commitments that the DRC must make a reality between now and 2031 include the systematic integration of high-value forests, peatlands and the concessions of local forest communities into the LUP processes and plans so that they can be preserved and centralized, as well as the publication of land-use contracts applying to agriculture, forests, mines and hydrocarbons. As for the political milestones to be reached

Table 11.6: Overview of LUP organization in the DRC

Periods	Key events	Institutions
Prior to independence in 1960	• During the colonial period, aspects of an LUP policy were developed: transport infrastructure and facilities for the colony, as well as the creation of cities and urban areas. • 1949: Adoption of the 1949–1959 ten-year plan and the decree on the urbanization of the Congo, aimed at structuring the existing cities and urban areas. • 1957: Promulgation of the urban planning decree as a regulatory reference for territorial planning.	Colonial authority
1960–1970	• 1965: LUP was put under the supervision of the Office of the High Commissioner for National Planning and Reconstruction, attached to the Presidency of the Republic. • 1969: LUP was attached to the Ministry of State in charge of Planning and Scientific Research. • 1969: LUP was made part of the Ministry of Public Works (TPAT) in the form of a directorate called "*Direction de l'aménagement du territoire*".	Presidency, Office of the High Commissioner for Planning and National Reconstruction; Ministry of State in charge of Planning and Scientific Research; Ministry of Public Works
1971–1980	• 1973: Adoption of Law No. 1973-021 on the general property regime, land-tenure and real estate regime and securities regime, amended and supplemented by Law No. 1980-008. • 1974: Merger of the LUP and Urban Planning directorate (which had been a division) into a single directorate called "*Direction de l'aménagement du territoire.*" • 1975: Creation of the public works and LUP department attached to the Land use and Urban Planning Office (*Bureau d'Études d'Aménagement et d'Urbanisme*)	Presidency; Ministry of Public Works

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Table 11.6: continued

Periods	Key events	Institutions
1981–2005	• 1982–2004: Five drafts of the LUP National Programme are prepared at the national level. At the regional level, two regional LUP programmes for Bas-Zaire and Greater Kivu (Nord-Kivu, Sud-Kivu and Maniema) were drafted, as there were studies on specific areas (five studies of development centres). At the urban level, studies on cities were carried out. • Further reflection was carried out on a national LUP policy and on draft LUP legislation. The work developed throughout this period was not accompanied by the political ownership which was supposed to improve it in view of it being adopted and put into practice institutionally. • 1988: The Urban Planning Division was upgraded to the Ministry of Urban Planning. • 2002: Forest Code and Mining Code adopted.	Office for Spatial and Urban Planning (*Bureau d'Études d'Aménagement et d'Urbanisme* - BEAU)
2006–2014	• 2008: Creation of the Ministry of Decentralization and LUP (DECAT) • 2010: Establishment of the LUP Support Unit. • 2011: Decentralization and LUP come under the Ministry of the Interior and Security. Adoption of the Law on Agriculture and the Law on the Environment. • 2012: (i) LUP comes under Urban Planning and Housing, Infrastructure and Public Works and Reconstruction; (ii) National REDD+ framework strategy adopted. • 2013: National consultations and advocacy for the LUP sector in the DRC.	Ministry of the Interior and Security; Ministry of Decentralization and LUP; Ministry of Urban Planning and Housing, Infrastructure and Public Works and Reconstruction; Presidency
2015–2020	• 2015: (i) Launch of work to provide LUP with an autonomous administration; (ii) Support from the WRI and CODELT to reflection on the launch of LUP reform in the DRC; (iii) Approval of the Strategic Guidelines Document for the drafting of the national LUP policy and a national LUP programme (June 2015) • 2016: Approval of the Framework and Organic Structures of the LUP General Secretariat by Order No. CAB.MIN/FP/PIM/CA/WBC/071/2016. • 2017: (i) Creation of the Ministry of Public Works and Urban Renovation; (ii) Establishment of LUP provincial divisions; (iii) Launch of a Support Programme for LUP reform. • 2018: Recruitment of national experts. • 2019: (i) Change of name to Ministry of LUP; (ii) Validation process for a national LUP policy document and a draft legislation on LUP; (iii) WRI contracted for LUP technical support. • 2020: Draft legislation on LUP submitted to Parliament.	UNDP; Ministries of LUP, Planning, Decentralization, Urban Planning, Infrastructure and Environment, FONAREDD; programme and project implementing organizations, universities, civil society, international cooperation agencies, etc.; WRI and CODELT; Idea Consult & AED Consult as well as STUDI International; CAT (Congo Agriculture Technology); Parliament

Table adapted by Blaise-Pascal Ntirumenyerwa Mihigo, 2020, based on information from Deliverable 3: National LUP policy document (Ministère du Plan DRC 2019)

in 2023, the following were adopted: enactment of the law on LUP, development of a national directory of soil and subsoil natural resources, establishment of an arbitration process dealing with land-use disputes, and production of an LUP atlas. In view of the above, it is likely that LUP will increasingly contribute to the management of forest ecosystems in the DRC, the largest country in the Congo Basin.

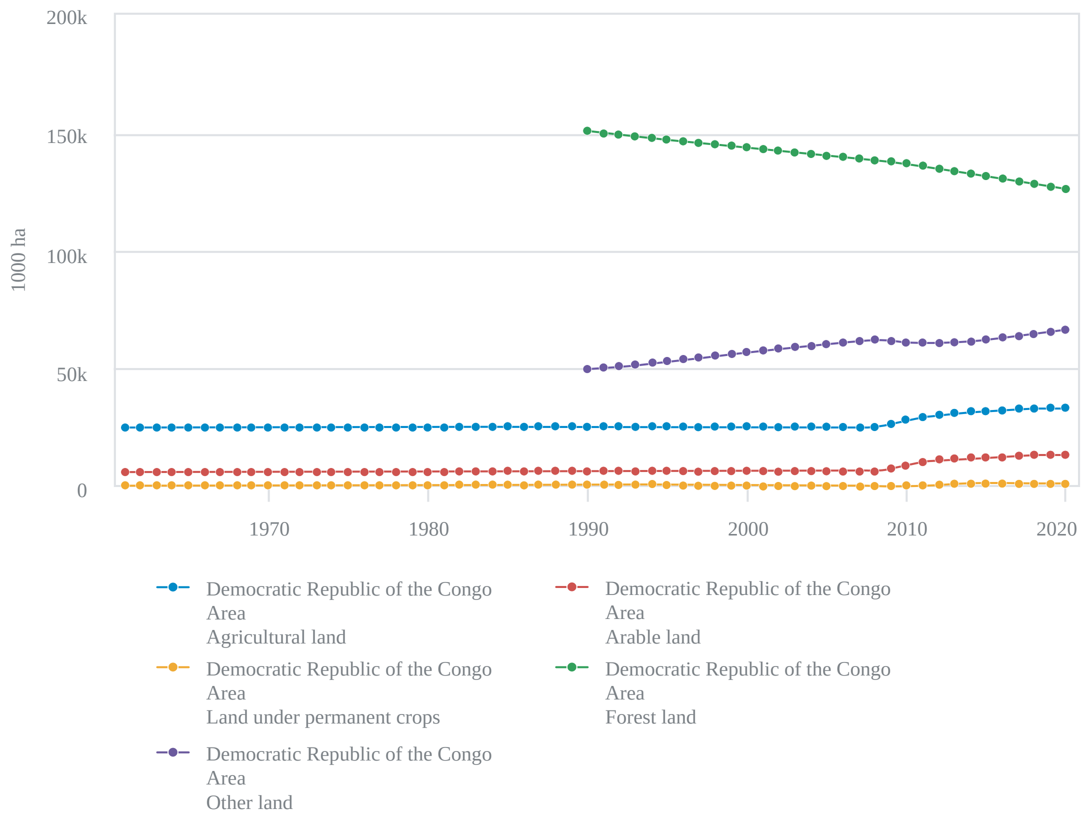

Figure 11.3: Curve chart of land-use allocation areas in the DRC

Source: Curves generated online on this website: http://www.fao.org/faostat/en/#compare (2021)

11.2.3 Land use planning in a landlocked mountainous country: Burundi

Land management and the emergence of LUP in Burundi

Burundi is a very ancient kingdom, where the king, the *Mwami*, had control over all lands and power to take them away or allocate them. He was assisted in this task by an administration and advisers, the *Bashingantahe*, an institution whose members were selected for their wisdom. Some groups, such as the Batwa (Pygmies), were traditionally excluded from access to land. This power was withdrawn from the *Mwami* and his advisers in 1960.

The history of LUP in Burundi was marked by the introduction of various cash crops (e.g., oil palm, coffee, tea and cotton) in the form of industrial plantations associated with artisanal village plantations. Later, forest and agroforestry plantations continued to change the Burundian landscape significantly. These large plantations, which contribute to the way the territory is organized, were created by the coercive power of the various administrations before and after independence.

Burundi experienced two different administrations during the colonial period: German administration from 1898 to 1919 and Belgian administration from 1919 to 1962. It was the Belgian administration that had the greatest impact on land management and thus on LUP in Burundi. Following independence in 1962, Burundi had difficulty establishing an LUP that could take into account both the powers of the post-colonial State and the practices of the population under the

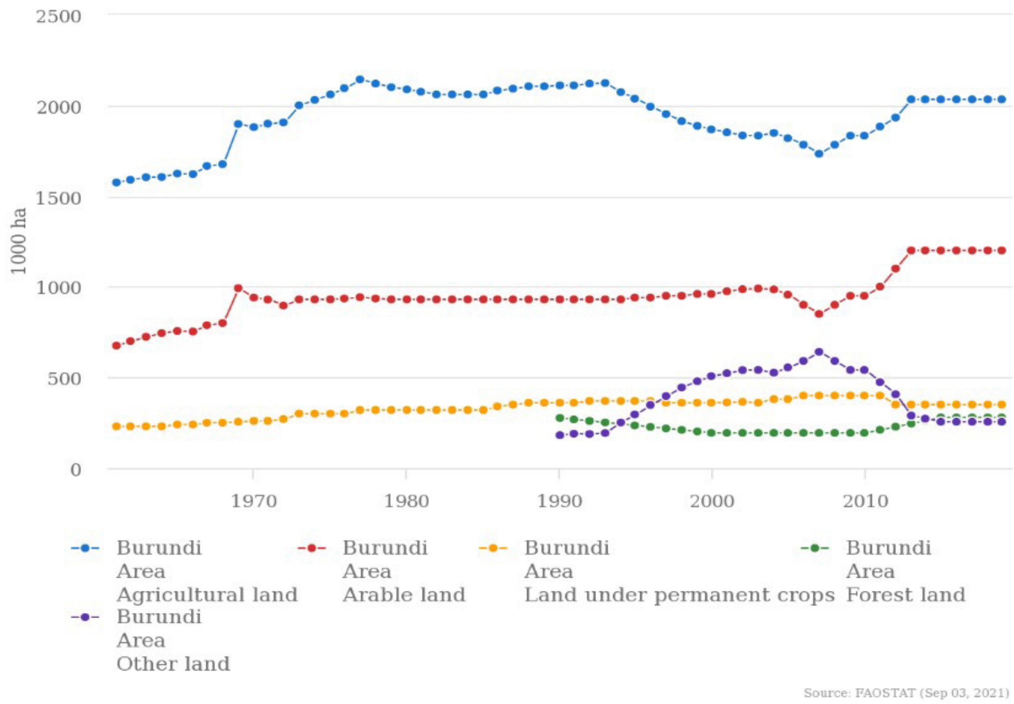

Figure 11.4: Curve chart of land-use allocation areas in Burundi

Source: Curves generated online on this website: http://www.fao.org/faostat/en/#compare (2021)

circumstances of a continuous fragmentation of land and of insecurity in the neighbouring Great Lakes countries, which had suffered from multiple crises.

The history of LUP in Burundi can be summed up by the issue of land reform, which tried to deal with the organization of land before, during and after the colonial period. Burundi is today the third most densely populated country in Africa, with a density of more than 300 inhabitants/km^2. One of the causes of the continuous fragmentation of land is the form of land inheritance. Land inheritance is carried out by lineage and by family. It has led to the reduction of the agricultural area to less than 0.5 ha of arable land per farm (Ndikumagenge 2018).

Brief historical analysis

Table 11.7: The colonial period in Burundi

Periods	Key events during the colonial period: from king-owned land to State-owned land	Institutions
1910	• Start of oil palm tree cultivation extension along Lake Tanganyika.	German administration
1913	• Destruction of oil palm trees, considered as tsetse fly hosts, to eliminate sleeping sickness. • Local populations resisted this measure, as they already understood the importance of the crop.	German administration
1925–1930	• In contrast to German practices, supervision of industrial and “indigenous” plantations, with introduction of pre-selected oil palm nuts. • Obligation to plant 10 to 30 palm trees per family. • Rule imposing oil palm loosened; local populations forced to plant cotton and coffee instead. • Decline in oil palm production.	Belgian administration with power under the king

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Table 11.7: continued

1930–1931	• First artificial (State-owned) forest plantations and roadside trees. • Obligation by the Belgian administration to create municipal woodlands, the area of which depended on the number of taxpayers. • Obligation to plant coffee.	Belgian administration with power under the king
April 1948	• Judgment by the Urundi Territorial Court stipulating that "the land issue [was] intimately linked to political power.": "The main income of the chiefs shall come from land – fallow, field or pasture – and their power largely resides on their ability to award it or deprive people of it." • Extension to Rwanda-Urundi of a fundamental rule of land law applied to their colony in the Congo, which stipulated that "the lands occupied by the indigenous populations, under the authority of their leaders, shall continue to be governed by local customs and usages."	Belgian administration with power under the king
1948	• Establishment of a forestry service responsible mainly for preserving natural forests and managing economic woodlands.	Belgian administration with power under the king
1950	• Creation of peasant settlements, i.e., areas where inhabitants are grouped. These peasant settlements were created and regulated by the Belgian administration to develop sparsely populated areas and to introduce new export crops in Gihanga (Bubanza Province), Mutimbuzi (rural Bujumbura) and Bukemba (Rutana). The inhabitants consequently suffered from precarious conditions because their rights to grow export crops were taken away if schedules were not met.	Belgian administration with power under the king
26/09/1960	• Legislative order abolishing the rights of the *Mwami* and the Baganwa to land, following elimination of monarchical power.	Belgian administration
1962–1986	• Independence of Burundi in 1962. • No fundamental changes to Belgian land law until enactment of the Land Code.	Administration by independent Burundi

Source: Prepared by the authors

Table 11.8: The post-colonial period in Burundi

Periods	Key events during the post-colonial period: the emergence of LUP	Institutions
01/09/1986	First land code of Burundi (and of the subregion). The status quo between the two land ownership theories is maintained (exclusive State ownership of land and the recognition of land ownership by individuals).	Administration by independent Burundi
1989	Establishment of the Ministry of LUP, Environment and Tourism (MINATE).	Ministry of LUP, Environment and Tourism
1992	Start of rural consultations on the land code. Proposal for a draft land code on the pre-eminence of State law over all land. Not accepted due to lack of consensus.	
1965, 1972, 1988, 1993	Successive political crises and civil wars followed by internal and external displacements, with impacts on land in Burundi and neighbouring countries. Gradual decline of customary practices, alienation of municipal plantations.	
2004	Thanks to support from FAO, proposal for a project for reform that maintains a dual situation of individual property and State property. Initial proposal for "specialized LUP" which gives the State the right to impose certain types of crops on certain regions in order to promote agricultural production. Proposal not adopted during the consultations.	
June 2005	Villagization policy to free up agricultural land and provide access to development infrastructure (e.g., for water, electricity, schools, health centres and income-generating activities).	

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Table 11.8: continued

Periods	Key events during the post-colonial period: the emergence of LUP	Institutions
2008	Proposals for decentralized land management supported by two projects financed by Swiss cooperation and the European Union, with the goal of partially relieving backlog in the already saturated courts of Bujumbura, the capital.	Ministry of LUP, Environment and Tourism
2008	Creation of the Ministry of the Environment, LUP and Urban Planning.	Ministry of Environment, LUP and Urban Planning
2008	Letter on urban and housing policy.	
2009	Four strategic land policy priorities established in Burundi, via an action plan implementing a strategy and proposing a system for managing it and making it consistent with the other sectoral actions involved in land management. The four priorities: (1) Reform of land legislation through the adoption of laws on new land systems based on modernization of the land system, simplification of procedures and decentralization of land management. (2) Restructuring and modernization of land management services with a view to improving public services. (3) Decentralization of land management: implementation of a local legal and institutional framework to strengthen the capacities of municipalities. (4) Inventories of municipal land to update knowledge on available land and its occupancy.	
2010	Drafting of 11 provincial LUP programmes across 11 provinces. The following major advances were made as a result of these programmes: General territorial survey to determine large areas at the province level, including the forest areas sought after by landless peasants, and to determine the pillars of the economy focused on agriculture, fishing (along Lake Tanganyika), agro-industries and artisanal activities (e.g., wood, coffee, tea, palm oil, clay work and craft art). Drafting of an analysis on the existence and diversification of natural resources, the population structure, the status and distribution of social and collective infrastructure and facilities, the level of urbanization, and tourist sites. The demographic outlook for the year 2025 was aligned with Vision 2025. Setting priorities for the national strategy of land use, set with clear basic principles such as the distribution of large-scale infrastructure, the creation of villages with modern facilities and the major development themes. These latter are: (i) urban development, (ii) rural development, (iii) regional integration (interdependence with neighbouring countries with regard to industrialization, energy, skilled labour, security, and access to remote areas).	
2011	Creation of the Ministry of Water, the Environment, LUP and Urban Planning, which has the new dimension of management of water resources and sanitation.	Ministry of Water, the Environment, LUP and Urban Planning
2011	Drafting of Vision 2025 to provide a framework that will guide the implementation of sustainable development strategies and policies. This vision is based on the following priorities: (i) good governance and State capacity building, (ii) human capital, (iii) economic growth and poverty reduction, (iv) regional integration, (v) demography, (vi) social cohesion, (vii) LUP and (viii) partnership. With regard to LUP, Vision 2025 aims "to establish a villagization and urbanization policy that will significantly increase the rate of urbanization from 12 percent to 40 percent by 2025." It also seeks to "make LUP an important priority of its economic and social development policy with a view to facilitating the organization of the management of national space."	
2012	With the support of FAO, the establishment of a REDD and MRV project to determine the activities to be implemented as part of REDD and MRV.	
2018	Drafting of the 2018–2027 National Development Plan with strategic orientations including environmental protection, climate change adaptation and improvement of LUP.	

Source: Prepared by the authors

Land use planning limited by shortage of land

The main challenges facing Burundi, which are interrelated, are population density, degradation of natural resources and the fact that the country is landlocked. Burundi is a densely populated country. It is predominantly agricultural, mountainous and has limited space. The population is growing at a rate of 3.1 percent per year, doubling every 24 years (Ndikumagenge 2018).

LUP and environmental problems have always been interrelated there. Institutionally, before 1960, spaces were managed by the king. When the country became a republic, LUP was integrated into various ministries, including the Ministry of LUP and the Environment (MINATE) and the Ministry of Water, Environment, LUP and Urban Planning (MEEATU). The management of natural resources was thus included very early in Burundi's LUP, as the Belgian administration created forest plantations as early as 1930 to meet the firewood needs of the local populations and of the first industrial activities.

The challenge of LUP in Burundi is to maintain the agricultural economy, and at the same time to preserve the productive capacities of land and natural resources. Burundi has always been looking for export products to support its economy. The development of industrial export crops (e.g., tea, quinine, coffee) has been a factor behind deforestation since the 1930s. Tea and coffee were for a long time the main resources of the country, but now they are second after gold and rare metals. Over the past 20 years, artisanal mining has been a factor behind the deforestation of the remaining natural forests (Ndikumagenge et al. 2018).

The objective of LUP is to provide public services and to guarantee food security and export revenues, and at the same time to preserve ecosystems. The factors that structure LUP have been identified in the provincial development programmes: cities and villages, public facilities and infrastructure (e.g., roads, streets, drinking-water supply, electricity and telecommunications). The functioning of the framework between the local, communal, provincial and national levels depends heavily on road infrastructure and on effective coordination between the different administrative levels.

The greatest challenge is to implement the LUP programmes according to the guidelines proposed.

One of the major points at stake about LUP is to guarantee equitable access to basic services and infrastructure (e.g., water, roads and trails) to all citizens from all provinces. But this is not easy in a rural and mountainous country with isolated and very hilly areas. In some areas, houses are built on very steep slopes. The urbanization rate is currently estimated at less than 12 percent, which is very low. The African average was 40 percent in 2018. Cities indeed play a driving role in development, as they enable access to services for a greater number of people. As for the villagization policy in rural areas, it has been ineffective despite it having been around for a long time. More generally, the rural world lacks basic infrastructure, roads, tracks, drinking water, electricity and telecommunications (Ndikumagenge et al. 2018).

Another objective of LUP is the protection of natural resources, in particular water and soil management and the fight against erosion. For this latter there is persistent use of unsuitable techniques, such as anti-erosion ditches. Many concrete problems exist, such as the clearing of natural areas; illegal logging and violation of land boundaries during successive political crises; and poor water control, with very little rainwater collection, storage and management. In the very densely populated coffee-growing provinces, the relationship between food crops and coffee is changing as food crops begin to be grown under coffee trees. Finally, some cities face new challenges related to the prevention of environmental degradation, including waste management, sewage disposal and sanitation.

City-countryside relations are also a challenge for LUP, given that the rural world is not very monetized. With most rural populations living off home consumption, rural areas lack integration into the national economy. In addition, urban areas tend to encroach on agricultural land. This leads to conflicts in land use between housing and agriculture, disputes over water use, and the search for construction materials that are a factor behind environmental degradation. In Burundi, the rate of increase of the urban population was 5.1 percent between 1990 and 2008 and even reached 6–7 percent in the provinces of Gitega and Ngozi (MEATU 2010; Ndikumagenge et al. 2018).

The implementation of LUP programmes is hampered by a lack of mastery of LUP techniques and governance. The Government itself does not always respect urban planning, and the people do not respect State-owned land.

As forests have recently been placed under the Ministry of the Environment and Agriculture, there are risks that the importance of forests will be forgotten, that forest budgets will be reduced, and that the higher-level civil servants with solid experience in forest policy may be dispersed among several departments. Institutional conflicts and disputes between the people and the Government are multiplying, for example to demand the restitution of former land and pastures that have been converted into plantations.

Meanwhile, demographic pressure is having an impact on forest ecosystems. Forestry agro-socio-ecosystems, and then agro-industries, have strongly modified the Burundian landscape for a long time. Yet, Burundi has more forest cover than 100 years ago, thanks to the efforts of successive governments and the support of many technical and financial partners – this despite the impacts of various political crises. However, there is a great risk that these forest areas could be reduced. To cope with these land use constraints, Burundi must devise new agroforestry models that take into account not only climatic conditions and population densities, but also the expectations of the private sector, such as food-crop and coffee combinations, the promotion of agroforestry plantations including oil palm, and the integration of livestock farming into State-owned woodlands.

Finally, the rehabilitation of communal woodlands must be included in the new LUP programmes. Research on erosion over the last 30 years highlights the contribution of plantations and natural spaces to the fight against erosion (Besse 1991).

LUP in Burundi: a product of the State and farmers

LUP in Burundi is a public action: its purpose is to provide guidance for population distribution, for the activities of the population, and for facilities and infrastructure in a given space, all the while taking into account national and global policies. However, in the specific context of the country and its history, the old patterns of space specialization – for example a single agro-industrial crop in a given space – are giving way to more integrated models to meet several needs in increasingly small spaces.

Given the country's demographic and environmental constraints, LUP in Burundi must take into account five elements (natural, social, economic, financial and infrastructure). It must also consider the geopolitical issues of the subregion, such as migration, which may impact its territory.

As the State has a significant sovereign role in this LUP process, it is essential to take into account land use management through peasant practices related to the modes of transmission of land capital. The search for land, to enable the extension of profitable cash crops such as oil palm, will increase competition between cash crops themselves and between cash crops and food crops, and it will exacerbate the pressure on the areas occupied by forest plantations and nature reserves.

11.2.4 Rwanda: a densely populated and mountainous country that preserves its natural parks

Like Burundi, Rwanda is also densely populated, with more than 12 million inhabitants and an average density of nearly 459 inhabitants/km^2. Because of this density, cultivated land tends to develop at the expense of forest cover. One of the major challenges of Rwanda has long been to contain the effects of water erosion in a densely populated mountainous country which still relies heavily on agriculture.

In this context, proactive environmental protection policies, in the form of the creation of many protected areas, have had a marked effect on the country. This is how Rwanda enjoys 28 percent forest cover. About 9 percent of the country is classified as a protected area, and 70 percent of land is allocated to agricultural or forestry activities (source: OFAC, see Table 11.2). In the western part of Rwanda, dense natural mountain forests and forest plantations can be found.

In the extension of the north-south axis of the Congo-Nile Ridge lies the Nyungwe National Park to the south and, a little further north, the Gishwati Reserve. One of Rwanda's great treasures is its Volcanoes National Park, an integral part of the Virunga transborder complex, which offers the possibility of visiting mountain gorillas in their natural environment. To the east, Akagera Park offers a good potential outlook for savannah fauna. Dry forests in low-elevation areas of the east contrast with high-elevation forests in the west.

History of the importance of the environment and national parks in Rwanda's land use planning

In Rwanda, environmental conservation policies have had an influence on its LUP. This history dates back to the beginning of the 20th century, with the start of Belgian colonization in Ruanda-Urundi territory. Reforestation work began as early as 1920. Albert Park was established in 1925, followed by two reserves in 1934 (see Table 11.9). These environmental initiatives were also accompanied by an extensive soil conservation campaign initiated by INEAC, which later became the Institute of Agricultural Sciences of Rwanda (ISAR) in 1937. They initially took place in research stations, before spreading to the whole country. In 1947, soil conservation work was made mandatory by colonial legislation. This policy was abandoned at the time of independence, because it was perceived as statute labour. After independence and especially from 1977, environmental action programmes were launched within the framework of annual themes: habitat (1977), livestock (1978), soil protection and conservation (1980), rural hydraulics (1981), the fight against erosion (1982), and reforestation (1983) (Rwanyiziri 2020).

In 1933 and 1934, natural parks were created in a coercive and authoritarian manner: a series of laws and rules were adopted contrary to the interests of local people. As a result of this policy, people were dispossessed of their land and their resources (pastures, artisanal activities, pharmacopoeia, etc.) (Mbuzehose 1995). After independence, the new rulers authorized some clearing in the

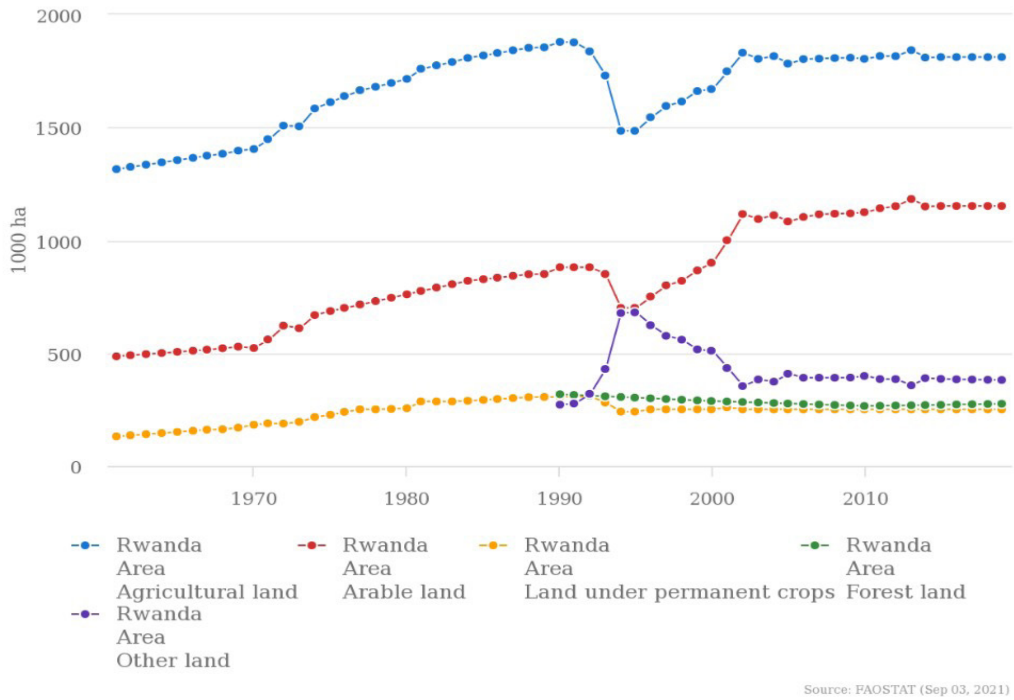

Figure 11.5: Curve chart of land-use allocation areas in Rwanda

Source: Curves generated online on this website: http://www.fao.org/faostat/en/#compare (2021)

parks. In 1967, for example, in Volcanoes Park, 10,000 ha were converted for pyrethrum cultivation (Rwanyiziri et al. 2020). Akagera National Park was infested with the tsetse fly and did not undergo much change in the first 10 years after independence. In contrast the Nyungwe Forest Reserve has been cleared on all sides (east and west) by farmers since 1958, as the land is fertile.

The forms of LUP and their implementation

As in many countries, LUP in Rwanda has been structured by the development of cities and roads. However, the development of spaces devoted to environmental protection has greatly influenced the structuring of the territory.

Against this backdrop, the role of international NGOs and bilateral aid has been important for the organization of Rwandan territory. In 1967, thanks to the authorization of the Rwandan Government and to logistical and financial support from American conservation NGOs, a research centre called the Karisoke Research Center (KRC) was created by Dian Fossey. In 1986, the Belgian Administration for Development Cooperation (AGCD), the Belgian bilateral cooperation agency, decided to finance the “Tourism and National Parks” project for four years. In 1987, the natural forest of Nyungwe found a good partner in the Zoological Society of New York (now the Wildlife Conservation Society - WCS), which went on to seriously address the main problems in the protection of its resources. The ORTPN and the WCS helped create the Nyungwe Forest Conservation Project (PCFN). These efforts continued thanks to financing from the German Technical Cooperation Agency (GTZ) in October 2000 via the Protection and Restoration of the Akagera Natural Resources project, then via the PRORENA, whose goal was to restore the Akagera National Park within its new boundaries.

The Rwandan governments have always been very willing to combine environmental protection and tourism in order to diversify the economy, as demonstrated by the creation of the ORTPN in 1974.

Table 11.9: Start of LUP during the colonial period in Rwanda

Periods	Key events during the colonial period: the emergence of LUP	Institutions
1925	Creation of Albert Park.	Belgian administration
1933	Following the London Convention of 1933, Belgium created Rwanda's first two forest reserves: • The highland natural forest reserve on the Congo-Nile divide corresponded to the former boundaries of the natural forests of Nyungwe, Cyamudongo and Mukura. • The second, the volcano mountains, corresponded to the boundaries of Albert National Park in its Rwandan part.	Belgian administration
1934	• Borders of the Volcanoes and Akagera National Parks became delineated. Creation of two national parks in Ruanda-Urundi territory. • The first park, the Volcanoes National Park, was created in 1925, but its boundaries were later set in 1934 along with the boundaries of Albert National Park. • The second park, Akagera, was created in the northeast of Rwanda in an area that was then sparsely populated due to the tsetse fly.	Establishment of the National Parks Institute of the Belgian Congo
1959	• Creation of a corps of national park rangers in Ruanda-Urundi to provide armed protection for all national parks in the territories under Belgian administration.	Belgian administration
1960	Independence of Belgian Rwanda.	
1967	Creation of a research centre to protect gorillas, under the impetus of an American NGO.	Karisoke Research Center (KRC) by Dian Fossey
1974	Government desire to combine environmental protection and tourism.	Rwandan Office of Tourism and National Parks (ORTPN).
1992	Creation of a ministry dedicated to the environment, following the Rio World Congress on Biodiversity and Sustainable Development.	Ministry in charge of environment and tourism.
1990-1994	Conflict and genocide against the Tutsi.	
2001	Government decision to strengthen the environmental sector.	State Secretariat for Environmental Protection + Rwandan Environmental Management Office (ORGE).
2003	With the aim of involving local people in the management of protected areas, ORTPN was restructured into two agencies.	The Rwandan Conservation Agency (RWA) and the Rwandan Tourism Agency (RTA).
21st century	The restructuring of ORTPN became a turning point in the country's nature conservation policies, as it established a community-based conservation programme for the first time.	
Early 21st century (specifically, in 2002)	Fierce battle between nature conservationists, conservation NGOs in particular, and development promoters, represented by the various governments in power. Decrease in the size of protected areas and exclusion of populations that practice certain activities within those areas (the forest Batwa in particular).	

Source: Table developed by the authors, based on Rwanyiziri et al. 2020

However, conservation policy was carried out against the will of the people, as was the case during the colonial period. The second mission of the ORTPN was to ensure the promotion of tourism and to implement all means that could contribute to the development of this economic sector.

Since 2002, considerable efforts have been made to resolve the many conflicts between protected areas and local people. Conservation has become community-based, and participatory methods have been used to anticipate conflicts. These methods, which have helped find solutions to alleviate the conservation constraints imposed on local communities, include better sharing of tourism revenues, access to resources in and near protected areas, and financial compensation for the destruction of crops by wild animals.

International discussions on the environment have also influenced the way Rwanda has arranged to manage its spaces. In 1992, Rwanda participated in the Rio de Janeiro Summit on Biodiversity and Sustainable Development. That same year, a ministry in charge of the environment and tourism was created.

The 1990–1994 war, which culminated in the genocide against the Tutsi, had significant impact on the environment. Not only were the parks the scene of clashes, but the conflict also greatly destabilized the normal operations of the ORTPN. Akagera National Park was the first protected area affected by the war and was even looted at the beginning of the war.

Despite these adverse events, Rwanda now has four national parks and nature reserves throughout the country. They contribute to its economy and help maintain the quality of its environment.

However, this form of LUP was at first directed against indigenous peoples, as it opposed traditional rights to use forest land and products and put them in a precarious or illegal situation. When the parks were created, the Batwa hunters were deprived of their main activity or became poachers out of necessity. Conservation mitigation measures, which aimed at improving the lives of people near the parks, have had effects especially when accompanied by greater public investment in rural infrastructure such as passable roads, schools and health centres.

11.3 Can LUP reconcile development and ecosystem conservation?

Achieving the Sustainable Development Goals (SDGs) in Central Africa is not so simple, because some objectives are in principle contradictory. In the context of Central Africa, reducing poverty (SDG 1) and ending hunger (SDG 2) while preserving life on earth and ecosystems (SDG 15) requires finding compromises, and LUP is definitely one of the tools to identify these latter.

The various countries examined here have made significant efforts in developing public policies to enable them to design their LUP. These have created the conditions for development compatible with both better management of their resources and economic development to combat poverty. However, these efforts are hampered by two complex phenomena: on the one hand, the resistance stemming from power games – often between State institutions – and, on the other, the vulnerability of natural resources to the growing demands of a rapidly expanding population.

People want services and infrastructure more than anything, whether in the cities or in the countryside. In the latter, people demand roads (to better sell their agricultural products), schools and health centres. They also want a good environment, which starts with having access to clean water. These demands bring people into conflict with conservation advocates, who argue for limiting road development in forest areas (Alamgir et al. 2017). Roads symbolize development and are expected by local stakeholders, but they are criticized by some scientists for their impact on biodiversity (Laurence et al. 2009; Gibson et al. 2011). These roads, sometimes initially laid out for logging, agro-industry or mining, are then used for all sorts of activities and especially small-scale subsistence farming, which takes over land along the roads. Today, road development has an undeniable impact on ecosystems, by contributing to the direct causes of deforestation, for example in the DRC (Kleinschroth et al. 2019). This does not have to be the case. By making road development conditional on local governance models, such as contracts with local people who desperately need the roads for their development, it should be possible to reconcile environmental protection and inclusive development. These new governance models are still under construction but could build on local planning processes such as those being developed in Cameroon (see Figure 11.1 PLADDT above).

In all the countries, the primary goal of LUP has been to ensure development and provide people with basic services. In Central Africa, with the exception of Rwanda and Burundi, environmental matters were introduced relatively late into LUP objectives. The evolution of these objectives has varied according to the institutions in charge of them.

For example, in the DRC, after independence LUP was associated with public works, then with urban planning: the aim was to develop the country's many natural resources, to support the economy, to serve remote areas and to manage the rapid and poorly controlled development of cities. More recently, starting in 2015 with the support of environmental NGOs, the issue of ecosystem conservation, in particular thanks to REDD+, has been included within LUP at the national and subnational levels in the DRC.

Cameroon also continues to see tension between development and conservation. Implementation of the LUP programme at the national level is in practice managed only by the administrative office in charge of the LUP programme, but contradictorily also concerns at least six other ministries (see Table 11.5) whose various missions include mining, water, energy, forests, environment, land registry, LUP, and local development. These ministries sometimes have very different interests and approaches, thereby raising governance issues that call into question the effective implementation of LUP. Ministries tend to operate in silos, each defending its areas of competence with little effective interministerial coordination. In Cameroon, MINEPAT is a powerful ministry, responsible for economy, planning and LUP with the purpose of playing a coordinating role with the technical ministries working on forests, mines and the environment, but in practice this coordination remains difficult. These cross-sectoral governance challenges are not unique to Cameroon. The power games produce conflicts and make the design phase of development plans endless, thus delaying effective implementation of these plans all the more (e.g., DRC and Cameroon).

Conservation of forest ecosystems has often been carried out by coercion since colonial times, and this trend continues to this day. Because there are natural parks and permanent forest areas, local populations lose usage rights, which is a cause for disputes.

In addition to the old forms of zoning initiated since the colonial era, there are now new territorial divisions stemming from decentralization or initiatives from international players. For example, in Cameroon, delimitation of municipal forests is now linked to decentralization, and that of community forests is linked to initiatives aimed at social and environmental objectives launched by environmental NGOs.

Rwanda has developed an original model, whereby LUP is characterized not only by large-scale infrastructure (e.g., roads and cities) as elsewhere, but also by the presence of protected areas. The country has recovered from the 1994 genocide, and its model for managing protected areas – supported by the international community and in a context of peace – has made it possible to overcome certain tensions with the people living near those areas, who lack space, as in the neighbouring country of Burundi. At the cost of compromises with local populations, Rwanda has been able to transform conservation into a sustainable source of income and develop tourism through a series of measures dealing with hotel and transport infrastructure and visa requirements. As the tourist is very fearful by nature and because Rwanda has also become an exception in the Congo Basin in terms of security, this model does not necessarily seem replicable, as many countries in the region are still experiencing cycles of violence (e.g., the DRC, Cameroon and Burundi).

In Burundi, continuing to have natural parks and planted forests is contested by people who lack land to cultivate food crops. New development models are encouraging the use of participatory approaches, but increasingly carving up land for parks and forests, or just maintaining existing ones, is causing real land-tenure tensions that add to the other tensions in the country.

International actors still have significant influence on LUP in Central Africa. Private actors, international NGOs, and extractive and agribusiness industries influence decisions in order to create development corridors and roads that impact ecosystems (Laurance et al. 2015). These interventions sometimes create conflicts due to overlapping land-use rights, for example between mining permits and nature reserves (Schwartz et al. 2012). To prevent these conflicts, it is necessary to develop new models of governance at the local level, as mentioned above.

International agencies, development partners and environmental NGOs act on LUP through the creation of nature reserves, biodiversity corridors and global policies such as REDD+ (and its variations such as forest landscape restoration). Two programmes have been remarkable in Central Africa. The CARPE programme has promoted a landscape-wide approach to LUP, with the goal of reconciling conservation and improvement in people's lives. This project, supported by the United States Government and adopted by COMIFAC and the CBFP, lasted about 20 years. It covered six countries: the DRC, the Republic of Congo, the Central African Republic, Cameroon, Gabon and Equatorial Guinea. The EU ECOFAC programme started in 1993 and has been going on for nearly 30 years. This conservation programme takes into account the uses of Central African forest ecosystems. ECOFAC also strives to promote regional coordination processes for conservation while mainstreaming socioeconomic aspects. It is within this framework that it supported the creation of protected areas decided on by the governments of Central Africa following the Rio Summit in 1992, including transboundary areas. This was the idea that produced the Network of Protected Areas of Central Africa (RAPAC).

LUP must increasingly take into account migration phenomena, which is occasionally cross-border and which also have repercussions on the environment and the potential emergence of conflicts. For transhumant herds, it is possible to provide for passages far from farmers' fields and nature reserves. As for people displaced by political and climate crises, in addition to emergency assistance there is a need for support for the sustainable management of renewable resources in host areas. This will help prevent the irreversible degradation of ecosystems in the host areas and also integrate the local populations, who are sometimes almost as poor as displaced populations, into that management. (see Box 12.1 of Chapter 12). Finally, sometimes the goal of LUP is to reconcile the not always easy coexistence between local populations and wild animals. For example, sometimes LUP can provide for the circulation of wildlife through biodiversity corridors compatible with farmers' activities (Doumenge et al. 2020).

Conclusions: For better knowledge of LUP in Central Africa

In most of the countries of Central Africa, LUP seems to be progressing too slowly as a set of national public policies for peaceful development. One cause often pointed out by all development stakeholders is governance. But another is the real difficulty of reconciling interests, especially between economic development and the preservation of natural resources. Yet, the challenges ahead are demographic and climatic. These will bring direct effects, such as population displacement and fires, and indirect effects in the form of degradation of food resources, natural forests and biodiversity.

Much remains to be done to invent the forms for managing the links between the various territorial entities: between cities and countryside, between agricultural and forestry areas, between the interstices nestled between large park or forest areas, and between countries in the case of cross-border park or forest areas. Some tools for reconciling interests are already in place. Experiences in Rwanda and Cameroon show that through innovations in local governance it would be possible to implement LUP that allows for both national and local development, while sustainably limiting the degradation of renewable resources and ecosystems.

What are the best institutional arrangements to facilitate LUP implementation? We can see that LUP is very different from one country to another. For example, in Cameroon LUP is integrated into the Ministry of the Economy, while the DRC has a ministry solely dedicated to LUP. But which system is more effective than the other: a powerful ministry or a specialized ministry?

This brief overview of the forms of LUP at work in the Congo Basin should be followed by real comparative studies by country, in order to provide some answers to the issues and questions mentioned above and in particular on their implementation. Despite the efforts already made as part of some programmes (e.g., CARPE and ECOFAC), we still lack data on the characteristics and effects of current LUP. This is why there is a pressing need to provide information and awareness-raising on LUP, targeting politicians, the scientific community and the general public.

CHAPTER 12

Forest Landscape Restoration (FLR) in Central Africa

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Photo by Philippe Guizol

Introduction

The aim of this chapter is to take stock of forest landscape restoration in Central Africa. First, we clarify the concept of landscape restoration. Second, we present some cases illustrative of forest landscape restoration in Central Africa. Finally, we cover the question of governance and then offer some conclusions.

12.1 Degradation and restoration of forest ecosystems in Central Africa

Views on forest landscape restoration (FLR) often differ. Ecological rehabilitation, which seeks to restore pre-existing ecosystems in terms of specific compositions and community structures, is not always feasible. FLR works differently, to reconstitute certain ecosystem functions in order to improve the well-being of the people who live or will live in those landscapes. In this way, FLR also contributes to climate-change adaptation and mitigation and to biodiversity conservation. These two forms of response to forest ecosystem degradation can be combined in local or regional landscape planning.

12.1.1 Clarifying the FLR concept

FLR is a long-term process that seeks to limit continued degradation of existing forest ecosystems and/or to repair them (i.e., forest rehabilitation), so as to sustainably improve the living environment of local people[1]. Reducing forest degradation involves changing the rules of interaction between natural and social dynamics (e.g., patterns of resource appropriation). FLR may, of course, include forest rehabilitation actions, such as plantations, assisted natural regeneration, or water and soil management (e.g., terraces, anti-erosion ditches, mulching, soil conditioning) on areas that are individually owned or common property, but it cannot be reduced to and confused with these actions. FLR is a long-term and changing process that involves adaptations to social, demographic or institutional change, or to change in stakeholder perception or environmental conditions. It requires shared vision at various levels, co-construction with stakeholders, and monitoring systems. FLR should be part of local land use planning via a decision-making process, and this latter must precede the setting out of its objectives and methods of action. This decision-making process determines the framework for the long-term restoration of the ecosystems in question.

Landscape restoration is therefore not limited to planting projects, and – given societal demands – it is very rarely a return to the original ecosystems.

1 https://www.decadeonrestoration.org/strategy

12.1.2 From the Bonn Challenge to the Decade for Ecosystem Restoration

Landscape and forest restoration has become one of the leading activities of climate-change mitigation. The "Bonn Challenge" was initially a global effort to reforest degraded or deforested land. Its original goal to restore 150 million ha between 2011 and 2020 has gradually evolved to 350 million ha by 2030, including 100 million ha in Africa. This initiative should generate a net benefit of USD 170 billion per year stemming from FLR, as well as provide an ecological benefit by helping to stock 1.7 gigatonnes of CO_2 equivalent annually. Significant environmental services are also expected.

FLR contributes to the Bonn Challenge and the New York Declaration on Forests, with the goals of protecting biological diversity and ensuring food security and human subsistence conditions. The African version of the initiative (AFR100) was officially launched during COP21 in Paris, in December 2015. AFR100 also acts as a contribution to the African Resilient Landscapes Initiative (ARLI), the Sustainable Development Goals (SDGs) and other programmes such as the Bonn Challenge. Several African countries are involved in the AFR100 process. The target of 100 million ha has been largely exceeded, with commitments having been made to restore 108 million ha by 2030. This landscape restoration effort is being supported in particular by Germany, Norway, the International Union for Conservation of Nature (IUCN) and the World Resources Institute (WRI), in collaboration with the Global Partnership on Forest and Landscape Restoration (GPFLR).

More recently, the UN Decade on Ecosystem Restoration, which seeks to scale up the restoration of all ecosystems globally, started in 2021 and is expected to end in 2030. It has a clear objective of reversing the degradation of ecosystems whatever their nature: forests, croplands, wetlands or savannas. This initiative started with a proposal from El Salvador in March 2019. It has been adopted by more than 70 countries and reinforces the Bonn Challenge. Its implementation will require (i) setting clear and measurable objectives, involving as many people as possible; (ii) listening to the stakeholders on the ground; and above all (iii) mobilizing investments commensurate with the challenges. For example, restoring 350 million ha requires at least USD 1 trillion.[2]

Table 12.1: Commitments of some COMIFAC countries at AFR100 (note: not all COMIFAC countries have committed to restoring their landscapes)

	Commitments to AFR100 in million ha	Area of the country in million ha	% of landscapes to be restored in relation to area of the country
Burundi	2.0	2.8	72%
Cameroon	12.0	47.5	25%
Rep. of Congo	2.0	34.2	6%
CAR	3.5	62.3	6%
DRC	8.0	234.5	3%
Rwanda	2.0	2.6	76%
Chad	1.4	128.4	1%
Totals	30.9	512.4	6%

Source: https://afr100.org/content/countries

2 https://wedocs.unep.org/bitstream/handle/20.500.11822/30919/UNDecade.pdf

At its 9th Ordinary Session in November 2016 in Kigali, Rwanda, the COMIFAC Council of Ministers gave its support to the AFR100 process. This should help COMIFAC countries to meet their commitments to reverse the trend of forest and land degradation, by restoring 15 percent of degraded forests by 2020 and 25 percent by 2025 in Central Africa (COMIFAC 2014).

12.1.3 Process to determine landscape restoration objectives

At the national and subnational levels, there are methods to determine the general framework and objectives of FLR (see the case of the CAR below). At the local level, a very different approach is needed to ensure that local populations are fully involved in the decision-making process. Indeed, it is important that they themselves determine how their living environment and habits will be transformed with the purpose of restoring, over the long term, the landscapes that provide them with the renewable resources and ecosystem services on which they depend. Linkage between the top-down decision-making process of the national framework and the bottom-up process from the local populations is critical and probably unique to each country, when it exists.

The FLR process involves a multistakeholder dimension at the local level and requires the establishment of a consultation strategy which seeks to empower each category of stakeholders. This, in turn, should motivate their involvement in the various stages. Women's contribution to knowledge is crucial and must be equal to that of men, as they are most often excluded from decision-making processes.

12.1.4 Evolution and causes of degradation in Central Africa

The processes of degradation are often a precursor to deforestation (Vancutsem et al. 2021). In Central Africa, when forest tracks are opened, it enables the local population to clear the forest for growing crops. The multiplication in the number of these fields increases along with population growth, leading to complete deforestation, when logging alone would not have caused it. These processes are not inevitable: they are due to an institutional and governance situation that is unable to control the activities that generate forest degradation. In other words, it is not so much logging, roads and tracks which cause deforestation as the lack of suitable institutions to control and limit the various processes of degradation.

The Central Africa region had long seemed spared by forest degradation (Tchatchou et al. 2015), especially compared to other large tropical forest basins in Brazil and Indonesia. But today acceleration of degradation and deforestation in the regions is observed, by both the JRC[3] (Vancutsem et al. 2021) and by Global Forest Change.

Given the increasing degradation of forest ecosystems in Central Africa, it is essential that landscape restoration incorporate measures to slow it down. In line with countries' commitments, the challenge is to find trade-offs that allow the people who live there to produce the goods they need (e.g., food, wood and energy), all the while maintaining the forest ecosystems that ensure the sustainability of agronomic systems and provide other ecosystem services (see Chapter 7).

3 JRC: the Joint Research Centre, an internal scientific service of the European Commission.

Table 12.2: Average annual losses in Central Africa of undisturbed tropical rainforests, in million ha, due to degradation (followed or not by deforestation), 1990 to 2020, over 5-year intervals

1990-1994	1995-1999	2000-2004	2005-2009	2010-2014	2015-2019
0.28	0.83	0.4	0.91	0.92	1.24

Source: Vancutsem et al 2021

Slash-and-burn and subsistence agriculture are the leading cause of forest cover loss in the Central African humid zone (GFW).[4] Around cities, in areas of high population density, or along roads, slash-and-burn practices used by elders are no longer a sustainable system of agriculture, but a major cause of degradation and deforestation. In the past, these practices led to small clearings within large forest areas. The fallow system at the time was long and thus viable, as it allowed return to secondary forests. Today, that system is characterized by a process of degradation, with increasingly short fallow periods and made worse by the excessive use of fires, this latter being the main tool of a precarious peasant population with limited options. Uncertainties about land rights leave these people with no choice but to assert these rights by means of axe and chainsaw.

The main causes of degradation in the driest areas are exploitation of firewood, excessive use of pastoral fires and the roaming of livestock. Other causes that can have a significant local impact include agro-industries, mining (which is often informal) and refugee camps. These can lead to significant local degradation of ecosystems and even to definite deforestation.

There are also indirect causes. For example, land and forest management is linked to the institutional framework specific to each territory and each country. These institutions are based on perceptions of the state of forest resources and land. With the exception of countries such as Rwanda and Burundi, there is a widely shared perception in Central Africa that there are abundant forest resources and land (abundance theory). As a result, forestry policies have focused on *developing*, i.e., exploiting natural resources rather than investing in their long-term management. These policies have thus created conflicts either with local populations due to lack of participation or transparency, or between government agencies due to lack of coordination. Finally, rural populations, within existing institutional frameworks, also often have the same approach: exploiting to develop and appropriate space, by destroying the existing ecosystem, according to the rights of clearance.

Other indirect causes of forest degradation stem from inconsistencies in international public policies. Many efforts were made in the 1970s and 1980s to develop forest plantations. Such efforts could have alleviated the pressure logging causes in natural forests today, but they were abandoned in the 1990s because of structural adjustments. A whole body of technical knowledge was lost this way, even though major forest rehabilitation programmes are being considered today.

4 https://www.globalforestwatch.org (see dashboard for Cameroon or the DRC, for example)

12.2 FLR in several countries of Central Africa

12.2.1 Cameroon: FLR a concept still in its start-up phase

Desertification as well as land and landscape degradation are a long-standing concern in Cameroon. In response, Cameroon undertook to deal with these issues and that of drought for the northern part of the country, even prior to the implementation of the main guidelines of the 1992 Rio Summit, which enshrined the major conventions (United Nations Framework Convention on Climate Change - UNFCCC, United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification - UNCCD, Convention on Biological Diversity - CBD, etc.). In 1975, for example, it set up a provincial committee for drought control in the north of the country. This organization started the actions to combat desertification and drought via the initial phase of Operation Green Sahel. This programme promoted mass reforestation to respond to the degradation of the environment.

To comply with its commitments to the UNCCD, Cameroon produced the National Action Plan to Combat Desertification (NAP/LCD) in 2006. This plan relaunched Operation Green Sahel, which incorporates the new guidelines of the Convention. Later, to cope with land degradation on cotton-growing areas in the old cotton basin of North Cameroon, a plot-based land restoration system was set up to develop soil fertility preservation habits among cotton producers. An analysis of the second progress report on the Bonn Challenge states that, from 2004 to 2017, reforestation actions in Cameroon were carried out on an estimated 2 million ha of degraded lands.[5]

Within the framework of the Bonn Challenge and AFR100, Cameroon has undertaken to restore 12 million ha. As part of this approach, and following several consultations with the partners involved in the process, out of 10 projects under development, two major projects co-signed by the MINEPDED and the MINFOF were programmed for implementation in 2021. The first, the Large-scale Forest Landscape Restoration in Africa project, aims at the large-scale restoration of forest landscapes. In Cameroon, it is funded through the IKI initiative by the German Federal Ministry of the Environment, Nature Conservation and Nuclear Safety (BMU). The second is a programme made up of several projects, each with different forms of implementation depending on the stakeholders involved (public and private stakeholders, Decentralized Territorial Community, NGOs).

Cameroon has also undertaken to implement the Great Green Wall, whose new approach advocated by the African Union is to involve countries that did not directly participate in the launch of the initiative. As early as 2015, Cameroon took action along with the UNCCD to promote the concept of "land degradation neutrality (LDN)," which has been defined as *"a state in which the amount and quality of land resources necessary (i) to support ecosystem functions and services and (ii) to enhance food security remains stable or increases within specified temporal and spatial scales and ecosystems."* Cameroon has proposed its programme to determine national land degradation neutrality targets; it aims to improve land productivity by at least 10 percent nationwide and by 90 percent in municipalities located in priority areas for fighting land degradation.

5 https://portals.iucn.org/library/sites/library/files/documents/2019-018-En.pdf

The National Plantation Forests Development Programme (NPFDP), validated in 2019 by the forest administration and development partners, could be the basis for the rehabilitation of degraded landscapes and forests in Cameroon. The National Forestry Development Agency (ANAFOR) is responsible for directly or indirectly supporting the implementation of the said programme. To do so, it carries out studies, looks for financing, provides seeds and seedlings and develops consulting expertise. Even though financial support is not yet available, this programme offers the opportunity to reconcile restoration actions using a landscape approach, with the involvement of local populations via decentralized local authorities. Under this programme, the main objective of ANAFOR is to facilitate the planning, establishment and development of private and community forest plantations, the development of value chains, and a sustainable forestry economy generating jobs and growth.

Research objectives have been determined in order to capitalize on and improve the contribution of research to the development of FLR actions. The programme has made it possible to identify various fields of research including both the enhancement of local knowledge and the development of procedures for tracking the socioeconomic impacts of FLR. However, research in Cameroon continues to suffer from a lack of resources to meet all these challenges.

The current orientations for financing FLR are identified through two sources, the Cameroon Public Investment Budget and external aid. The Public Investment Budget coming from the government ministries is mainly allocated to the rural sector (MINEPDED, MINFOF, MINADER, MINEPIA, etc.). Depending on their relevance, the actions are included in the operational programmes or made to be part of a project.

External resources via bilateral or multilateral cooperation can focus on FLR actions, or they may approach FLR from related issues (resilience of family farming, decentralization, management of permanent or non-permanent forests, innovations in agriculture, green cocoa farming, biodiversity protection, etc.). However, as indicated in the FLR Strategic Framework, there is a need to diversify the sources of support for FLR funding.

In short, the rehabilitation of landscapes in Cameroon has given rise to quite a number of strategy papers, and many past and current reforestation projects – which can by default be assimilated to landscape restoration actions – have been implemented in various regions of the country. These projects make up a body of experiences that could help facilitate implementation of FLR in the country. Finally, the personnel involved in FLR in Cameroon have participated in conferences and exchanges of experience, which represents still another asset for developing FLR there.

However, structural problems in Cameroon make for serious obstacles. While FLR requires actions that cut across the fields of action of the various government ministries, these latter operate in silos, with each one tending to act in isolation, according to its own policy. This generates approaches locally that are contradictory and that lead to land conflicts. Other structural problems include the weakness of national research on forest ecology, forestry, agronomy and forest plantations. This weakness is linked in particular to the lack of stable financing, which is an obstacle to stimulating the innovations needed for FLR on the ground. Despite all the efforts made in the past to involve local populations in decision-making (Diaw et al. 2016), real implementation of this approach faces difficulty on the ground. Yet, we do know that without involvement by local stakeholders, FLR will not be sustainable. Means and tools are still lacking when it comes to monitoring and evaluating restoration efforts whose goal is to improve knowledge and correct approaches.

Box 12.1: Refugees and FLR

In areas hosting large numbers of people displaced as a result of sociopolitical conflicts, rehabilitation of degraded spaces is a means of improving their living conditions as well as those of local populations. At the same time, it helps maintain ecosystem functions. The existence of refugees and internal displaced persons in Africa is not a new phenomenon, but unfortunately it is growing. According to the UNHCR, there were 20.36 million refugees worldwide, including 6.33 million in sub-Saharan Africa and 0.38 million in Cameroon. To this should be added an even greater number of internally displaced persons: 41.43 million worldwide, including 17.66 million in sub-Saharan Africa and 0.67 million in Cameroon (UNHCR 2018; Laird et al. 2022). These persons often remain displaced a very long time, and their status becomes permanent. Cohabitation between host populations and refugees can be a source of conflict due to the high demand for land for subsistence needs.

This situation impacts the surrounding landscapes. For this reason, beyond the urgent need to care for displaced people in the short term, planning should also adopt strategies to ensure the sustainability of natural resources for their longer-term livelihood needs through FLR. Faced with this major challenge, the Governing Multifunctional Landscapes in Sub-Saharan Africa (GML) project led by CIFOR-ICRAF seeks to contribute to sustainable management of wood fuel value chains in sub-Saharan Africa. In Cameroon, the focus has been on restoring degraded landscapes in sites in several communes in the East Region that are host to refugees from the CAR. Since more than 70 percent of these refugees live in local communities, outside of the officially designated camps, more than 78,000 seedlings of wood energy and/or fruit tree species were planted along the corridor between the municipalities of Mandjou and Garoua-Boulaï between 2020 and 2021. This is of course only the beginning of the FLR process: financial and technical support also need to be provided over the long term to ensure sustainability. To this end, the strategy has been to involve the stakeholders active in these landscapes, at all stages.

12.2.2 FLR strategy: the case of the Central African Republic

AFR100 proposes the Restoration Opportunities Assessment Methodology (ROAM), a guide developed by WRI and IUCN. ROAM helps to identify and organize national and regional priorities, and it proposes models with calculations of the costs and benefits of mitigation of possible carbon emissions according to the options selected by the study (Maginnis et al. 2014). Certain Central African countries now use this guide as a flexible and affordable framework to quickly identify and analyse the potential of FLR and to designate areas where there are opportunities at the national and regional levels.

In the CAR, the Ministry of the Environment, Sustainable Development, Water, Forests, Hunting and Fisheries (MEDDEFCP), in collaboration with WRI, conducted a study between 2016 and 2018 using this ROAM methodology, which led to the development of a strategy paper to guide the country's FLR policy. The paper assessed FLR opportunities for the various regions of the CAR (CAR, WRI and KfW 2017).

The initial results of the geospatial analysis of this study highlighted a great opportunity for rehabilitation, called "secondary forest restoration," on the basis of population density.

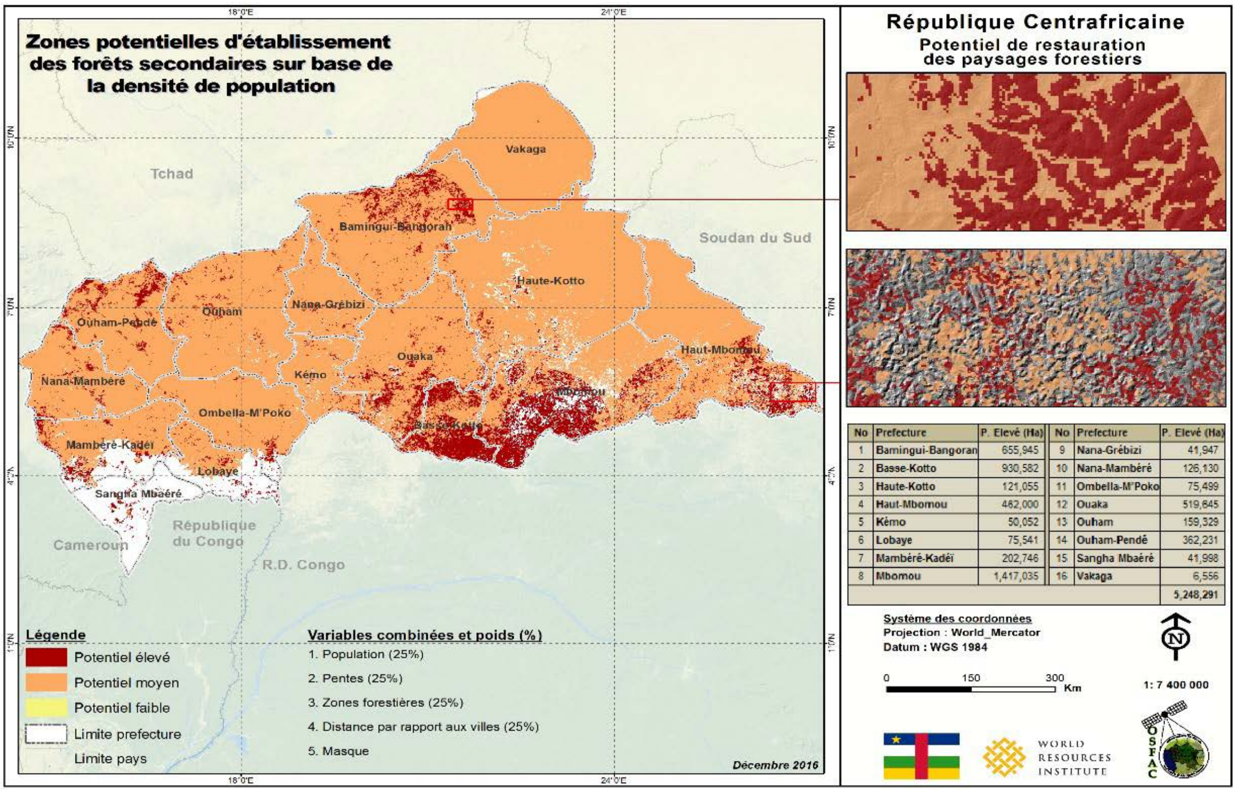

Figure 12.1: Location of secondary forest areas in the CAR on the basis of human population density.

Source: CAR, WRI and KfW 2017.

The map (Figure 12.1) shows the potential for FLR by reforestation around densely populated urban areas. The aim is to restore secondary forests through reforestation activities or through conservation of deforested or degraded areas around urban areas in the CAR.

Four key variables were taken into account to identify these potential areas: populations, cities, forest areas and slopes. These variables cover the CAR's 16 prefectures and have the same weight (25 percent) in the analyses for identifying these areas. The results of these analyses estimate that the surface areas with medium and high restoration potential are about 5 and 48 million ha respectively.

This map was produced with the purpose of directing the CAR's FLR policy towards deforested or degraded areas around urban areas via various conservation concession projects, botanical gardens and green spaces.

12.2.3 DRC: International commitments (REDD+ and CBD) and FLR

The DRC is often portrayed as a country of megabiodiversity, but the speeding up of landscape degradation there calls for more restoration efforts. The country is also committed to landscape restoration and is developing a provincial FLR strategy, which will be followed by a national strategy. Both strategies were due to be validated in June 2021.

These efforts have led to participation in international initiatives. In 2016, the DRC embarked on the process of restoring 8 million ha of degraded and deforested land as part of the Bonn Challenge.

It ratified the CBD in December 1994, the UNFCCC in January 1995, and the UNCCD in September 1997. The implementation of these initiatives has helped the country to acquire a legal arsenal on forest and biodiversity conservation. There is a very strong link between FLR and the Nationally Determined Climate Contributions (NDCs) and these other global Reducing Emissions from Deforestation and forest Degradation (REDD+) and CBD processes to which the DRC is committed.

For FLR, the national and provincial strategies under preparation emphasize the restoration of deforested and degraded ecosystems and landscapes. This restoration must be combined with other objectives, such as improvement of economic activities, food security, and people's ability to adapt to climate change and climate-mitigation projects. FLR must therefore be included into various types of development projects in order to benefit from various funding opportunities.

The provincial and national strategies are also aligned with the CAFI (Central African Forest Initiative) objectives. The objectives of the letter of intent between the government and CAFI for the 2016-2020 period were to reduce the loss of forest cover from 300,000 ha/year to 200,000 ha/year by 2020. To achieve this, several programmes were developed that would focus on the key reforms needed in land-use planning, land policy to better secure land rights in the rural sector, and investments that enhance existing actions at provincial and territorial levels in REDD+ regions.

FLR in the DRC benefits from the country's commitment in 2009 to the REDD+ process. The DRC aims to reduce national emissions from deforestation by 56 percent by 2035, in a context of sustained economic development and poverty reduction. The DRC's REDD+ strategy has identified the direct causes of deforestation and forest degradation: slash-and-burn agriculture, artisanal wood harvesting, carbonization, wood fuel, mining and bush fires. The main underlying causes include population growth, institutional aspects such as political decisions, poor governance and civil wars, infrastructure development and urbanization. In 2012, the country adopted its National REDD+ Framework Strategy, which is part of a long-term global vision for development.

This REDD+ strategy includes actions that contribute to the country's FLR. In particular, these actions include (i) the finalization and deployment of a concerted policy for the local management of natural and forest resources supported by payment mechanisms for environmental services; (ii) the rehabilitation of protected areas covering about 13 percent of national territory; (iii) extension of their surface areas to 17 percent; and (iv) the planting of 3 million ha of forests by 2025 (DRC 2012).

In 2015, the Government of the DRC adopted a REDD+ Investment Plan to mobilize the funding needed for the implementation of the National REDD+ Framework Strategy. It also established the FONAREDD+ National Fund, which received USD 200 million in financing from CAFI and other initiatives. Thanks to this financial support, at least seven REDD+ integrated programmes have been launched in the provinces (Équateur, Maï-Ndombe, Kwilou, Mongala, Maniema, and others).

These many international conventions ratified by the DRC, plus the REDD+ strategy, act as a great advantage for FLR. Policy documents are developed to help achieve the objectives set out in these conventions, in particular forest and biodiversity conservation and climate-change mitigation and adaptation. Most of them offer opportunities for financing FLR.

The DRC has developed a series of legal instruments which, if properly implemented, act as an asset for promoting FLR initiatives. These include the Law setting the general property regime and the land ownership regimes (1980); the Forestry Code (2002); the Mining Code (2002); the Law on the Environment; the Decree setting the conditions of access by local communities to forest concessions (2014); Ministerial Decree No. 026/CAB/Min/ECN-T/15/JEB/2008 setting the conditions of suspension, monitoring and evaluation of forest capital restoration interventions; as well as the Law on the Conservation of Nature (2014).

However, the DRC continues to suffer from structural weaknesses in FLR implementation. Its institutional and technical capacities are insufficient to implement an integrated and effective approach to restoration at the provincial and local levels that would make it possible to fight land degradation and achieve sustainable management. There is no mechanism for intersectoral coordination at the provincial, local or chieftaincy levels, including on the environment, agriculture, forestry, land affairs and mining.

While political commitment to FLR does exist at the highest level in the DRC, it is not currently on the provincial agenda. Despite the constitutional prerogatives and the decentralization laws that bestow power to legislate to the Provincial Assembly and to the provincial government, these latter do not make the decrees and decisions needed for natural resources.

The importance of looking for support for FLR

There has been little research in the South Kivu region in recent decades. But there are plans to develop research at the institutional level in South Kivu Province as part of the development of provincial and national FLR strategies, particularly on the following: (i) highlighting the value of indigenous species for restoration; (ii) scale-up of anti-erosion, agroforestry, and sustainable agriculture activities; (iii) more resilient and sustainable agricultural practices; (iv) the production and sustainable exploitation of wood fuel and timber; (v) the impact of artisanal and industrial mining; and (vi) sustainable pasture management.

Box 12.2: FLR and land conflicts in the DRC, the case of South Kivu Province


Photo by CIFOR-ICRAF

Land concessionaires and sharecroppers are often in land conflict. However, the majority of concessions in South Kivu Province are not developed, thereby facilitating concession-grabbing by customary chiefs.

There are a number of bodies that can take action on land management and on procedures for proving land rights. Draft edicts on land-tenure security, worked out by development partners and civil society organizations, have never been promulgated.

The environment in South Kivu is threatened by exacerbated deforestation due to logging of construction timber, firewood and charcoal. Slash-and-burn agriculture and bush fires lead to the destruction of ecosystems and landscapes there.

The resurgence of jurisdictional disputes between customary powers and the land administration is exacerbating land conflicts between municipalities. There are many such conflicts on limits, inheritances, forms of ownership, and double sales, leading to endless legal proceedings.

In South Kivu Province, the ROAM approach (see above) has made it possible to identify restoration priorities. Combined with the research results, these data provide useful information for FLR. Basic information, including maps on degradation in this province, already exists.

Within the framework of the national REDD+ strategy, plans are under consideration for relaunching research applied to deforestation and degradation linked to agriculture and other factors outside the forest sector. This is why research should be a real lever for land use and development planning, by encouraging decision makers to anticipate the impacts of their choices beyond the sector they are responsible for. This research should take into account social and environmental impact assessments of development projects. To this end, it is essential to develop partnerships between Congolese universities and international research centres, such as the programme for Reviving Agricultural and Forestry Research (REAFOR, 2006-2011) financed by the European Commission and implemented by FAO.

In its 2016 updated policy paper and national biodiversity action plan, the DRC incorporated a research strategy focused in particular on the green economy and on understanding the links between poverty, environmental degradation and climate change.

The main sources of financing FLR in the DRC

The main source of financing for REDD+ was the National REDD+ Fund (FONAREDD), with USD 200 million between 2016 and 2020. A new letter of intent between CAFI and the Government is currently under negotiation.

The Land Degradation Neutrality Target Setting Programme (LDN TSP) aims to (i) achieve 100 percent restoration of degraded land by 2030; (ii) ensure that people use all land sustainably; (iii) contribute, in doing so, to improving the livelihoods of those people; and (iv) increase forest cover by 8 million ha through the restoration of degraded forest landscapes.

There is much international support for FLR in the DRC. The National Adaptation Programme of Action for Climate Change (PANARDC) is financed by the Global Mechanism to Combat Desertification. The GEF supports the South Kivu Mountain Landscape Restoration Project and the Miombo Forest Community Management Project in Southeastern Katanga (GCP/RDC/046/FEM), and GIZ provides financial support for landscape restoration programmes in South Kivu Province.

12.2.4 FLR in densely populated countries: the case of Burundi

As early as the 1940s, the Belgian colonial administration adopted binding measures to slow down the degradation of natural forests and to develop forest heritage through State-owned, municipal and private afforestation at a rate of 1 ha per 300 households.

Following independence, Burundi decided to provide itself with a forestry policy and regulations. The country drew up its first policy paper, “Development of Burundi’s Forest Sector,” in 1969. Through it, the Government of Burundi set the national exploitation quota for natural forests at 650 ha per year and reforestation at 100,000 ha for 30 years (Département des Forêts 2012).

In 1973, the Department of Water and Forests, in collaboration with the Institute of Agricultural Sciences of Burundi (ISABU), organized the first forest symposium to work out priority orientations and actions for the development of the forest sector. Differently from the 1969 policy paper, the conclusions of this symposium deplored the damage caused by the exploitation of natural forests. Instead, they encouraged the protection of these formations and insisted – already at that time – on land use planning and the need for forest legislation.

In addition, in order to meet the ever-growing population's needs for timber for various purposes while at the same time preserving the environment, the Burundian Government initiated a huge reforestation programme in 1978. The quantitative target was to have 20 percent of national territory reforested by the year 2000 (Besse et al. 1991).

As a result of these efforts, the national forest cover rate rose from 3 percent in 1978 to 8 percent in 1992. Approximately 75,000 ha were planted during this period. However, the war that was waged in the country from 1993 to 2003 led to the degradation of forest resources; more than 30 percent of man-made formations and 14 percent of natural formations were reportedly destroyed during this period (Ndikumagenge 1997; UNDP 1996). In this way, the rate of forest cover was estimated at 5 percent in 2005.

In 2015, Burundi, with the support of the International Union for Conservation of Nature (IUCN), organized a workshop that identified the main strengths and weaknesses of the forest sector. This country has a great wealth of natural ecosystems and of plant and animal biological diversity. These ecosystems offer varied ecosystem services that contribute to the socioeconomic and ecological development of the country. They also help reduce global warming. However, these forest ecosystems – despite the advantages they generate – are under anthropogenic pressure from expansion of agricultural land, heavy reliance on wood as an energy source, bush fires and urbanization.

More broadly, as part of its FLR policy, Burundi ratified the three Rio conventions in the 1990s: the UNCCD, the UNFCCC and the CBD. The strategies and action plan developed by the country as part of the implementation of these three conventions converge on the development of the forest sector to fight land degradation, preserve biological diversity and its habitat, and promote climate-change mitigation and adaptation.

In addition, a national forest policy, in line with other national, international, regional and subregional policies, was developed in 2012. The aim of this policy is to develop and manage forest resources rationally, by increasing the proportion of forest cover to 20 percent by 2025.

A National Convergence Plan, in accordance with the COMIFAC Convergence Plan, has also been developed and implemented. It provides for regular assessment of progress made within the framework of FLR. Meanwhile, as part of the Bonn Challenge, Burundi undertook to restore landscapes covering 2 million ha in 2020.

In the past, Burundi has conducted research on erosion and restoration opportunities; these should be updated. Indeed, quantitative studies on water erosion of cultivated soils have proven that rainfall characteristics (the volume of precipitation and its intensity) are the predominant factors. Added to this is the frequency and duration of precipitation. Studies on runoff and soil losses have shown that the increase of these losses is commensurate with the intensity of climatic events, and they have revealed a certain uniformity of behaviour according to the soil. As Burundi is a highly agricultural country, the influence of cultivation practices and anti-erosion systems has also been pointed out.

The quantitative experimental study of water erosion in Burundi helped to better identify the respective shares of the various factors of erosion and those likely to reduce it significantly. For example, on bare ground, soil losses due to sheet erosion and rill erosion are very high. Many traditional crops grown in the direction of the slope cause significant soil losses, making them unsuitable for maintaining soil productivity and fertility. Vegetation cover of any kind is the main factor that considerably reduces water erosion of soils. Furthermore, improvement in anti-erosive cultivation practices (e.g., level line mounds, contour strip cropping, crop associations of different plant cycles, and live fencing on contour strips) reduce erosion and runoff by a factor of 2 to 50. Mulching completely reduces soil losses regardless of the slope. The only problem remains its availability in densely populated rural areas. Closed ditches on level lines, low walls and benches have limited effectiveness and require much work. Burundian peasants should therefore be discouraged from using them. Meanwhile, agroforestry is turning out to be useful both for biomass production and for ensuring a sustainable balance between fertility conservation and agricultural production.

Like other Parties to the UNFCCC, Burundi has committed to reducing its GHG emissions, by 3 percent from 2016 to 2030 unconditionally (by increasing its forest cover by 60,000 ha at a rate of 4,000 ha/year) or by 20 percent under condition of international aid, through (i) the reforestation of 120,000 ha at a rate of 8,000 ha/year from 2016 to 2030 and (ii) replacement, by the 2030 deadline, of 100 percent of all traditional charcoal ovens, with a view to limiting losses resulting from the production of charcoal and all traditional household cooking stoves. If the targets set by the country are met, 180,000 ha will have been gained by 2030, and the rate of forest cover will be 14.88 percent not including natural forests (Republic of Burundi 2019).

As Burundi is heavily involved in the various initiatives, national and regional policies are benefiting from regional subprojects on landscape restoration. These are the international commitments showing the interactions and synergies between the various conventions and initiatives (CBD, REDD, CCC, NAP/LCD, SDGs, Montreal Convention, Aichi Targets) and national policies (FLEGT, NEPAD, NRP, REDD+, PRSP, NBSAP, COMIFAC CP).

12.3 What kind of governance can remove barriers to FLR in Central Africa?

12.3.1 Commitments and barriers for FLR in Central Africa

As noted above, mobilization for the restoration of degraded land is gaining ground in Central Africa, and national initiatives are growing in number through the African Forest Landscape Restoration Initiative (AFR100[6]) sponsored by the African Union. Some Central African countries (see table 12.1) have made national commitments to promote integrated landscape and forest management, all through a large-scale reforestation programme (CAR, Cameroon, Burundi), but also through substantive work on soil and water resources management (Cameroon, Burundi) or by building on previous initiatives, such as REDD+ (DRC). These efforts are linked to other international commitments in the field of sustainable development, such as the SDGs, those related to forest exploitation, and the reduction of greenhouse gas emissions.

Landscape restoration is supported by many international donors, such as the AfDB, the EU, BMZ, BMU, the GEF and AFD, through various initiatives (e.g., CAFI, AFR100). Countries also contribute

6 https://afr100.org/fr

directly to this effort through their budgets, via national initiatives such as "Ewe Burundi Urambaye" and the national budget in Cameroon.

At the national level, many efforts have already been made to establish the framework of the restoration process at the scale of a large region or a country (CAR, Cameroon, Burundi, DRC). Proposals also exist to define FLR at the local level of land use planning (DRC). We can thus see a twofold movement taking shape in Central Africa: a framework for restoration at the country level in connection with land use planning in a top-down movement and, on the contrary, processes that are more bottom-up, for setting the FLR objectives at the local level (as in Cameroon). The ROAM approach proposed by WRI and IUCN helps the countries that wish to do so to achieve this national framework.

But these countries still face great difficulties in implementing their very ambitious FLR objectives. The list of barriers to this implementation is long. They are more generally linked to sustainable management of natural resources and include problems of limited capacity at various levels, particularly at the local level and lack of possibilities for individuals to change their behaviour. But the causes are above all institutional and related to non-compliance with rules and the law, the sectoral approach to rural development, conflicts of interest or land, as well as security (as in the CAR, Cameroon, Burundi and the DRC). This last cause – security – is a prerequisite for FLR, because it is difficult to think about the long term when one does not know what will happen from one day to the next. Governance has also been identified as one of the main barriers to renewable resource management and FLR.

Box 12.3: Food security and rehabilitation of Mumirwa watersheds in a rural, urban and peri-urban context: the case of the IFAD Project

The International Fund for Agricultural Development (IFAD) is making great efforts to restore forest landscapes. IFAD's main objective is to promote food security and the fight against poverty in rural areas. Since 1980, IFAD has run 13 projects and programmes, of which 8 are completed and 5 still ongoing. The average annual disbursements of IFAD's portfolio in Burundi range from USD 14 million to USD 16 million per year.

As IFAD sees it, *environmental restoration is one of the key elements in achieving good food production that can ensure food security*. This is reflected in programmes including protection of watershed soils (to preserve their fertility and to safeguard hydroagricultural infrastructure in marshes), restoration of plant cover (to preserve the water table that feeds marshes and drinking-water sources), and land cover of soil by cultivated fodder (to feed livestock).

The IFAD Transitional Programme of Post-Conflict Reconstruction contribution to FLR targets local governance issues including community development (legal and gender support, income-generating activities) and food security (seeds, fertilizers, rice, marshland development, cattle and pig farming, environmental restoration, infrastructure and health promotion).

The programme distributed 12 million agroforestry seedlings (*Eucalyptus, Cedrela, Grevillea*), 1.7 million cultivated fodder seedlings (*Calliandra, Leucaena*, Bana grass, *Tripsacum*) and 0.3 million fruit seedlings (avocado, guava and mandarin trees). More than 100,000 families have received these seedlings, and the area of protected watersheds exceeds 7,000 ha (IUCN 2015).

12.3.2 Governance to reconcile different interests

Governance is a set of elements that lie at the intersection of institutions, networks, directives, regulations, norms, policies, social practices, public and private stakeholders, and local and indigenous communities (Borrini-Feyerabend et al. 2014). All these stakeholders involved may initially have divergent interests.

Governance is central to FLR insofar as it allows for "good practices" that are crucial for local, national and regional initiatives to generate convincing results. Examples are inclusive decision-making and public participation, which enable the stakeholders concerned to take part in decision-making alongside the State (McLain et al. 2019). While there are many definitions of "governance," it could be summed up as follows in this context:

The purpose of the governance of forest landscape rehabilitation is to reconcile, within the framework of the law and the rules in use, the interests of the various stakeholders who will influence the economic development and environmental quality of the territories considered, in particular by including the local populations into the decision-making process.

This good governance includes the implementation, monitoring and evaluation of restoration methods, and it requires converting FLR into policies, programmes, and projects (van Oosten et al. 2018) and producing rules and standards that structure and coordinate it.

To generate relevant ecological, social, and economic results at various scales, FLR must be based on the determinants of its governance (Mansourian 2016; Bigombe Logo et al. 2021). These determinants include (i) relevant and adequate policies; (ii) effective regulation and coordination of implementation actions; (iii) inclusive decision-making; (iv) respect for the rights of women, local communities and indigenous peoples; (v) devolution of responsibilities; (vi) equitable access and sharing of benefits; and (vii) sufficient funding. Overall, evaluations conducted in the subregion in the past decade have called for improved governance (Yanggen et al. 2010; Hagen et al. 2011; Oyono 2015).

In terms of the governance of renewable resources, we are not starting from scratch, as concepts have evolved for at least three decades (Buttoud et al. 2016). The idea of co-management was intended to involve users – often local stakeholders – directly in the management of renewable resources, in consultation with the various levels of the State and its agencies. Co-management is a sharing of decision-making and responsibilities between the State and users. It is a strong idea that has rarely been applied in the region. Adaptive co-management enriches the idea of co-management by recognizing that the stakeholders act in complex socio-ecosystems. Also, the relationships between them must be dynamic and be able to adapt to any kind of event, such as climate change or the outbreak of a virus. Finally, the concept of multistakeholder governance (i.e., adaptive multilevel governance) further increases complexity, by integrating stakeholders at multiple levels.

FLR supposes several aspects at work: (i) bodies that work on climate change; (ii) the SDGs at international and national levels; (iii) the development goals of central or decentralized governments; (iv) stakeholders throughout value chains; (v) and local stakeholders. FLR falls indeed within the scope of multistakeholder governance.

Inclusive decision-making and its challenges

One of the challenges facing governance and landscape restoration remains the involvement of local and indigenous communities in decision-making processes. The forest landscapes to be governed and restored are located on lands whose rights have been contested between central governments and local and indigenous communities since the colonial period (Oyono 2014). In order not to exacerbate conflicts between States and their partners on the one hand and local and indigenous communities on the other, governance and FLR must be organized using inclusive decision-making processes. Participation and involvement of local and indigenous communities are widely paid lip service in speeches and documents, but rarely observed in practice. To keep up appearances, forms of involvement and participation are very often presented by decision makers and professionals as an end in themselves. However, such approaches create more problems at the local level than they solve.

Inclusive decision-making requires a consultation process in which views are shared, objectives reconciled and options for action discussed before any consensus is reached. In the reality of Central Africa, this type of process has rarely been put into practice, as it must be distinguished from mere information or consultation. In a public information meeting, information is one-way, but local administrative authorities and land investors of course mistakenly confuse such meetings with stakeholder participation. In a consultation, on the other hand, local and indigenous communities are asked to express their views freely: these latter may be taken into account or (more commonly) not. Decision makers, investors, administrative authorities and professionals often make decisions improperly, prior to meeting with local and indigenous communities. This is typically the case for projects that are discussed above all between development agencies and donors. Ultimately, consultation consists in a confrontation of points of view before decisions are taken. The resulting synthesis effort is likely to "give a voice" to local and indigenous communities. If their voices were to be heard in an FLR programme, concerted management of forest landscapes would be possible.

There is strong demand for recognition of customary land and forest rights throughout the subregion (Oyono 2014). In many parts of Central Africa, peasant farmers' most effective way of asserting their right to land is to "break the forest." This situation is a source of conflicts on land and a hindrance to FLR activities. Inclusive decision-making is a means of reducing this risk. It also empowers local and indigenous communities on their lands and makes them less vulnerable in legal matters (Oyono 2014). This is the meaning of "free, prior and informed consent" (FPIC) developed as part of the REDD+ process (Borreill and Lewis 2009). This mechanism is based on the fact, for example, that in a landscape restoration programme, local and indigenous communities, after receiving extensive information, may be free to say "yes" or "no" – without pressure or retaliation – to the request for their adherence to the process (FAO 2017). However, this crucial mechanism is slow to be institutionalized and put into practice.

12.3.3 The difficulty of coordinating stakeholders for the preservation of biodiversity

The management of a country's natural heritage cannot be limited to protected areas such as national parks and wildlife reserves, as most of the natural areas designated for biodiversity preservation, with the exception of the largest and most spectacular national parks, are not large enough to ensure the long-term conservation of all species and biological processes. Most species of mammals and birds have strong needs for home ranges and distribution areas. For their survival, it is thus essential to create and develop forest networks with zoning that includes both conservation and production areas within the extensive forest landscapes. This way, all ecological and genetic variations can be covered without neglecting marginal areas.

Sectoral management – in which everyone exploits a common good without coordination and consultation – can only lead to competition or even conflicts between users (e.g., sector against sector, upstream against downstream, protected areas against production areas, etc.) and ultimately to an unsustainable use of limited and vulnerable resources.

On the other hand, an integrated approach to forest landscapes that includes forest, ecological and socioeconomic components is seen as a prerequisite for the sustainable and multifunctional management of tropical forests at the landscape level. Indeed, the integrated approach provides the opportunity to control the impact of human activities on the connectivity between natural habitats and ecological processes throughout the landscape and thus prevent protected areas strictly speaking from becoming isolated pockets of biodiversity. The end goal is to avoid the depletion of each renewable resource and then to ensure that all management measures are integrated into the regional plan for the territory's sustainable development.

This supra-sectoral integrated management approach seeks to ensure the sustainability of natural environments by integrating them into a broader logic of land use planning and sustainable development on a landscape scale. One of its major challenges is ongoing collaboration between the various forest and hunting concessionaires, the managers of protected areas and the local populations.

However, the transformation from sectoral management of landscape mosaic components to integrated management of forest landscapes is a long process requiring a rigorous approach, a change in mindsets and a constant effort to improve strategic and operational decision-making processes. This difficulty can be seen at several levels.

At the level of institutional decision makers and government administration, there are conflicts of competences between administrations; for example, in Cameroon, the ministries of the Environment (MINEPDED), of Agriculture (MINADER), of Forests and Fauna (MINFOF), of Water and Energy (MINEE) and of Mines (MINMIDT) all work on the same aspects of the environment: soil, water and ecosystems. The actions of some constitute obstacles to the actions of others because of the lack of concerted vision. This results in contradictory authorizations being issued. Some agricultural projects, for example, do not take into account environmental requirements, let alone current forestry regulations.

Stakeholders on the ground, such as some loggers or mine operators, are taking advantage of the legal loopholes created by sectoral conflicts, which are furthering a constant and disorderly rush towards these resources. The difficulties in coordinating stakeholders for the preservation of biodiversity can only be overcome by the good governance described above. This implies that all stakeholders respect the rules that take into account the supporting capacity of habitats and the rate of natural regeneration of biological resources. Only with a critical look at the past, a clear vision of the future, and a well-defined way forward can FLR become operational and contribute to the preservation of ecosystems. There is a need for a new vision as well as for a new approach to forest landscapes linked with land use and sustainable development planning.

It is in the interest of civil society to engage in this participatory process bringing together all the representatives of the main users and managers with their partners, so as to ensure full and unreserved ownership and participation by all stakeholders. Civil society should play the role of a coordinator that further integrates local interrelationships in order to create synergies between all types of programmes that are taking place within the forest landscape in question.

Two main challenges for stakeholder coordination emerge: (a) The implementation of measures to compensate for damage to ecosystems and biodiversity. Such compensation could be demanded for pollution of water, land and air, for example, resulting from the use of pesticides, herbicides, fertilizers and other chemicals. (b) A more equitable distribution of profits, i.e., a greater share of the taxes and revenues generated on-site, should be reinvested directly into the conservation and sustainable development of production areas. This can free up financial resources that can mitigate the effects of agricultural fronts that are developing to the detriment of wooded areas.

12.3.4 The need to monitor results

The restoration of a forest landscape is a complex operation and requires constant monitoring of the ecological and socioeconomic effects. This must be done based on the initial objectives, which, depending on the circumstances, reconcile these two aspects by giving a greater or lesser weight to one or the other.

In the monitoring and evaluation of ecological effects, the actions carried out must be recorded, whether they are successes or failures. We could consider that the main criterion for an ecological assessment is how well the process of rehabilitating a degraded landscape progresses so that it reaches a stage with structures and properties similar to those of a local spontaneous forest. In this case, the indicators may be the degree to which animal populations originally home there are restocked in the rehabilitated forest. These “bio-indicator” animals serve as a “barometer” for the “health” of the forest.

At the scale of a managed landscape or a managed forest range, the restoration of ecosystem integrity and the quality of forest biotopes cannot be assessed by just the number of species or by an index of biodiversity; rather, they should be assessed by the long-term viability of forest fauna. Indications of changes in the abundance and distribution of forest animals are what are most useful for wildlife habitat restoration and natural habitat management. The purpose of monitoring the restoration results is to reveal the changes over space and time. The expanse of the distribution area, its continuous or discontinuous form, and whether or not its functional dynamics are undergoing progression or regression are relevant criteria for assessing the viability of a population and the integrity of its home range.

For example, during the restoration of a degraded forest, the planner expects a change in the composition and structure of the forest ecosystem: on the one hand an increase in the areas of “mature forest” with an almost closed canopy, and on the other a change in the structure of the undergrowth and the reduction of open land to small clearings.

A concept based on the management and monitoring of forest fauna will enable a rapid and periodic analysis of the dynamics of animal populations that act as indicators. The identification of evolving trends will make it possible to assess the impact of the developments undertaken and, even better, establish a prognosis on the probable development of the future restoration. Using such a scenario, rehabilitation measures can be continually adapted to the new knowledge acquired, in order to pilot FLR.

The minimum size of specific habitats and their connectivity are essential factors for the survival of forest vertebrate species and for the maintenance of associated plant associations. These factors are useful for monitoring the relevance of the zoning established within a forest range undergoing restoration. For this reason, the effectiveness of the mosaic of managed areas in restoring biodiversity can be assessed only on the basis of a few selected individual species, the so-called target species.

Monitoring should be accompanied by further research, the subjects and themes of which should be oriented according to the request of the managers and users of the areas benefiting from ecological restoration. Research should be seen as an ancillary aspect of monitoring and evaluation systems, through which certain trending phenomena will be analysed more in-depth than in standardized monitoring.

The monitoring and evaluation of economic and societal effects are equally important to ensure the sustainability of the FLR process. These indicators may relate to the contribution of the local populations over time to the FLR processes and, conversely, to the improvement by the FLR of those people's living environment and incomes. The support of indigenous peoples and local communities is a crucial factor for the success of restoration actions. However, it is conditional on a change in behaviour based on an effective awareness of the challenges of restoring natural environments and the benefits they can derive from enhancing the value of biodiversity. This adhesion can be achieved only through a sustained programme focused on dialogue, information, education and communication (IEC) in the various restoration zones. The main challenge of the IEC programme is to mobilize all stakeholders, including users and managers as well as the authorities, to take up environmental opportunities and problems, with a long-term vision, for the restoration and sustainability of forest landscapes.

Conclusions

FLR is rightly seen as a priority for the countries of Central Africa (Besseau et al. 2018; Begeladze 2020). Given the critical mass of threats to the health of forest ecosystems in the subregion, national responses appear robust (Begeladze 2020; Tunk et al. 2016). FLR in Central Africa, while not a completely new idea, is triggering new types of processes that build on recent climate-change mitigation efforts such as REDD+. We are at the very beginning of these processes.

In many countries, these processes are still in an initial phase, at which evaluation is not yet possible. Many country commitments and strategies have been initiated within the framework of FLR, significant funding is being put in place, and some smaller projects are already underway. There is an urgent need to establish multicriteria monitoring and evaluation systems in order to steer this rehabilitation process.

In Central Africa, implementation of the FLR process reveals a lack of accompanying research in the areas of (i) genetic resource conservation; (ii) species selection; (iii) germplasm improvement; (iv) planting techniques; (v) assisted natural regeneration; (vi) research on governance, including land-tenure issues and inclusive decision-making processes; (vii) socioeconomic research, including value chains; and (viii) innovation and evaluation processes, particularly the assessment of ecological and socioeconomic impacts. Some of this research requires long-term arrangements that are difficult to maintain in Central Africa and are very rarely funded.

Forest landscape rehabilitation relies heavily on local populations, as in many cases it involves changes in agricultural and forest resource-management practices. FLR involves investing in developmental aspects that are too costly to be borne by these local populations alone. Meanwhile, governments in the region have great difficulty in providing basic services to their people, such as infrastructure and health care, education, access to electricity and drinking water, and accessible roads.

The financing of FLR therefore relies mainly on donors and the private sector. However, most donors carry out development projects over four to five years, with performance indicators associated with these durations. As rehabilitation is a long-term process, donors must also adapt their practices. Often, they want the local population to be involved, but they are not prepared to allow for the time needed on the ground to consult them beforehand. The financing of FLR may also be based on the principle of compensation or on corporate social responsibility.

Land restoration has long been seen as a way to revitalize ecosystems and build resilience to climate change, but it can also have great economic and entrepreneurial potential. The monitoring of FLR programmes currently being implemented in Central Africa should include indicators that can inform us about these different dimensions of FLR.

CHAPTER 13

The rights of local and indigenous peoples in the light of forest and conservation policies

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Photo by Axel Fassio

Introduction

The subject of the rights of local and indigenous peoples is at the heart of the international forest resource management agenda, now more than ever (Sikor and Stahl 2011). These groups claim a set of inherent rights to enjoy land and forest tenure, to practice their cultures and to speak on the management of the natural resources around their biotopes. In response to these demands and pressure from both the grassroots and the non-governmental organizations (NGOs) that claim to represent them, the international community and many governments have put in place a range of legal mechanisms that recognize and promote the rights and duties of these vulnerable social groups in relation to biodiversity. The natural resource conservation approach – focused on promoting and respecting the rights of these groups – is, of course, one response to local stakeholders' demands for environmental justice (Campese et al. 2009).

Conscious of current shifts in the discourse in favour of recognizing and promoting the rights of local communities and indigenous peoples in forest management, Central African Forestry Commission (COMIFAC) member countries have aligned their subregional and national policies with international norms and standards by opening up forest management processes to local stakeholders. It is in this spirit that the Subregional guidelines for the participation of local and indigenous communities and NGOs in sustainable forest management in Central Africa were published and Strategic Objective 5.2. of the Convergence Plan was adopted to "strengthen the participation of all stakeholders, especially vulnerable populations, in forest management".

The rights of local and indigenous peoples can be understood as stemming from "a bundle of norms, principles and rules (bundle of rights) that constrain and direct interactions between this social group and various institutions" (Campese 2009; Schlager and Ostrom 1992). The rights currently recognized by international mechanisms – most of which are also recognized in national law – include procedural rights (participation in decision-making, information sharing, notification of decisions and other instruments, and access to justice) and substantive or fundamental rights (right to life, security of person, health, an adequate standard of living, education, development, a healthy environment, access to natural resources and benefits, free, prior and informed consent, self-determination, representation and to practice customs) (Greiber et al. 2009).

The rights of indigenous and local peoples are effectively embedded into the normative framework, at least in theory. However, an assessment conducted by the Rainforest Foundation in 2016 clearly showed that recognition of local communities and indigenous peoples' rights was declining in Central African forest management practice, particularly around protected areas (Pyhälä et al. 2016).

The “Indigènes”[1] and colonial-era forestry

Two distinct periods characterized French colonial rule in French Equatorial Africa, one before and one after the introduction of a new policy on the “native” population adopted in 1941. After the demise of African logging enterprises, ‘indigenes’ were primarily seen by French administrators as a source of unskilled labour in the forestry sector during both periods. ‘Indigenes’ were labourers (without status) initially engaged by the concessionaires to supply export markets with “rich products”, namely wild rubber (both tree rubber, *Funtumia elastica*, and vine rubber, *Landolphia*) and ivory. Rubber production was abandoned after 1920. In addition, ‘indigenes’ supported the French war efforts (World War I, and WWII) and post WWI reconstruction. British and French efforts to reach a “cordial economic agreement” with French Equatorial Africa in 1919 were not successful (Michel 1975). Similarly, French Equatorial Africa’s initial attempts to introduce horticulture and small livestock farming between 1907 and 1910 all failed. A subsequent treaty signed in 1911 led to further efforts to establish coffee, rubber, cotton, rice and cassava plantations, as well as a new forestry industry (Coquery-Vidrovitch 2001).

French Equatorial Africa slowly emerged from a period of stagnation after WWI, as a competitive economy gradually replaced the monopolies previously enjoyed by large concessionaires. New investments were made in timber, notably in okoume (*Aucoumea klaineana*) in Gabon, new agricultural crops, road and rail infrastructure, and the mining sector. All concessions remained dependent on “native” labour. Working conditions were appalling and wages did not keep pace with colonial taxation nor the inflation of import prices. Traditional food production systems were disrupted, resulting in widespread famine, revolts between 1928 and 1932, and rural exodus (Coquery-Vidrovitch 2001; Rich 2007). An anti-colonial movement led by André Matsoua established the Société Amicale des Originaires of French Equatorial Africa and sought French citizenship for the subjects of the territory in the late 1920s and early 1930s (Ansprenger 1989). The more progressive labour laws introduced in French West Africa did not extend to French Equatorial Africa (Bertin 1929).

A new policy for ‘indigenes’ was introduced in French Equatorial Africa by the Governor General, Félix Éboué, on 8 November 1941. The document was prepared for the Brazzaville Conference, held from 30 January to 8 February 1944. The conference brought together all the colonial governors and sought to realign the policies of the French colonial empire (Éboué 1941). The conference was held over two decades after Maurice Delafosse’s Native Policy for French West Africa was presented at a Franco-British colonial conference convened by the French Colonial Union in Paris in 1919. The so-called Éboué circular called for traditions to be respected, customary chiefs to be supported, existing social structures to be developed and working conditions to be improved.

Working conditions in the forestry camps did not improve significantly after 1941 (Moutangu 2013). While forced labour was abolished in the French colonies in 1946 and a new labour code was adopted in 1952 (Cooper 2018), labour-intensive methods continued to be used in the Central African Republic until 1965 (Tchakossa 2012). In 1953, 39 percent of Gabon’s working population was employed in the forestry sector (Mouloungui 2014), suggesting that wages and employment conditions for African workers had improved since the time of company concessions. Strikes did, however, take place in 1957. Conditions were influenced by the increasing mechanization of logging operations, improved road infrastructure and the adoption of new technologies (like aerial photography), giving African nationals more opportunity to develop specialized skills.

1 The term “Indigène” was used during the colonial period to refer to local and indigenous people to distinguish them from (European) colonizers and people brought in from other parts of Africa (see Bruel 1930 and Bruel 1935).

Contemporary conception of local and indigenous peoples in Central Africa

The situation of forest peoples, in particular hunter-gatherers, and transhumant and nomadic populations, such as the Mbororo Fulani herders, has raised the question of rights and a specific status to protect these populations from threats to their culture, their way of life and their territory. Despite the fact that many groups, including nomadic, herder and hunter-gatherer peoples, are highly vulnerable and extremely marginalized, the legal recognition of the status of indigenous peoples is still a work in progress in Africa. "Indigenous peoples" are often minority groups in a country who differ from the rest of the population in the historical continuity of their specific production methods or access to natural resources. A wide range of peoples are considered indigenous, including nomadic, pastoralist or herder, and hunter-gatherer peoples (International Labour Organization 2013). In Central Africa, "Pygmy" and Mbororo peoples are explicitly recognized as indigenous (see Table 13.1).

At the international level, the recognition of indigenous peoples is based, on the one hand, on the anteriority of their presence on a territory in comparison with subsequent population movements or colonization and, on the other hand, on self-identification, which is legally recognized independently of national governments (Karpe 2008). This description is however contested in many Central African countries. The normative framework for protecting the rights of communities in Central Africa does not therefore always distinguish between local communities and indigenous peoples.

In Cameroon, for example, forestry legislation does not include a clear legal definition of indigenous peoples. The preamble to the Constitution of 18 January 1996 affirms without further clarification that "the government shall protect minorities and protect the rights of indigenous peoples". The recognition of indigenous peoples and the elevation of the need to protect them to constitutional status does not, however, give any indication of how to distinguish them from other social groups at the national level. In 2021, the Cameroonian legislator further clarified the concept in Act No. 2021/014 of 9 July 2021 governing access to genetic resources, their derivatives, associated

Table 13.1: Indigenous peoples in Central Africa

Country	Indigenous peoples
Burundi	Batwa
Cameroon	Bakola / Bagyeli Baka Bedzan Mbororo
Gabon	Baka
Central African Republic	Baaka / Aka (Bayaka, Biaka) Mbororo
Republic of the Congo	Yaka
DRC	Batwa Bacwa Bambuti
Rwanda	Batwa

Source: African Commission on Human and Peoples' Rights (ACHPR) and International Work Group for Indigenous Affairs (IWGIA) (2006) traditional knowledge, and fair and equitable sharing of the benefits arising from their use. Article 7 sheds light on the legal concept of indigenous peoples: “Indigenous peoples and local communities: communities of inhabitants who rely on their traditional knowledge to obtain their livelihoods from their natural environment and genetic resources, and whose way of life is conducive to the conservation and sustainable use of the resources”. This approach differs somewhat from that adopted in international legal instruments, in particular International Labour Organization (ILO) Convention No. 169 on Indigenous and Tribal Peoples and the African Charter on Human and Peoples’ Rights. Cameroonian legislation, for example, groups indigenous peoples and local communities together rather than distinguishing them as recommended by international standards.

In the Republic of the Congo, the relevant legislation identifies indigenous populations much more precisely, but explicitly rejects anteriority as a defining characteristic. Article 1 of Congolese Act No. 5-2011 of 25 February 2011 on the promotion and protection of the rights of indigenous peoples defines indigenous peoples: “For the purposes of this Act, without prejudice to any anteriority on the national territory, indigenous populations shall mean those populations who differ from other groups of the national population in their cultural identity, their way of life and their extreme vulnerability”.

Rwanda, for its part, prefers the concept of “historically marginalized groups”. The reference to marginalization makes it possible to confer “indigenous” status on all the social groups that make up the Rwandan population. A report on the implementation of the African Charter on Human and Peoples’ Rights in Rwanda specifically highlights that: “[I]t is difficult, if not impossible, to define indigenous peoples in the Rwandan context. This is because, in view of our history and knowledge, we cannot say that any group of Rwandans is considered to have a preferential right to Rwanda on the basis of the concept of indigenous people or any other form of ownership. All Rwandans are historically regarded as indigenous to Rwanda, sharing resources, opportunities, and social and cultural values. However, it is clear from our history that Rwanda is home to communities that can be categorized as historically marginalized. This situation is a direct consequence of the self-serving policies pursued by pre-genocide regimes. Such artificial divisions are currently prohibited as inhuman and barbaric practices that belong in the past”.[2]

While countries’ national legislation appears to be inflexible with regard to their recognition of indigenous identity in respect of specific groups, governments are nevertheless relatively flexible when it comes to implementing commitments agreed with international financial institutions. For example, the World Bank accords indigenous people’s high priority in its operational policies and requires borrowing governments to comply with these policies when implementing projects that it finances (Couillard et al. 2009). By agreeing to these instruments, governments tacitly recognize the existence of a specific indigenous identity on their territory.

COMIFAC (2010) has adopted the definition laid down in ILO Convention No. 169 and World Bank Policy 4.10, which was taken up by the 2007 United Nations Declaration on the Rights of Indigenous Peoples (World Bank 2017). COMIFAC recognizes indigenous peoples as “people whose cultural and social identity distinguishes them from the dominant groups in society and makes them vulnerable in the process of development. They have an economic and social status that limits their ability to defend their interests and rights to land and other productive resources, or that limits their ability to participate in and benefit from development. They are characterized by a strong attachment to the

2 Republic of Rwanda, Ministry of Justice. Ninth and tenth periodic reports of Rwanda under the African Charter on Human and Peoples’ Rights. Period covered by the report: 2005-July 2009. July 2009. Para. 50.

territories of their ancestors and to the natural resources of these places, the presence of customary social and political institutions, economic systems geared towards subsistence production, an indigenous language, often different from the majority language, and self-identification and recognition by peers as belonging to a distinct cultural group".

Rather than focusing on anteriority, which is contested by governments, distinctness of cultural identity and self-determination, the concept of indigenousness should be considered in its broader context. In this vein, in the sense used by the African Commission on Human and Peoples' Rights (ACHPR), the question of indigenousness is of particular relevance in two spheres: human rights and the environment. According to the ACHPR, the term "indigenous peoples" has come to have connotations and meanings that go far beyond the question of "who came first". It is now a global term and movement that fights for the rights of and justice for specific groups who have been left behind by development, who are viewed negatively by dominant development paradigms, whose cultures and lifestyles are discriminated against and disrespected, and whose very existence is threatened with extinction (ACHPR and IWGIA 2005).

Defining the concept of local communities is equally complex. Karsenty (2008) has already noted the difficulty of identifying local communities, given that the concept does not define clear boundaries nor fixed rules for doing so. There are, however, some criteria that make it possible to identify local communities. They are traditional groups who, like indigenous peoples, have specific customs and beliefs, but who do not have any territorial claim linked to their prior occupation of the land. This does not prevent them from claiming specific rights over the natural resources located around their settlements. On this point, COMIFAC draws on Article 1 of Act No. 011/2002 of 29 August 2002 on the Forestry Code in the Democratic Republic of the Congo (DRC), which states: "local populations are village populations settled in forest areas, who organize their lives on the basis of custom and tradition and who are united by bonds of solidarity and kinship that underpin their cohesion and ensure their continuity in space and time".

13.1 A normative framework with room for improvement

Several legal instruments promote the rights of local and indigenous peoples, including to land and natural resources. At both the international and the regional level, the protection regime comprises both *hard* and *soft* law instruments (Siegele et al. 2009). Some of these instruments are rooted in the United Nations system and others take the form of multilateral and regional agreements.

13.1.1 International protection instruments

The legal protection of indigenous peoples is enshrined in international instruments such as ILO Convention No. 169 (1989) and the United Nations Declaration on the Rights of Indigenous Peoples (2007). The Convention on Biological Diversity also offers opportunities for the protection of local and indigenous peoples. ILO Convention No. 169 is a binding instrument that requires ratifying countries to implement specific policies and measures that respect the rights of indigenous peoples, such as self-determination, autonomy and collective land rights. The United Nations Declaration on the other hand is not legally binding. It does, however, have considerable "moral weight", though this is not sufficient to allow it to arbitrate on nor define specific rights for the whole world, at any time (Pelican 2009).

Table 13.2: Non-exhaustive list of major binding international mechanisms relating to the rights of local communities and indigenous peoples in Central Africa

	Legally binding instrument	Year signed
1	International Covenant on Civil and Political Rights	16 December 1966
2	International Covenant on Economic, Social and Cultural Rights	16 December 1966
3	International Convention on the Elimination of All Forms of Racial Discrimination	21 December 1965
4	Convention on Biological Diversity (CBD)	5 June 1992
5	Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the CBD	29 October 2010
6	International Treaty on Plant Genetic Resources for Food and Agriculture	3 November 2001
7	ILO Indigenous and Tribal Peoples Convention No. 169	1989
8	African Charter on Human and Peoples' Rights	June 1981
9	Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa (Maputo Protocol)	11 July 2003

Source: Authors

The United Nations Declaration on the Rights of Indigenous Peoples was adopted by 143 countries, including all African countries. In contrast, the Central African Republic (CAR) is the only African country to have ratified ILO Convention No. 169, which it did in 2010. The vast majority of African countries have refrained from acceding to this instrument because self-determination is such a divisive domestic issue. Moreover, national governments often prefer to avoid making binding commitments at the international level, so as to limit the delegation of their authority to other centres of power.

The Convention on Biological Diversity has been ratified by all 10 COMIFAC member countries. Among others, this Convention – in particular Article 8(j) thereof – has catalysed the claims made by indigenous peoples' organizations. Moreover, highlighting the links between these threads promotes more coordinated allocation of financial assistance. For example, the Batwa of DRC are supported by various donors, such as the European Union and Norway, through anti-deforestation, climate change adaptation and forest management governance programmes, and by the World Bank's operational policies on indigenous peoples. International organizations are also very active in this area: Forest Peoples Programme (Couillard et al. 2009), for example, is the best known and works in the area of forest management in the Congo Basin (Boutinot and Karpe 2020).

In addition to those found in international legal instruments, specific provisions for indigenous peoples are included in programmes to review land and forest law or to adopt and implement policies to combat climate change and deforestation (such as Reducing emissions from deforestation and forest degradation (REDD)) (Alvarado and Wertz-Kanounnikoff 2008). Such provisions can also be found in the rules established by forestry certifications, such as the Forest Stewardship Council (FSC) certification.

13.1.2 National protection instruments

At the national level, the need to protect the rights of indigenous peoples and local communities is consistently asserted in the forestry legislation of Congo Basin countries. Their laws formally recognize the rights of these groups to their ancestral lands. The acknowledgement of customary usage rights is often harnessed as the legal mechanism for the recognition and protection of the economic, social and cultural rights of communities. In terms of economic and social effects, such rights should guarantee local and indigenous peoples access to the resources essential to their livelihoods. As regards cultural impacts, this approach seeks to protect sites of recognized importance to the identity of indigenous peoples and local communities.

According to the Forestry Code of CAR, customary usage rights apply to forest areas and the collection of non-timber forest products. The Gabonese Forestry Code is more explicit about what is covered by the concept of traditional rights. Specifically, it permits small-scale hunting and fishing, subsistence agriculture, the use of trees for building materials, grazing and the use of water, among other activities. In Cameroon, local people's usage or customary rights are recognized, allowing them to use all types of forest, wildlife and fishery resources for personal use with the exception of protected species. The Forestry Code of DRC recognizes the existence of traditional usage rights without specifying their content. In the Republic of the Congo, Act No. 33-2020 of 8 July 2020 on the Forestry Code takes a new approach to traditional usage rights. Article 2 defines usage rights as "rights that flow from local custom or tradition that allow local communities or indigenous peoples, in a forest not belonging to them, either to harvest certain products or engage in certain productive activities, whether or not intended for sale, to meet their domestic needs". In this provision, the Republic of the Congo explicitly establishes the right to use resources for commercial purposes, whereas the trend in Central Africa is to require products collected in exercise of usage rights to be used to meet personal needs.

Our analysis of forestry legislation shows that traditional rights are characterized by their limited scope and insufficient legal safeguards. As regards the scope of traditional rights, forestry laws tend to make them revocable in practice, particularly if they are considered incompatible with sustainable management objectives. As regards legal safeguards, existing legal instruments have not delivered sufficiently robust mechanisms to ensure these rights are respected, let alone to provide remedies if they are violated. Requirements such as the obligation to consult communities, to respect usage rights when classifying forests in the permanent forest domain or to pay compensation if these rights are restricted are not subject to any penalties in the event of non-compliance (Nguiffo 2020). Given that the obligation to respect the rights of local communities and indigenous peoples is not accompanied by enforcement mechanisms, governments and concessionaires feel fairly free to disregard it (Nguiffo 2020). Legal remedies are virtually non-existent in the event that traditional rights are violated. Considering that forests are public property, over which governments exercise full ownership rights, the capacity of indigenous and local peoples to act before the courts is undermined because they are not recognized as independent legal entities.

Beyond the recognition of traditional rights, forestry codes and related legislation contain several provisions aimed at improving the consideration of local communities and indigenous peoples in forest management. As regards socioeconomic rights, forestry legislation advocates sharing the benefits derived from the exploitation of forest resources. Several mechanisms are being trialled to this end. For example, annual forestry fees have been introduced in Cameroon, a share of which is paid to local communities, and social provisions, terms of reference and local development funds have been implemented in the Republic of the Congo, DRC and Gabon. In the same vein, community forestry is gradually gaining ground in DRC, following its early introduction in Cameroon, while communal forestry is still in its infancy in the wider Congo Basin.

13.2 The mixed evolution of the rights of local communities in production forests

13.2.1 The remarkable expansion of social forestry in the Congo Basin

The term "social forestry" in this context will be used in its broadest sense. It will be used to identify both strategies to stimulate the active participation of local communities in diversified small-scale forest management activities to improve their living conditions and approaches to forest management that are socially responsible because they respect the rights of local communities and contribute to local development (Wiersum 1999).

In the second half of the 1970s, governments began to recognize that forest management had thus far been focused on serving national interests and those of western companies rather than on the needs of local communities and indigenous peoples (Barnes and Ramsay 1982; FAO 1978; Westoby 1989). The forestry sector had therefore performed poorly in terms of improving the wellbeing of people living in or around forests and had failed to mobilize local capacity to help manage forest resources effectively and sustainably (FAO 1985; Gregersen et al. 1989).

In the 1990s (and following the 1992 Rio Earth Summit), the concept of sustainable management emerged, aimed at improving the well-being of local communities, countries' economic development, forest sustainability and biodiversity conservation. Local communities are expected to be involved in the forest management process so their rights, ways of life and wellbeing are better understood and protected, and to participate in decision-making (in particular on the boundaries of the blocks allocated to them: community development areas or agricultural or human occupation blocks).

Currently, forestry concessions are managed according to the rules set out in a forest management plan, in which local practices should be recognized and protected. In practice, forest management plans set out actions in support of local communities (through terms of reference that commit the forest manager to respect communities' usage rights and to help alleviate rural poverty). In some countries, such as Gabon and Cameroon, a share of the taxes paid per cubic metre of wood harvested is also paid to communities to support their development. While local development and poverty alleviation are the purview of the public authorities, the government often withdraws from forest areas, putting a lot of pressure on private operators, which are forced to take its place (e.g. maintaining the road network, building schools and health centres).

There are often conflicts between local communities and forestry concessionaires, but also between communities, when, for example, the financial income from logging is not distributed equally by the local authority (Cerutti et al. 2010; Eteme 2015). Conflicts in forestry concessions are likely linked to the reduction in the area dedicated to subsistence agriculture (even where management plans provide for the designation of areas for these activities: community development areas and agricultural blocks) and traditional hunting and gathering, as well as to weak compliance with social provisions (Buttoud and Nguinguiri 2016; Collas de Chatelperron 2005; Tsanga et al. 2020).

Over recent decades, social forestry has been adopted as a new forest management strategy aimed at improving the livelihoods of rural communities (Lacuna-Richman 2012; Moeliono et al. 2017; Sunderlin 1997; Westoby 1989; Wiersum 1999). Social forestry promotes forest management activities that involve local communities, who take on some responsibility for forest management and benefit directly from their own efforts (Djamhuri 2008; Lacuna-Richman 2012; Moeliono et al. 2017; Von Stieglitz et al. 2001; Wiersum 1999). It is an approach that allows customary knowledge, rules and institutions to be harnessed by integrating them into the management standards, at least to some extent.

Since the 1990s, the discourse and thinking on social forestry has advocated the devolution and decentralization of forest management with a view to ensuring the sustainability of natural resources and alleviating rural poverty. Devolution strives not only to reduce bureaucracy, but also to empower local communities and drive socioeconomic development through community participation in forest management (Arnolds 2001; Larson and Soto 2008; Mayers and Bass 1999; Oyono 2005). These developments in forest management have led to the emergence of three approaches to the implementation of social forestry in Central Africa:

1. Tree harvesting in agricultural areas where landowners (often "informal" or customary) are provided economic incentives, like a guaranteed market and price for the wood produced (Buttoud and Batunyi 2016; Marien et al. 2013). This model is not, however, widely implemented in Central Africa and where forestry legislation does provide for this model, there is a lack of willingness to take advantage of it (Marien et al. 2013; Megevand et al. 2013; Place et al. 2012; Tchoundjeu et al. 2010). In practice, these permits have mainly served the interests of ill-intentioned artisanal and industrial operators seeking to harvest wood fraudulently.
2. The joint management of public woodland with local stakeholders who receive a predefined quantity of the product harvested or other benefits, either free of charge or at an agreed price (Brown 1999; Chambers and Thrupp 1994; Fisher 1995). In Central Africa, this approach mainly involves engaging local communities in managing forests in the permanent domain, in the form of communal forests[3] managed by communal authorities or decentralized bodies.
3. Community forestry, which focuses on local communities as the main stakeholders that can ensure the sustainability of forest management. Under this management model, the processes and mechanisms employed must allow those directly affected by the use of forest resources to be involved in decision-making on all aspects of forest management (Hoare 2010; Larson and Dahal 2012). Community forests offer the best example in the Congo Basin of the comprehensive decentralization of forest management to the local community (Diaw et al. 2016; Julve 2007; Oyono et al. 2006).

The implementation of social forestry is currently facing a number of difficulties. An inclusive process was launched in September 2017 to remove the main barriers that prevent it from being effective. The solutions proposed were the subject of broad consultation. The outcome of this collective effort is set out in a policy document entitled "Brazzaville Roadmap for more effective participatory forestry in the context of the 2030 Agenda". To enable participatory forestry to reach its full potential and be more effective, the Brazzaville Roadmap proposes eight priorities built around four key areas: vision, institutions, support for local and indigenous communities, monitoring and adaptive management.

To this end, governments were invited to (i) make policy choices explicit by clearly defining the objectives of participatory forestry in relation to the environment (natural capital) and to improving livelihoods (social/institutional capital, financial capital); (ii) create an institutional,

3 For a critical appraisal of Cameroonian communal forests, see, for example, Poissonnet and Lescuyer (2005) and Ndangang (2008).

Box 13.1: Barriers to more effective participatory forestry

Jean-Claude Nguinguiri

Policy, regulatory and institutional frameworks are still incomplete, complex and sometimes inadequate, creating an environment that is not conducive to the realization of the full potential of participatory forestry.

Some countries do not yet have formal mechanisms for recognizing rights or for transferring rights and management responsibilities to indigenous peoples and local communities. This results in confusion over the type and nature of their forest land rights.

Community forests are the basis of the most common form of participatory forestry. The exclusionary nature of the model as it is currently implemented prevents it from being applied in areas where there are overlapping rights and uses, including on land traditionally recognized as indigenous peoples' and local communities' within forestry or industrial agriculture concessions, mining areas or where there are oil and gas wells.

Government support for indigenous peoples and local communities is weak, several countries do not have participatory forestry units, and human resources and technical expertise are inadequate.

In the absence of information on the effectiveness of participatory forestry, governments struggle to tailor their policy choices in view of lessons learned.

The entrepreneurial and managerial capacity of local communities is still weak and access to investments, markets and therefore to improved financial capital is limited.

Most countries do not make good use of the Sub-regional guidelines for the participation of local and indigenous communities and NGOs in sustainable forest management in Central Africa.

legal and regulatory environment favourable to participatory forestry; (iii) ensure adequate support from government technical services and civil society; and (iv) periodically assess the scale and effectiveness of participatory forestry.

13.2.2 The mixed record of community forestry

Although community forests are provided for in the legal frameworks of all Congo Basin countries, few have been established and implementing them effectively remains a challenge in most countries (Beauchamp and Ingram 2011; Cerutti et al. 2010; Julve Larrubia et al. 2013; Lescuyer et al. 2019).

While, in theory, community forestry has the potential to drive local development, advances in the normative framework are hampered in practice by the complexity and cost of allocation and implementation procedures. It follows that, under current arrangements, not only are community forests not profitable, but they also facilitate the conduct of illegal activities (Cameroonian community forests are widely suspected of being used as a cover for illegal logging).

Table 13.3: Local socioeconomic impacts of decentralized forest management via community forests

Community forestry assessment criteria	
Involvement of local people in forest management	
Respect for customary usage rights and participation of rural communities in the choice of species and logging areas.	Certain customary rights may be provided for in simple management plans, but their approval ultimately depends on the forest administration responsible for endorsing the management documents (Lescuyer 2006).
Participation of rural communities in logging activities	The logging operations in most community forests are subcontracted to a forestry company (Cuny 2011).
Compliance with agreements entered into by loggers with the local population	Recurring conflicts between customary rights holders and community forest managers (Ezzine de Blas et al. 2009; Oyono 2004, 2005).
Local socioeconomic development	
Employment	Very few permanent jobs
Rural incomes	Incomes from forestry are low once distributed among community members (Beauchamp and Ingram 2011; Cuny 2011; Lescuyer and Essoungou 2013).
Essential needs	Few investments funded by forestry revenues (Cuny 2011; Ezzine de Blas et al. 2009; Lescuyer et al. 2006).

Sources : Authors

An evaluation of 30 community forests in Cameroon highlighted the difficulty of complying with the requirements of the legality grids agreed as part of Voluntary Partnership Agreements (VPAs) under the EU Action Plan for Forest Law Enforcement, Governance and Trade (FLEGT) and of ensuring the traceability of the products harvested (Fomou et al. 2017). Community forestry was slower to develop in Gabon (Vermeulen 2008). The number of community forests remains low and practices in the vast majority of them are not legally compliant. In CAR, there has only been one attempt to set up a community forest. The initiative was later abandoned because the project was located in the production block of an Exploitation and Planning Permit (PEA) concession and was in fact unlawful. In the Republic of the Congo, community forestry legislation was only adopted recently and has not yet been implemented. In DRC, around 100 local community forestry concessions[4] have been awarded over considerable areas in recent years, but almost all depend on external technical and financial support and it is still too early to judge the success of this model, which is very different from others, whose predicted limitations have yet to be proven (Vermeulen and Karsenty 2016).

Data collected over the last decade, mainly in Cameroon, show that this form of logging has produced mixed results when assessed against the key aims of social forestry.

13.2.3 The complexity of implementing traditional usage rights

The adoption of the industrial forestry concession model at the beginning of the 1990s did not fundamentally challenge the usage rights of local people, but did limit them to subsistence practices. Commercial exploitation and deforestation were not permitted, nor therefore was slash and burn agriculture. The rights of indigenous peoples and local communities are recognized and guaranteed

4 See, in particular, Vermeulen and Karsenty (2017) and Lescuyer et al (2019) for a description of the type of community forestry specific to DRC.

within forestry concessions based on this narrow conception. The exercise of traditional rights is therefore compatible with the establishment of forestry concessions, but only to a limited extent.

Implementation is proving to be a challenge, as the legal arrangements applicable to usage rights often clash with the legitimacy of local practices. Under current arrangements, the exercise of traditional rights within concessions varies widely between sites. When certified concessionaires strictly enforce the regulations, for example by working to prevent commercial hunting, this is often perceived by local communities as infringing on their usage rights even when the practice in question is unlawful. This results in a paradoxical situation in which local communities perceive their ability to exercise their usage rights in unmanaged or managed concessions favourably because there is little to no regulation of illegal activities (Cerutti et al. 2017).

Conversely, certified forestry concessions are considered to hinder the exercise of traditional rights when managers work to stop practices considered illegal, even if they are merely applying the rules laid down by the government (see Figures 13.1 and 13.2). It should be noted that the interpretation of usage rights is particularly narrow with respect to hunting. For non-timber forest products, interpretations are less well defined: the collection of non-timber forest products for commercial purposes is permitted in certified forest management units, but the harvests must be sustainable, a requirement that is very rarely checked in practice. In any event, it is the responsibility of governments to address the continuing tension between sustainable development objectives and guaranteeing the traditional rights of local and indigenous communities. The new Forestry Code of the Republic of the Congo clarifies the scope of traditional rights in the country, based on an old Gabonese regulation. Article 61 of the Act allows for products obtained in exercise of usage rights to be sold at the local level. While the products covered and the arrangements for their sale are yet to be specified, this is a clear extension of usage rights.

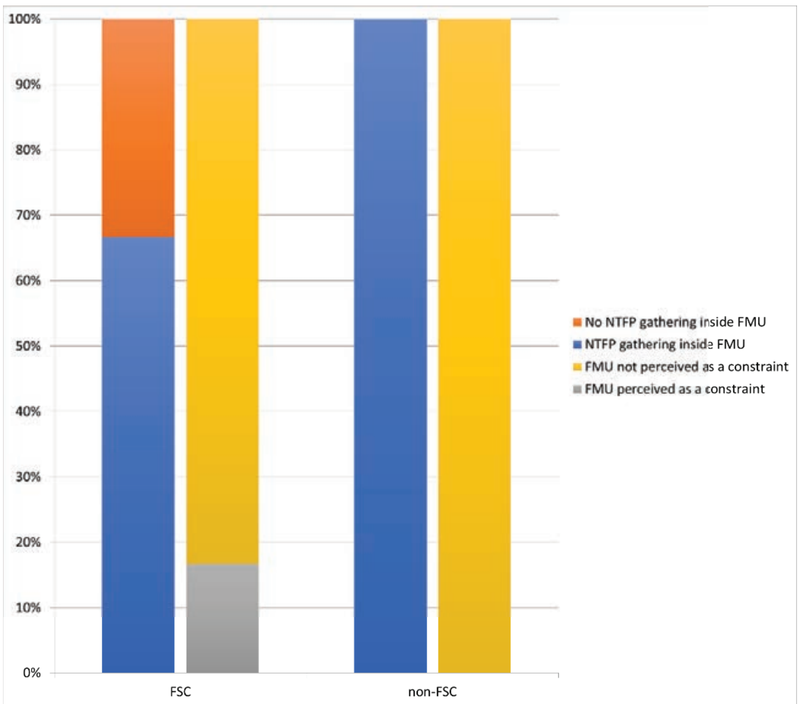

Figure 13.1: Forest management units and the collection of non-timber forest products (Cerutti et al. 2014)

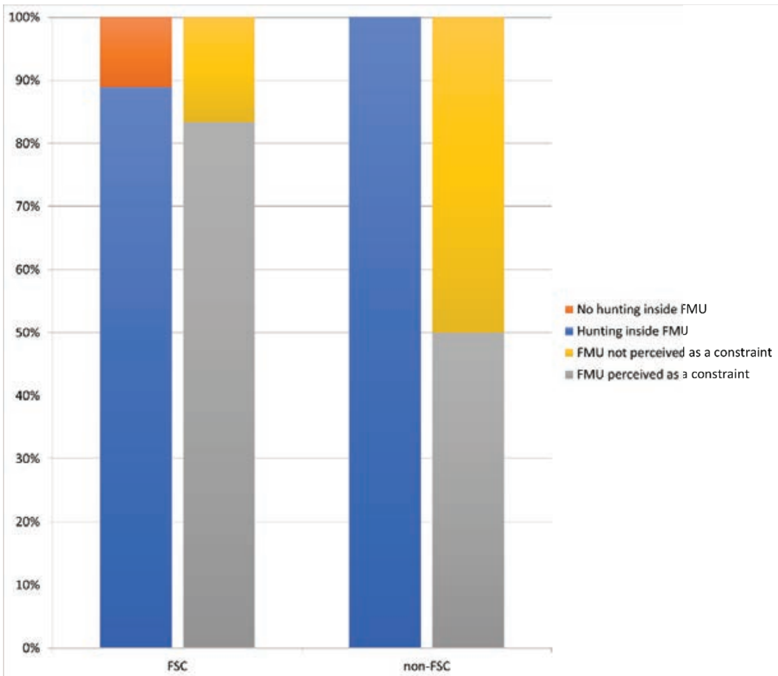

Figure 13.2: Forest management units and hunting practices (Cerutti et al. 2014)

13.2.4 The contribution of logging to local development

In Central Africa, logging is considered one of the main sources of employment in rural areas, contributing directly and indirectly to higher incomes for local and indigenous communities (Lescuyer et al. 2015). As regards poverty alleviation, given that governments often struggle to invest in local development and reduce poverty, various mechanisms have been developed to redistribute the proceeds of industrial logging. These mechanisms take the form of social provisions or local development funds to which companies are required to contribute. Companies may also be required to share the proceeds of forestry and industrial operations through the payment of fees.

Job creation at the local level

In many countries in the Congo Basin, the oil sector is the main contributor to gross domestic product (GDP). In Equatorial Guinea it accounts for 90 percent of GDP, in Gabon for 42.4 percent and in the Republic of the Congo for 64 percent. When compared with the oil sector, the economic weight of the forestry sector may seem low, accounting for 4 percent of GDP in Cameroon, 6 percent in Gabon, 5.6 percent in the Republic of the Congo, 0.2 percent in Equatorial Guinea and 1 percent in DRC. However, this seemingly limited contribution to national economies should be considered in context: the forestry sector is often the second largest contributor to GDP and export earnings and it creates many jobs, a large share of which are in rural areas.

Logging has therefore bolstered various forms of employment in rural areas. In places where the government is often absent, forestry companies often emerge as the sole source of paid employment. Indeed, a substantial proportion of these jobs are held by people from villages bordering logging areas, although, in most cases, they are low skilled (Cerutti et al. 2014; Tsanga et al. 2020).

In addition to industrial logging, the informal artisanal subsector, which is experiencing significant growth in Congo Basin countries, also creates many jobs in rural areas. This subsector has created an estimated 40,000 jobs in Cameroon, 3,000 in Orientale province in DRC, and 2,000 in the Republic of the Congo (Cerutti and Lescuyer 2011; Lescuyer et al. 2011, 2014). The jobs are generally low skilled and most are for labourers, sawmill assistants or machine operators. These jobs are also essentially temporary in nature, given that they are tied to the relatively short period of production operations.

Funding for community-interest projects

Local development funds are innovative mechanisms for local development that bring together local and indigenous communities, local authorities and the private sector (Mbete et al. 2021). Local development funds were first institutionalized in the late 1990s by the private sector and involved sharing the proceeds of forestry operations with communities whose borders lie at least in part within the concession area (Nguimbi et al. 2010). This practice would go on to be adopted into Gabon's forestry legislation, and later into that of DRC and the Republic of the Congo. Local development funds are built around two foundational principles: (i) forestry companies must contribute a predefined amount to a fund managed by village associations and (ii) the funds obtained must be used to finance community projects identified by local communities and indigenous peoples. The amount of the levy varies from country to country and depends on the annual production and/or commercial value of the species harvested, i.e. XAF 800/m^3 in Gabon, XAF 200/m^3 in the Republic of the Congo and USD 2-5/m^3 in DRC.

The amounts allocated to these redistribution mechanisms can be substantial. Four companies with certified forest management units contribute an estimated average of EUR 55,000 each per year, around EUR 56 per person living around their forest management units (Cerutti et al. 2014). These are sizeable amounts, especially in rural areas where the majority of the population lives below the poverty line.

The social provisions applied in DRC follow a similar trend. Over the past 10 years, forestry companies have contributed approximately USD 7.8 million to the local development funds of 24 concessions. These funds have made it possible to carry out several community-interest projects in the areas of education, health, village water supplies and improving road infrastructure (Tsanga et al. 2022).

There is still a gap between theoretical production forecasts and the amount actually transferred to local communities. One reason for this discrepancy is the reality of logging in the Congo Basin, where the actual volumes logged rarely reach the levels predicted. Before they begin their logging operations, concessionaires conduct inventories to identify all species of commercial value. However, international tropical timber market conditions and various technical barriers at the cutting stage can prevent the entire available volume from being harvested (Tsanga et al. 2017). Another key explanation for this discrepancy relates to the reliability of the production figures reported.

The relevant regulations do not oblige private companies to allow communities or civil society to verify their declared volumes, which can be problematic.

While local development funds have certainly made it possible to carry out many social infrastructure projects, evidence of whether they have improved the living standards of local people is still anecdotal. These mechanisms only produce tangible results in certified forestry concessions and a minority of managed concessions. Some companies do not fulfil their social obligations and, where they do implement the required mechanisms, communities rarely receive the full amount of funding expected (Tsanga et al. 2020). Indeed, the management bodies responsible for local

Table 13.4: Funding for social provisions in DRC: Forecast and actual amounts, 2015–2020 (24 concessions)

Year	Forecast amounts	Amounts invested	%	Gap (USD)
2015	5,677,878	2,067,007	36	3,610,871
2016	2,902,490	1,616,219	56	1,286,271
2017	5,892,046	2,466,632	42	3,425,414
2018	325,552	217,782	67	107,770
2019	2,027,252	350,766	17	1,676,486
2020	3,497,149	1,091,631	31	2,405,518
Total	**20,322,367**	**7,810,037**	**38**	**12,512,329**

Source: Tsanga et al. (2022)

development funds often replicate poor governance practices at the local level, including poor project identification, misappropriation of funds, diversion of equipment and overcharging for projects (Tsanga et al. 2017).

The success of local development depends primarily on the government. When its sovereign functions are transferred from public authorities to private companies in the forestry sector, questions arise about legitimacy and the capacity of such companies to perform this role. This transfer of responsibility brings to mind the “state within a state” phenomenon – when governments transfer their sovereign powers to the private sector –, which has already been observed in several Congo Basin countries. It is not clear whether the private sector has the expertise to manage complex development problems when the government itself has been largely unsuccessful (Cerutti et al. 2017; Tsanga et al. 2017).

The relative impact of forestry licence fees on local development

Forestry licence fees are one of the key innovative mechanisms for redistributing a share of the revenues from industrial logging to local stakeholders like municipalities and communities neighbouring concession areas (Bigombe Logo 2003; Topa et al. 2009). This approach aims to bolster local development funding and reduce rural poverty. However, several assessments of this mechanism and its effects on local development in practice have found that it is relatively ineffective and inefficient, and it has proven to be inequitable (Assembe-Mvondo et al. 2015; Cerutti et al. 2010; Oyono et al. 2009). Indeed, in a context characterized by systemically weak governance, a predatory political and administrative elite has co-opted the stated objectives of this mechanism.

13.3 Outlook for the rights of local and indigenous communities in production forests

13.3.1 Outlook for community forestry

In the wake of the 1992 Rio Conference, community forestry emerged in the Congo Basin as an “unidentified forest object”. This forest management model is the direct product of international processes and a modest offshoot from the industrial concession model. In its current configuration, community forestry is characterized by formal management, boundaries not tied to customary boundaries, an institutional structure not suited to local governance structures and weak financial viability.

Despite these challenges, community forestry remains a potentially attractive way to include indigenous peoples and local communities in domestic wood value chains. The African construction sector is forecast to grow significantly by 2050, by which time the continent is expected, according to the United Nations, to have a population of around 2.5 billion. Over the same time period, the population of the Congo Basin is expected to more than double to approximately 274 million people (UN-DESA 2017). Population growth on this scale will lead to significant demand for housing in urban and rural areas by 2050, 80 percent of which has not yet been built (World Green Building Council, Africa Partners 2020). The predicted boom in the construction sector is a major opportunity for job creation, the development of new skills and sustainable growth through greater use of wood as a construction material (World Green Building Council, Africa Partners 2020). The materials most commonly used in the African construction sector today (iron and cement) account for an average of 11 percent of emissions (Vussonji and Makeka, 2021). Wood can be used as an alternative to these traditional materials to reduce emissions from the real estate sector, provided that the wood comes from legal and sustainable sources, which is very rarely the case.

Community forestry could play a major role in this segment of the market. The aim here is not to satisfy demand for wood from urban Central African markets in its entirety, which would be unrealistic considering the volumes consumed, but to position the wood produced by community forests in existing market segments that are concerned about the legality and sustainability of products (Lescuyer et al. 2016). Whether this is feasible depends on the limited technical and financial capacity of local and indigenous peoples. As a start, governments will have to overhaul existing legal frameworks to address the triple challenge of access to legal status, profit margins and the low sensitivity of national markets to questions of sustainability, and finally issues around the legality of timber sources.

The revision of legal frameworks in the context of VPAs offers opportunities to improve the legality and traceability of the products produced by this sector and to increase their presence on national timber markets. Legal reforms must therefore be accompanied by concrete measures to transform national demand for timber. One notable development on the path to improving the legality of timber on national markets is the decision taken by the Government of Cameroon in 2020 to require project managers to source legal wood for public construction projects.

While individual public bodies consume relatively little wood, this measure could influence the behaviour of other actors, particularly those in the private sector (Lescuyer et al. 2016; Tsanga et al. 2020b). This could be achieved in several ways, as described below.

Make existing community forestry more credible

To improve the credibility of community forestry it will be necessary to substantially improve governance (Fapa Nanfack et al. 2019). This will require the effective enforcement of existing laws, anti-corruption efforts and the development of technologies to combat fraud.[5] Initiatives do already exist to teach communities how to detect and document cases of illegality themselves. This type of

5 Such as the traceability of products from community forests with the support of those allocated the forests. See, in particular, Fomou et al. (2017): http://communitytimbertracks.prosyjob.co/wp-content/uploads/2018/12/Rapport-de-letude-SVCL-6.pdf.

approach is a step in the right direction, as it empowers communities and reduces their dependence on the government and civil society (Same et al. 2013).

In the Republic of the Congo, ad hoc initiatives have attempted to align customary rights and titles (community forest areas). Other civil society actors advocate approaches focused on developing a business and economic model that supports communities to “formalize and professionalize their business activities sustainably and thereby improve the livelihoods of small and medium-sized forestry businesses.” On this point, all initiatives aimed at training and empowering communities, particularly in relation to their economic capacity, are worthwhile. Better market integration, market information and access to finance are also crucial (Beauchamp and Ingram 2011), as is greater collaboration with major forestry concessions and capital investment (Minang et al. 2019).

Strengthen the position of community forestry in international processes

Efforts to link community forestry to emerging processes rooted in international commitments on climate change and deforestation are attracting growing support from NGOs and international organizations. The Paris Agreement adopted under the United Nations Framework Convention on Climate Change (UNFCCC), for example, emphasizes the role of sustainable forest management and anti-deforestation efforts in nationally determined contributions (NDCs). Considering this, community forestry has been incorporated into NDC mitigation measures submitted by Cameroon and CAR (Nkuintchua 2018).

Many studies have also analysed the potential of community forestry under REDD+ in relation to sustainable forest management, conservation, reducing degradation and increasing carbon stocks. Clarifying and securing land rights – key elements of REDD+ projects, alongside livelihood benefits, income generation and job creation (Bernard and Minang 2019) – can support effective community forestry.

Community forests are covered by VPAs and are required to ensure the legality of their timber production, which they struggle to do, particularly in Cameroon. Simplifying the relevant regulations and building community capacity are essential if these forests are to become a legal source of timber for the national market (Julve et al. 2013) and the VPA process to have positive knock-on effects.

Moreover, several Central African countries have joined the African Forest Landscape Restoration Initiative (AFR100), which aims to restore 100 million hectares of deforested and degraded landscapes on the continent by 2030. This mammoth effort will depend on the participation of local communities, but initiatives are still at too early a stage to make any assessments and what place community forestry will have in the process has not yet been clarified.

Finally, providing incentives for the creation of commercial value chains for community forestry products is one way to ensure the sustainability of community forestry (Meier-Dörnberg and Karmann 2015). In particular, the Forest Stewardship Council (FSC) and Fairtrade have partnered to ensure that access to certification and its benefits are accessible to small-scale foresters and community forests. Programmes have been set up for small-scale foresters seeking to develop rational long-term management practices. These programmes propose measures to reduce costs and improve their market access. However, this approach is far from straightforward and has not yet been trialled in Central Africa. All initiatives seeking to anchor community forestry in international processes bolster its credibility and may one day contribute to the development of alternative sources of income for the communities involved.

Review the normative framework

The overview presented above highlights the mixed results of community forestry in the Congo Basin over the past 20 years. The first forestry laws governing community forestry were the subject of criticism on several fronts: they were seen as over restrictive, in that they did not allow for genuinely inclusive management, they only granted limited rights to the community allocated the forest and they limited where community forestry could be carried out (Cuny 2011; Julve 2007; Vermeulen et al. 2006). While not directly related to the normative framework, other problems like corruption and misappropriation in the management of community forests, as well as the top-down approach to local development assistance, have hampered the initial efforts and dampened early enthusiasm for this approach (Joiris et al. 2014). Reconsideration of these issues, driven by the advocacy efforts of civil society, have on occasion led to these laws being revised, with the participation of civil society, local and indigenous communities and the private sector, to improve the equity and effectiveness of forest management.

DRC offers a case in point. Community forestry was gradually formalized through a participatory system that was unique in the region. The resulting local community forestry concessions grant ownership of land to local communities in perpetuity on the basis of custom. They allow for multiple uses of the forest as a space within which several socioeconomic and environmental activities can take place (Vermeulen and Karsenty 2016). This approach has made it possible to move beyond the myopic focus on silviculture and timber sales seen in the community forestry models adopted in other countries (Billiard 2019), to the detriment of the actual development needs of the community.

All countries would benefit from and should follow this new approach to community forestry that seeks to secure access to resources and their sustainable management, that promotes greater recognition of customary law as underpinning community forestry, that has more flexible governance structures better suited to Central African societies and that is complemented by a favourable tax regime. Any changes should be made through inclusive processes, avoiding the pitfall of "piling rules atop rules" and "complexity on complexity" (like the revision of the manual of procedures for allocating and establishing management rules for community forests in Cameroon). Governments must therefore have the courage to review these texts in depth.

Furthermore, as highlighted in the paragraph on the Brazzaville Roadmap, most countries do not yet have formal mechanisms for recognizing rights or for transferring rights and management responsibilities to indigenous peoples and local communities. This is another vital area where countries are encouraged to make progress.[6] The need to promote and secure the rights of communities is acknowledged in various international and national texts adopted by Central African countries, which pay particular attention to the recognition of customary land rights (Billiard 2019). For civil society, formal recognition of communities' customary land rights could contribute to forest conservation and local livelihoods, but is also a question of social justice, especially in cases where communities managed the forest long before the government claimed ownership of it (RRI 2017). However, the recognition of customary rights comes with its own issues, namely that customary law in Africa favours elites and discriminates against women (Kenfack Essougong et al. 2019; Kusters and Graaf 2019), indigenous peoples and migrants (Vermeulen and Karsenty 2017).

6 See, in particular, the Mapping For Rights programme: https://www.mappingforrights.org/

Social forestry as the overlapping of uses and rights

The overriding aim of guaranteeing the rights of local and indigenous peoples to forest land is to prioritize their allocation of areas over which they have exclusive rights, possibly accompanied by ownership rights over the land. Community forestry epitomizes this exclusivity of land rights in that it rejects the intervention of any other actors in areas assigned to this form of forest management. This follows a similar logic to industrial forestry concessions, in which third parties are not permitted to intervene beyond exercising usage rights. The forestry sector in the Congo Basin is therefore characterized by the division of forested land into mutually exclusive areas. Recent developments in community forestry and the forestry concession model do, however, suggest that the "exclusive rights" approach to forested land is coming to an end.

It is therefore now time to rethink the forest governance model to focus more on coordinating the various possible uses of the forest at the forest block scale and less on the separation of areas (Karsenty and Vermeulen 2016). With regard to social forestry specifically, securing the rights of communities and ensuring the development of economic activities does not necessarily imply ownership of the land or the right to exclusive use. Karsenty and Vermeulen (2016) propose a "Concessions 2.0" governance model that allows spaces and uses to overlap and the joint development of economic activities by local populations and concessionaires via a joint decision-making platform.

A new model of community forestry for the future

Despite widespread rhetoric of community empowerment and participation, community forestry is often promoted from the top down by organizational stakeholders (often funders) who impose their own values and sophisticated management tools (Hajjar et al. 2013; Maryudi et al. 2012; Pokorny et al. 2010). A bottom-up approach that takes into account the current needs, wishes and realities of communities can produce support systems that are better designed than those imposed from outside (Hajjar et al. 2013; Malla et al. 2003; Thoms 2008).

After 20 years of experimentation, we need to replace the existing conceptual model – which is focused on transformation and built around an idealized vision of what community forestry could achieve– with an approach based on local knowledge and the actual practices of the local people.

The proliferation of local institutional arrangements also runs the risk of being poorly understood and considered unnecessary by the communities themselves. Efforts to improve the governance of shared forest resources could be a case of "supply without demand": the governance gap that community-based resource management seeks to close is not necessarily experienced as such by the communities themselves, especially if the governance practices proposed fail to reflect communities' way of life and knowledge. A more pragmatic approach would be to define some broad governance principles for community management, allowing each community to choose its own criteria for implementing them. Under the new model, community forestry would become a financially viable option for communities and reduce the cost of institutional procedures and institutional arrangements (Lescuyer et al. 2019).

As regards financial sustainability, there is consensus on the need for start-up support from governments and other partners in the form of seed capital, access to subsidized training and technical assistance, and support to navigate complex bureaucratic systems (Humphries et al. 2018), without communities becoming reliant on this support as a form of income. Secondly, it is crucial to analyse how local production systems can be integrated into sustainable and profitable value chains (Ezzine de Blas et al. 2009). Thirdly, conducting an analysis of potential financial performance before launching a project would prevent communities and their partners from attempting to conduct activities that will not prove profitable in the medium term.

Considering the costs involved, community forestry will only thrive if there are pragmatic and cost-effective ways to exploit forest resources. Conversely, the overall impact of community forestry on local livelihoods will be limited as long as communities have to bear the exorbitant cost of creating and managing a community forest. The cost of establishing and operating a community forest is largely attributable to the various committees that must be established in the community to manage this system. In DRC, for example, the level of bureaucracy required by local community forestry concessions exceeds that required in other Central African countries, where organizational difficulties are already a major weakness (Karsenty et al. 2010, unpublished manuscript). These regulatory provisions are generally justified by the desire to avoid decentralization being abused by external public or private actors to misappropriate the profits derived from the exploitation of forest resources (Jacquemot 2010). However, the complexity of local institutional arrangements undermines the effectiveness of this approach, forcing a significant share of revenue to be spent on maintaining the institutional system at the expense of investments for the well-being of the community, without even preventing misappropriation by elites.

These costs are now borne almost entirely by external donors. Unless national regulations are simplified, this dependence on external funding will prevent most rural communities from engaging in community forestry and could encourage illegal practices to cover these costs, as experience in Cameroon has clearly shown (Cuny 2011; Lescuyer et al. 2016).

13.3.2 The future of social forestry

The Brazzaville Roadmap highlighted the need to pilot new models of social forestry, beyond the classic “community forestry” model. Some avenues have not yet been explored, or at least not in detail, in relation to (i) co-management arrangements (participatory forestry at the household level, at the extended family level or at administrative levels other than the municipality or central government), (ii) participation arrangements (greater sharing of management and, above all, of the decision-making process), (iii) more rights to land or the financial viability of the arrangements envisaged. Other new models have been proposed (Vermeulen 2017; Vermeulen and Karsenty 2016), including the “household agroforestry” model. Given that households are the main unit responsible for slash and burn agriculture (a major cause of deforestation and degradation in many places) and that they have the right to claim customary land rights (the right of the axe), it would make sense to develop a specific type of participatory forestry for households. The idea would be to prevent land saturation and permanent clearing of forest cover by assigning certain households the rights to sufficient space to guarantee their long-term access to a mosaic landscape typical of shifting agriculture (fields-forest fallow-secondary forest) and the many goods and services it provides. Household agroforests could cover an area of 25 ha per household, as a single unit, within a radius of 5 km around villages, that cannot be transferred outside the household and must be bequeathed as a single unit (to avoid future fragmentation). These areas would provide land for growing cocoa, coffee and food, and for forest fallows. A minimum level of forest cover would have to be maintained (around 50 percent) and all products, including those resulting from improvements to the land, would be the property of the household. This would offer a form of “quasi land title”, conditional on maintaining productive mixed forest cover. The timber could be harvested using traditional methods, as a private enterprise, with an annual quota.

Household agroforests are just one example of how the concept of social forestry could evolve. We have chosen this model to illustrate this point primarily to demonstrate that we need to be inventive and bold to reinvigorate communities' participation in forest management, by offering new opportunities with the aim of finding innovative solutions for the benefit of local communities and indigenous peoples.

13.4 The status of community rights in production forests

13.4.1 Community rights under the protected area regime

Central Africa's protected areas grew massively during the second half of the twentieth century. Currently, the subregion has 315 protected areas covering an area of approximately 1,011,770 km^2 (OFAC 2020). Countries such as the Republic of the Congo, CAR and Sao Tome and Principe have already classified more than 30 percent of their national territory as protected area and others such as Cameroon, Gabon and Equatorial Guinea should achieve this level in the medium term (Proces et al. 2020). This trend is set to continue as the COMIFAC Convergence Plan calls on countries to strengthen the network of national and cross-border protected areas by 2025, ensuring that it is representative of all land and water-based ecosystems. This will require them to increase the number and size of national and cross-border protected areas in the medium term.

Some of these protected areas are not strictly protected and local communities are permitted to use natural resources according to their customary practices (e.g. non-commercial hunting and fishing, collecting non-timber forest products, etc.). However, when implementing planned increases to the area protected, countries should pay particular attention to coexistence with local communities and indigenous peoples to ensure their rights are not dramatically curtailed. This is particularly important when strict protection frameworks are envisaged, such as under International Union for Conservation of Nature (IUCN) category II,[7] an international standard for rigorous biodiversity protection (Doumenge et al. 2015).

Indeed, under strict protection frameworks (primarily national parks), tenure rights over customary land are not recognized, even where national laws require community participation in the establishment of specific conservation areas and guaranteed access to these areas for subsistence or cultural purposes. Sometimes the overlapping or coexistence of national and international laws is a source of tension (see Box 13.2).

In some cases, customary rights are recognized if indigenous peoples are established before a protected area is created. In CAR, for example, Article 17 of the 2008 Forestry Code states that "usage rights shall not be exercised in strict nature reserves and national parks. If indigenous peoples are

7 IUCN Categories:

- Ia (Strict Nature Reserve)
- Ib (Wilderness Area)
- II (National Park)
- III (Natural Monument)
- IV (Habitat or Species Management Area)
- V (Protected Landscape or Seascape)
- VI (Protected Area with Sustainable Use of Natural Resources)

Box 13.2: Situation of the rights of Baka indigenous peoples around the Dja Faunal Reserve in Cameroon

Fernande Abanda Ngono

The Baka who live around the Dja Faunal Reserve, like most indigenous forest peoples in Cameroon, have been forced to settle along roads and trails since colonial times. Compared with other local communities who are able to claim their customary land rights by showing that they have developed their traditional territory, these indigenous peoples, because of their nomadic lifestyle and their lack of interest in land ownership, are more vulnerable to the impacts of insidious natural resource management policies, particularly those relating to protected areas.

The management plan does not give them any specific rights over this protected area, which established artificially fixed borders for their ancestral territories following its creation in 1950. The management plan grants all the communities neighbouring the Dja reserve the right to engage in traditional agricultural activities in a specific area of the reserve called the "contractual usage rights area" (MINFOF). This area adjacent to the Dja reserve is available for non-industrial agricultural uses and communities are allowed to collect non-timber forest products there. On the other hand, traditional hunting and fishing can only be carried out if there is an agreement between the local communities and the conservation services managing the reserve or under annual agreements provided for in the planning documents.

The case of the Dja Faunal Reserve also illustrates the potential tension between the rights of indigenous peoples under international conventions not recognized by a given country (in this example, Cameroon has not ratified ILO Convention No. 169), on the one hand, and the protected area status enshrined in the country's environmental codes (here, Cameroon's) and by UNESCO's World Heritage status. Approaches that alleviate these tensions should be adopted wherever they exist, to ensure that the rights of indigenous peoples are fully recognized and – where appropriate – fair and equitable compensation is provided.

Customary territorial rights go hand in hand with communities' right to participatory and joint management. The Baka peoples therefore have the right to participate in the management of the Dja reserve, i.e. by sitting on the governance bodies established for this purpose. On this point, there has been considerable progress in the legal arrangements. Decision of the Ministry of Forests and Wildlife (MINFOF) No. 03300/MINFOF/SG/DFAP of 28 April 2008 on the organization of the Dja reserve provides for two seats for representatives of the Baka peoples on the advisory committee, one of the reserve management bodies. The advisory committee's mission is to propose ways of involving local people in the implementation of the management plan and to identify and propose priority socioeconomic measures to the Dja reserve management committee.

established before an area is classified as a protected area under Article 9 of this Code, arrangements shall be made to preserve their rights to harvest and practice subsistence hunting and traditional fishing, provided that such activities do not affect their integrity, the interests of other communities or the environment." In such cases, it is necessary to understand, explain and specify what the legislator defines as "established", to prevent human rights violations. The same applies to provisions on compensating communities for violations of their rights due to the establishment of a protected area; however, the available data needs to be improved and regularly updated to enable us to assess the extent to which these provisions are implemented.

Examples like this lead some authors to assert that the dominant philosophy enshrined in Central African conservation policies is highly focused on the need to protect charismatic animal species, while neglecting traditional social structures and natural resource management systems (Pyhälä et al. 2016). However, conservation approaches that give local communities a greater role, in terms of access to their traditional resources or participation in the management of protected areas, do exist and are becoming more common worldwide, although they are not widely used in Central Africa. This management model, under which areas are called "conservancies", is very widespread in southern and eastern Africa. It makes it possible to reconcile greater use of natural resources by local communities with biodiversity protection.

13.4.2 The impact of the protected area regime on community rights

If we can make one recommendation at the start of this section, it would be to improve data and knowledge on the impacts (both socioeconomic and environmental) of the legal provisions on protected areas in Central Africa and of nature conservation measures that seek to promote the sustainable development of surrounding landscapes. Several regional and global analyses have been conducted, including a study of 306 protected areas in 45 countries in Africa and Latin America (Wittemyer et al. 2008), which shows that population growth around these conservation areas was almost twice as high as that observed in other rural areas. One explanation for the attractiveness of protected areas suggested by the authors is tied to the conservation projects carried out there, and more specifically to the international funds allocated to them, to the activities carried out and the infrastructure developed, to economic opportunities and access to road networks, to their safety in times of conflict and to the greater abundance of natural resources.

This general pattern could however become more complex if specific situations are considered, especially given that, generally speaking, the participation and consultation of local communities has historically been very weak in the establishment of protected areas. The requirement to obtain free, prior and informed consent enshrined in the Convention on Biological Diversity and recently incorporated into the 2020 Forestry Code of the Republic of the Congo is being mainstreamed in new conservation initiatives. Other possible improvements can be made in relation to governance, tenure management and human rights. As regards governance, governments still favour a centralized, monolithic management model for protected areas, even though it can lead to repressive forms of wildlife protection and the criminalization of local people, which can be a source of conflict (Mayen Ndiong et al. 2021). The emergence of a mixed governance model, such as public-private partnership, brings with it an approach that is more respectful of the rights of local and indigenous peoples. Nevertheless each situation should be judged on its own terms – with local and indigenous peoples – before one form of governance or another is chosen.

As regards land tenure, forced population displacement due to the establishment of a protected area has been documented in some cases (Brockington and Igoe 2006) and should be replaced by tenure management approaches that are negotiated with customary rights holders, to avoid displacement and restrictions on access to ancestral lands. Where appropriate, resettlement measures and fair compensation must be negotiated and agreed with rights holders, including indigenous peoples, to avoid any negative socioeconomic impact. Restrictions on access to and the sale of natural resources, for example, can risk causing food insecurity and impoverishment (Cernea and Schmidt-Soltau 2003b, 2003a).

As regards human rights, both NGOs and governments increasingly promote conservation centred around respect for the rights of indigenous peoples and local communities. This approach is, for example, taken by the Congolese Institute for Nature Conservation (ICCN), which is holding discussions on how to set up a streamlined system for handling complaints from communities neighbouring protected areas and, more broadly, on the establishment of a framework to ensure compliance with international human rights law (European Commission 2021).

Despite this shift in conservation thinking, problematic situations persist. In 2019, BuzzFeed published a report on human rights abuses perpetrated by ecoguards in protected areas co-managed or supported by the World Wide Fund for Nature (WWF) in Cameroon (Lobeké, Boumba Bek and Nki Parks), Republic of the Congo (the process of creating Messok Dja Park) and DRC (Salonga National Park).[8] Key criticisms included the conservation organization's decision to work with partners who have a history of violence and abuse against indigenous peoples and local communities, and the weak application of the principle of free, prior and informed consent.[9] A panel of independent experts charged with investigating the accusations found that WWF was not directly involved in the abuses uncovered. Weaknesses were, however, identified in the procedures designed to prevent abuse and ensure compliance with the NGO's human rights commitments related to activities in protected areas (Pillay et al. 2020).

A new paradigm for the management of protected areas that advocates the professionalization of the rangers appears to be beneficial for wildlife. The ecoguard roles at Zakouma National Park, for example, have been professionalized, which has made park border areas more secure and enabled several large mammal populations to be maintained and even increased. However, ecoguards' activities – including whether they are armed – must always be properly supervised and monitored to prevent, at all costs, the deterioration of relationships with local communities, who continue to hold legitimate rights to land and resources in protected areas.

13.4.3 Innovative approaches to the governance of conservation forests

A major concern for the management of protected areas is reconciling the objectives of effective biodiversity conservation and upholding the human and land rights of rural communities (Karsenty et al. 2021). The quest for efficiency has, over time, led some Central African countries to trial new ways of managing protected areas, such as delegating responsibility to conservation NGOs and, more recently, to private companies, through public-private partnership (PPP) agreements.

The involvement of non-state actors, mainly conservation NGOs, in biodiversity protection is based on the belief that these actors are able to manage areas more effectively in the face of government failures, that their involvement confers credibility in the eyes of donors and that they are better able to secure sustainable funding (Scholte et al. 2021). These suppositions are similar to those underpinning managed forestry concessions.

Public-private partnerships give a robust mandate to the non-state actors to whom management is delegated. The government retains a formal presence in governance mechanisms, but operational management is handled entirely by the non-state partner, which is granted decision-making

8 https://www.buzzfeednews.com/article/tomwarren/wwf-world-wide-fund-nature-parks-torture-death

9 https://www.buzzfeednews.com/article/tomwarren/wwf-world-wide-fund-nature-parks-torture-death

Box 13.3: Practical and innovative tools for analysing and strengthening communities' rights around the sustainable management of natural resources: Case study of the Sustainable Wildlife Management (SWM) Programme

Andrew Wardell, Eugenio Sartoretto, Sandra Ratiarison

As highlighted in this chapter, forest and wildlife management in Central Africa is governed by multiple legal systems and rules operating simultaneously at different levels (national and international obligations, statutory and customary law). The resulting complex and sometimes divergent sets of rules can significantly weaken the governance of natural resources and even the rule of law, often to the detriment of the people who depend on these resources for their livelihoods.

Intervening in this area, the SWM Programme is one of the first large-scale conservation initiatives to put rights-based approaches into practice. As regards social safeguards, the SWM Programme aims, at all its sites (including those in the Republic of the Congo, Gabon and DRC in Central Africa), to: complete risk and opportunity analysis grids on the rights of project stakeholders, in the light of the human rights situation in each country; establish a free, prior and informed consent protocol and a framework complaint management mechanism that can be adapted to different contexts; develop planning and monitoring tools, and tailored communications materials. Site teams and local partners are trained to use these tools and are helping to improve them through practice.

In parallel, the SWM Programme is undertaking a technical review of relevant legal issues. This work has led to the development of a tool kit to facilitate a holistic cross-sectoral evaluation of the legal frameworks governing the various aspects of hunting and fishing value chains. These tools address both gender-related issues and the substantive and procedural rights of members of local communities, indigenous peoples and marginalized groups. Available via the legal hub on the SWM website (with results from SWM pilot countries), these complementary and interdependent tools make it possible to:

- Map the relevant legal framework;
- Consider how to transpose relevant international instruments into national law;
- Analyse the level of alignment between sectoral legislation and identify potential gaps;
- Clarify the relationship between statutory law and customary law;
- Identify barriers to implementation and/or enforcement.

By using these different tools to implement a community rights-based approach, the SWM Programme aims to promote participatory, inclusive and evidence-based processes, including by working on normative frameworks, legislation and customary law, to enable and support the effective management and sustainable use of wildlife and its habitat.

autonomy and some flexibility when it comes to administrative and financial arrangements (European Commission 2015; Scholte et al. 2021). Although public-private partnerships delegate responsibility for the management of protected areas to non-state actors, it is important for governments to maintain ownership and mixed boards of directors could be established to balance private and public power.

In some cases, certain sovereign functions like law enforcement and anti-poaching initiatives might also be transferred to non-state actors (Scholte et al. 2021). The African Parks Network model, under which the non-state actor assumes full responsibility for all aspects of running a protected area, countering any threats and managing all revenues, is illustrative of the tacit privatization of conservation (African Parks Network 2021). The draw of this approach for governments that lack the resources or capacity to manage these areas is clear; nevertheless, governments must be mindful of the risk that their own interests and those of rights holders will be marginalized. It is therefore important that PPPs establish discussion, awareness and information-sharing forums with these stakeholders, in which local people are included and have a formal vote on issues in which they share an interest.

In Central Africa, 13 protected areas are managed under this model, with the majority managed by the South African NGO African Parks Network (APN), followed by Wildlife Conservation Society (WCS) and WWF. This new model is widely praised by international conservation NGOs, as well as by some donors, for whom PPPs are a way to involve local communities in the management of protected areas and improve their incomes. In the case of the Odzala-Kokoua park in the Republic of the Congo, the public-private partnership arrangement has helped to increase the participation of all stakeholders, in particular local communities, in the management of the park (Mayen Ndiong et al. 2020).

In addition to public-private partnerships, there are compelling new initiatives that view biodiversity conservation as the management of a resource for the benefit of local communities, such as the Sustainable Wildlife Management Programme. With this in mind, NGOs and major programmes have sought to align their approaches to community relations (complaints management mechanisms, free, prior and informed consent, gender mainstreaming, etc.). The Central African Forest Ecosystem (ECOFAC) programme is working on reforms to more effectively incorporate these concerns, following the model of EU programmes in DRC that have made similar changes.

Conclusions

The inclusion of indigenous peoples in forestry and conservation policies can no longer be overlooked by those operating in the sector, whether conservation organizations or logging companies. Over the past three decades, public and private initiatives supported by technical and financial partners have gradually strengthened the role of local communities and indigenous peoples in forest management. On this front, subregional and national legal and policy frameworks have become significantly denser. Legal instruments have, among other things, laid down participation, the consideration of usage rights, benefit-sharing and free, prior and informed consent as fundamental requirements for the responsible management of natural resources. The implementation of these provisions by private operators, in particular certified operators, has had some tangible success through the construction of infrastructure projects with socioeconomic benefits.

Such legal progress remains precarious and implementation in practice is often challenging given that some local communities lack the required managerial capacity. Current trends in development planning, land-use planning policies and the consolidation of ultra-liberal forest management approaches in the subregion, as well as land grabbing by national elites, suggest that the irrevocable legal recognition of community and indigenous forest rights is being sidelined. In the Congo Basin, occasional outbreaks of violence linked to efforts to claim these rights coupled with a deep and legitimate desire for (sometimes unsustainable) development are an ongoing concern.

And yet, there is another better possible path and future. First and foremost, enabling conditions for this optimistic scenario and public political dialogues could complement the necessary reforms, as part of processes that are genuinely inclusive of local and indigenous peoples' demands. Secondly, national land-use plans, which may use different names, could map the customary lands of village communities and – as far as realistic – the territories on which indigenous peoples depend for their livelihoods (allowing for several uses in the same space). This would not threaten governments' sovereignty over forests and land, but it would allow for local and indigenous peoples' rights to be mapped and finally recognized. Thirdly, land titles, or any other means of irrevocably securing the forest lands of local and indigenous peoples, could be gradually assigned, on a case-by-case basis. It is a compromise scenario, but a win-win one that should appease the most vindictive few at the local level and remove a thorn in legislators' and policymakers' side. These various possibilities underscore the need to better account for the diversity of customary rights in forest land management and to put the government back at the centre of forest management, with regulations tailored to realities on the ground.

State of the Congo Basin Forests in 2021: Overall conclusions

Richard Eba'a Atyi

Photo by Joel Kouam/CIFOR

State of resources

Huge areas of little disturbed dense forest, but with a clearly growing trend of deforestation and degradation

The remaining evergreen and semi-deciduous forests of Central Africa were estimated to cover approximately 200 million ha in January 2020, including 184.7 million ha with no visible sign of disturbances (Vancutsem et al. 2020). Overall, about 9 percent of the TMF area of Central Africa has disappeared since 2000, representing 18 million ha (See Chapter 1).

Two key findings underline the scale of the degradation process in such ecosystems: degraded forests in Central Africa represent approximately 7 percent of the remaining TMF area (up to 30 percent when we consider disturbance-edge-affected forests), and approximately 40 percent of all forest disturbances (deforestation, regeneration and degradation).

Analysis of changes shows a considerable increase in the annual disturbance rate in the TMFs of Central Africa over a five-year period (2015–2020), as it reached 1.79 million ha per year compared to 1.36 million ha per year during the previous decade (2005–2015) (see Figure 1.13).

The main drivers of deforestation in Central Africa remain the increase in cultivated areas, demographic growth and infrastructure development. Nonetheless, land-use policies are a valuable tool in the fight against deforestation and forest degradation. Protected areas, forestry concessions and community forests can significantly reduce forest loss. At the same time, they can engage local people in the conservation of forests and provide them with livelihoods.

With a carbon sequestration capacity unique in the world

Central African forests sequester about 40 Gt of carbon (Saatchi et al. 2011). These forests have structural characteristics that distinguish them from Amazonian forests: while the density of trees per hectare is lower, there are more trees of a greater diameter, and trees at a similar diameter are taller. This results in a higher average level of carbon or biomass per hectare than that of Amazonian forests (Sullivan et al. 2017). While the atmospheric carbon absorption capacity of undisturbed Amazonian forests has been declining for around 30 years due to an increase in tree mortality blamed on climate change (Brienen et al. 2015), this trend has not yet been observed in Central Africa (Hubau et al. 2020). Currently, despite their comparatively smaller area, the undisturbed forests in Africa are now absorbing more carbon than those in the Amazon. However, an increase in carbon loss from 2011 has been observed, suggesting that the absorption capacity of intact forests in Central Africa will become saturated in the future, despite the stability observed to date (Hubau et al. 2020).

The annual rates of forest disturbance by type of land use and by country over the last 20 years highlight the importance, for conservation, of forest concessions and protected areas in relation to mining concessions and unallocated areas. The monitoring of deforestation, degradation and forest regeneration also sheds light on the differences between not only the various forest countries, but also between monitoring periods: between 2010 and 2020, there was an overall increase in rates of deforestation in protected areas (Doumenge et al. 2020) and forest concessions compared to 2000–2010.

A significant contribution to the industrial development of Central Africa

The Congo Basin forests contribute to the economies of Central African countries in diverse ways. They contribute significantly to the socioeconomic development of those countries through the value chains still dominated by the informal sector and that include non-wood forest products, woodfuel and the exploitation of wildlife for food. This State of the Forests 2021 report puts special emphasis on the timber value chain (see Chapter 2 above), which constitutes the bulk of the forest contribution to the formal economic sector of Central African countries and on which information is abundant.

Of the 200 million ha of dense moist forest in Central Africa (Vancutsem et al. 2020), nearly 54 million ha (27 percent) are classified as production forests of various types, mainly in the form of forestry concessions.

Many conservation concessions have been created in DRC in recent years, either by converting production forest concessions (thereby reducing the area presented above) or by creating new concessions. There are no comprehensive public data on these concessions, which cover more than 6 million ha according to an estimate by FRMi. The purpose of these concessions is to help reduce greenhouse gas (GHG) emissions.

The model of forest management in Central Africa is a major asset for their conservation and sustainable use. However, their implementation has yet to be assessed, more than 15 years after approval of the first management plans. Besides concessions, two other forms of management of production forests in Central Africa deserve attention: community forests and council forests (or forests of decentralized authorities).

In 2020, FSC-certified forest concessions covered a total area of just over 2 million ha. Prospects for growth in certified areas remain encouraging, particularly with the advent of the PAFC. Since 2019, ATIBT has been developing a PAFC certification system for the Congo Basin and working to make it recognized by the PEFC Board. This regional approach will help minimize the costs of PEFC certification, by pooling its development in the three target countries via national PAFC bodies. This will make it easier to implement and reduce the costs associated with certification for businesses.

Generally speaking, log production has been relatively stable in Congo Basin countries for the past 25 years. Production was not impacted by the Covid crisis and even grew in 2020 to over 8 million m^3.

The processing rate, i.e., the share of the harvested volume processed domestically, varies greatly between countries. Gabon has banned the export of logs and therefore requires all logs harvested to be processed in the country. Cameroon has a processing rate of almost 70 percent. The processing rates in DRC, CAR, and the Republic of the Congo are around 55 percent, even though their regulations stipulate that only 15–30 percent of production may be exported as logs. In Equatorial Guinea, less than 20 percent of production is processed. Cameroon and Gabon are the main industrial producers in the Congo Basin thanks to their high production levels and very good processing rates. Products that have undergone primary processing dominate exports, mainly in the form of sawnwood, as well as veneer in Gabon.

Despite the steps taken to encourage forestry operators to increase their production of higher added-value products, Central African countries are lagging far behind due to lack of infrastructure, high transport costs and failure to train people in processing trades.

The global market for Central African wood is estimated at USD 178 billion for the 440 million metric tons produced. Central African countries account for only USD 2.2 billion for a volume of 4.2 million metric tons (i.e., 1 percent). The total value of exports has changed very little in the last 10 years despite volumes increasing by 35 percent. This suggests that the average price per metric ton has decreased for all products on aggregate.

While domestic timber markets appear to be relatively stable and their activity likely correlates with national economic growth rates, exports of artisanal sawnwood to neighbouring countries have increased significantly over the past decade. This is especially true in DRC, where exports to East Africa are now estimated at around 120,000 m^3 of sawnwood (Eba'a Atyi et al. 2016) and in Cameroon, where exports of informal sawnwood to Nigeria reached 27,000 m^3 per year in 2016. The most notable increase was observed between Cameroon and Chad: in 2015, around 210,000 m^3 of sawnwood crossed this border (Lescuyer and Tal 2016), very often with falsified documents from community forests. This is more than double previous estimates made in 2009.

Generally speaking, despite the enormous potential offered by forests in the Congo Basin, over the past 60 years their wood has been harvested and exported in its raw form to countries outside Africa, while African countries have imported finished wood products. The missed economic opportunities are incalculable. The Congo Basin operates on the fringes of the global wood subsector, accounting for 1 percent of global sawnwood production, 6 percent of tropical sawnwood production, 5 percent of tropical logs, 7 percent of tropical veneers, 1 percent of tropical plywood and little to no secondary or tertiary wood processing.

The AfDB's regional study on the sustainable industrialization of the wood subsector recommends that countries take 10 key steps (see Chapter 2) to establish an operational framework for the implementation of this vision by 2030.

If this vision is implemented successfully, jobs will be created in the primary processing sector, increasing from 40,000 today to over 100,000 by 2030, with possibly even more jobs in the secondary and tertiary sectors. The wood subsector's contribution to national GDP will also double. However, this will not happen without substantial investment. It will be necessary to inject EUR 3 billion in private funds into the regional economy. The AfDB plans to invest USD 35 billion over 10 years as part of its industrialization strategy. This will help Africa to increase its GDP from industry from just over USD 700 billion to over USD 1,720 billion by 2030.

Rehabilitation of resources and mainstreaming of climate change

Different countries have different approaches to forest plantations

Forest plantations (see Chapter 3) have been the main approach to forest resource rehabilitation in Central Africa since colonial times. Among the examples are the considerable investments made since the 1950s in the Republic of Congo, where eucalyptus plantations were established to produce fibres for wood pulp production. These efforts, combined with research work, have had significant success in developing plant material quality. However, investments in this sector are complicated because of unclear land tenure and use, inadequate industrial infrastructure, lack of technology, low productivity and shortage of financing. While there are good growth opportunities in the sector, progress is slow due to a risk-averse investment climate, limited financing opportunities and the lack of conclusively successful business models in the forest sector.

In the DRC, agroforestry systems that combine food crops (especially cassava) with fast-growing forest species for woodfuel production are instead what have been established. Some of these projects have shown their economic viability and impact on social development. An example is Mampu, a reference agroforestry project that has become an autonomous peasant-farming system that no longer receives funding or support from international donors.

The objective of the initial agroforestry projects was to produce woodfuel, but this has gradually shifted towards carbon sequestration, particularly since 2008. These types of initiatives open up new opportunities, such as the development of large-scale community agroforestry projects. While these are built on previous models, they have climate and sustainability criteria and comply with the fundamental principles of protected area management and conservation that are part of Congolese law.

Another example is Rwanda, where demand for woodfuel continues to be high and where wood from natural forests had virtually disappeared several decades ago. Public plantation wood is relatively difficult to access, and land availability for additional large-scale plantations – either private or public – is severely constrained due to the country's high population density.

A large portion of Rwandans will continue to use woodfuel as their main energy source for quite some time to come, as it remains cheaper than electricity, petroleum products and gas on an equivalent energy basis. Wood from farmers' fields has lower production costs than from large-scale plantations and is available without administrative hassle.

While the country claims that it can plant more trees in plantations on marginal lands, it is uncertain that this wood can be marketed easily: the costs per m^3 are substantially higher than wood from farmers' fields.

There are no reliable data on the actual production and use of woodfuel to even reliably determine if this will be a problem in the future. The supply of woodfuel has covered the energy demand without major government intervention, and it seems that this will not change any time soon.

Conditions for the success of forest plantations in Central Africa

The following conditions are required for the success of forest plantations in Central Africa:

- Programme objectives, target participants and incentives must be transparent and aligned.
- Suitable land for timber plantation growers must be available.
- Appropriate funding and clear and simple procedures to access the funding must be available.
- Access to high-quality plants must be available.
- The programmes must be developed for an extended period of time.
- A National Forest Inventory must be initiated to track progress and development of the sector.

Moreover, these forest plantations and agroforestry activities contribute to storing a significant amount of forest biomass. In addition to being a source of supply for businesses and woodfuel, plantations contribute to the REDD+ process.

Implementation of REDD+ projects to fight climate change.

Pilot projects act as laboratories for REDD+ implementation (see Chapter 5). Nearly 14 years after the Bali COP, the implementation of these projects should be assessed so that we can draw lessons from them. Some 15 pilot projects have been identified in Central Africa. They have helped (i) convince the most reluctant governments regarding the feasibility of REDD+ mechanism implementation, (ii) promote the incentives associated with this process (Sunderlin et al. 2014), and (iii) highlight the complexity of their implementation.

Since 2007, several technical and financial support initiatives have been developed to help countries prepare and start implementing REDD+ (in particular the FCPF Readiness Fund, UN-REDD, as well as the FIP, the REDD+ window of the Green Climate Fund, and others). Thanks to this support, mainstreaming of climate change mitigation issues has taken on an unprecedented dimension, particularly in Central African countries that have benefited from these funds (Cameroon, CAR, DRC, Republic of Congo and Gabon), but also in the other countries of the region via a rebound effect.

However, this mainstreaming remains relatively limited to the forest sector, and REDD+ has not achieved the expected results in terms of intersectoral coordination. Today, it is crucial to link REDD+ to more comprehensive green growth and/or low-carbon development policies (Thu Thuy et al. 2018), in order to drive the sectors (agriculture, mining, land, energy, etc.) that cause deforestation and forest degradation and ensure its sustainable and effective implementation. In this respect, CAFI is an important source of financing.

Similarly, countries need to harmonize carbon monitoring tools and instruments on their territory. Theoretically, insofar as REDD+ targets are included in the NDCs, the Measurement, Reporting and Verification (MRV) systems developed under REDD+ should feed directly into a broader carbon accounting system that would meet the requirements of the Enhanced Transparency Framework (ETF) of the Paris Agreement. In practice, the REDD+ MRV is often available before the global accounting tool into which it should be included. And it is not uncommon to observe semantic and methodological inconsistencies (often due to anachronisms) between the information submitted to the UNFCCC (greenhouse gas inventories, NDCs, etc.) and the REDD+ MRV instruments (some of which are also submitted to the UNFCCC, such as the FREL). At this time when countries are preparing to submit their second Nationally Determined Contribution (NDC), it is important to correct inconsistencies and harmonize methodologies.

Finally, this dual effort of perspective and harmonization should help align REDD+ commitments and REDD+ projects and programmes. As part of the Paris Agreement and the universality of climate commitments, this alignment (which we can also call moving closer together, linking or interlocking) has become necessary. Countries must be able to ensure that REDD+ activities implemented on the ground contribute to achieving their NDCs.

Currently, one of the major challenges of REDD+ is to succeed in raising funds to implement the activities. In fact, the main source of financing that had been envisaged for REDD+ (a binding carbon market) never materialized (Angelsen et al. 2018). Instead, a voluntary carbon market has taken over. Its development has been both explosive and substantial. In 2019, forestry projects accounted for 36.7 million metric tons of CO_2e on the voluntary carbon markets, worth around USD 160 million. In financial terms, it is by far the biggest category of voluntary market projects, not only in tCO_2e volume, but also in average sales price per metric ton, which exceeds all the other project categories

(USD 4.3 in 2019). Today, this voluntary market remains one of the main ways to tap into private financing. However, several questions remain unanswered with regard to the relationship between these voluntary markets and the Paris Agreement. Furthermore, financing does not cover needs (Atmadja et al. 2018), and new avenues must be explored to find funds.

International funding for the management of Central Africa's forests

Despite their importance and the organization put in place for their management, the forests of Central Africa are struggling to attract the same level of funding as other tropical forests in South America and Asia. Over the 10-year period from 2008 to 2017, the forest-environment sector of Central Africa accounted for only 11.5 percent of financing released for the conservation and sustainable management of tropical forests.

Internally, COMIFAC's operations have been perturbed due to difficulties in collecting contributions from States. Its main source of funding is supposed to be its autonomous funding mechanism; however, the latter is non-operational in most of the countries of the subregion. The amount of unpaid contributions totalled nearly FCFA 3 billion in 2021.

This low level of contributions from its member states makes it difficult for COMIFAC to fulfil its mission fully.

Financial flows come mainly from official development assistance, while contributions from the private sector and from foundations and philanthropic organizations remain very low. The main financial contributors are Germany, the European Union (EU) and the Global Environment Facility (GEF). New funding opportunities emerged at the UNFCCC COP26 – embodied in the declarations made by philanthropic organizations and actors in the private agricultural sector – and must now be harnessed. Indeed, a striking number of philanthropic organizations committed to mobilize USD 1.7 billion for indigenous peoples and local communities for the protection of tropical forests.

A significant share of the international financial flows to Central Africa for the conservation and sustainable management of forests is allocated to individual countries. There are, however, some noteworthy initiatives of subregional scope, including the ECOFAC programme funded by the EU for 30 years, the German COMIFAC support project, and the Congo Basin Ecosystems Conservation Support Programme (PACEBCo)

Financial partners should strive to align their subregional initiatives in the forest and environment sector with the COMIFAC Convergence Plan in the spirit of the 2005 Paris Declaration.

The thematic areas that attract the most funding are biodiversity conservation, environmental policies and forest management policies. In contrast, training and research are neglected, with serious consequences for the subregion, which is severely lacking capacity in this respect.

The forests of Central Africa are gradually becoming more important on the international political agenda, thanks in part to the efforts of the CBFP, which is stepping up diplomatic efforts towards recognition of their crucial role in regulating the world's climate. For example, at COP26, a collective declaration from 12 of the richest countries and including the Bezos Earth Fund pledged to mobilize at least USD 1.5 billion for the protection and sustainable management of Congo Basin forests. Central African countries must now seek to clarify the commitments of each donor country, and the mechanisms and arrangements for effectively managing the funds pledged.

COMIFAC must organize equitable fundraising, for a fair deal and a fair share for the Congo Basin. Such funding should amount to USD 6 billion/year to bring in funding commensurate with the contribution of Congo Basin forest ecosystems to the global climate.

Many opportunities and potential sources of international financing exist for the forest-environment sector of Central Africa. To take advantage of them, it will be necessary to improve the subregion's capacity to develop quality proposals and promote credible governance for the financial institutions of Central Africa, both at country level and at the common subregional level. As a first step, Member States must make COMIFAC a priority and pay their agreed annual contributions.

Growing participation by Central African countries in international discussions on forests

The contribution of forests within the context of the UN Sustainable Development Goals (SDGs) and of the UNFCCC Nationally Determined Contributions (NDCs) is followed by all countries of the world. The SOF 2021 report therefore draws attention to these two instruments.

Relationship between the SDGs and the COMIFAC Convergence Plan

In September 2015, the 193 UN Member States adopted the 2030 Agenda for Sustainable Development. This 'Agenda 2030' programme consists of 17 SDGs and 169 targets. It is a people-centred development agenda which seeks to eradicate poverty in all its forms and dimensions, preserve the environment and ensure more peaceful and inclusive societies.

Agenda 2030 recognizes the following: *"Targets are defined as aspirational and global, with each Government setting its own national targets guided by the global level of ambition but taking into account national circumstances. Each Government will also decide how these aspirational and global targets should be incorporated into national planning processes, policies and strategies."*

The COMIFAC Convergence Plan for the conservation and sustainable management of Central African forest ecosystems comprises six priority action areas and three cross-cutting areas. It serves as a reference framework for actions in the forestry and environmental sector in Central Africa.

To better guide Central African countries in implementing Agenda 2030, it is recommended that the Convergence Plan align with the SDGs (see Chapter 6). The nine action areas of the Convergence Plan and the 17 SDGs of Agenda 2030 thus act as a framework for the analyses performed in this report. The mainstreaming of the SDGs into sustainable forest management in Central Africa consisted of reviewing the ways in which the COMIFAC Convergence Plan action areas are linked to the SDGs.

The report thus shows that the COMIFAC Convergence Plan can serve as a reference framework for assessing the contribution of Central African forests to the SDGs. The exercise of aligning the COMIFAC Convergence Plan with the SDGs has once again highlighted the multiple functions performed by the forests of the Congo Basin and the many services they provide to humans and the planet.

However, the range of forest contributions to the SDGs has not been sufficiently understood and reflected in the voluntary national reports produced by the subregion countries. In fact, most countries did not provide detailed information on forest contributions to the SDGs.

The multifunctional approach employed by COMIFAC in monitoring forest contribution to the SDGs goes beyond simply an environmental function. This approach pays as much attention to the economic and social functions of the forest as to their environmental function. It should be made use of more, to aid in identifying the range of services that forest ecosystems provide to achieve the SDGs.

As for future prospects, the production of the Subregional Guidelines for monitoring forest contribution to the SDGs in COMIFAC countries is a significant step towards improving reporting on how these forests contribute to the SDGs. Once these guidelines are adopted by the COMIFAC Council of Ministers, they can be adopted domestically by member countries. To this end, the capacities of countries of the subregion should be enhanced, so that they can assume better ownership and implementation of the principles, guidelines and priority actions needed to improve their reporting on the SDGs and on forest contributions to the latter.

Diverse international commitments by Central African countries in the fight against climate change

Chapter 7 presents all these commitments and provides an overview of how well Central African countries have upheld their commitments under the UNFCCC and on combating climate change in general. More specifically, these are binding commitments such as National Communications, Biennial Update Reports (BURs) and NDCs, as well as voluntary commitments including NAPAs, REDD+, NAMAs, FCPF, UN-REDD, CAFI, AFR100, FLEGT, FIP and HLFD.

All the commitments by the Central African countries represent a reduction of 455.4 MtCO2e (conditional and unconditional) and represent funding needs of USD 117,882 billion for the commitment period to 2030 in most cases (Fobissie et al. 2016; Eba'a et al. 2018). A recent study has shown that the implementation of these commitments requires greater coordination between sectors within countries (Eba'a et al. 2018).

Under Article 4 paragraphs 2 and 9 of the Paris Agreement, the Parties must submit an NDC every five years. Countries' commitments and their progress towards achieving their NDCs should show growing ambition. Five years after the adoption and ratification of the Paris Agreement by all Central African countries, they embarked on the process of revising their NDCs or preparing new ones for submission to the UNFCCC Secretariat by the end of July 2021. Rwanda and São Tomé and Principe met this deadline. In March 2022, the UNFCCC website showed that eight countries had submitted an updated NDC (see Table 7.2). Gabon and Equatorial Guinea had not yet done so. The updated NDCs were submitted in preparation for COP26 in Glasgow, Scotland. These commitments will need to be monitored closely, and a new regional plan of action for the implementation of the Paris Agreement in Central Africa should be drawn up following the submission of the revised or updated NDCs.

The principle of common but differentiated responsibility has enabled Central African countries, which have low greenhouse gas emissions as compared to other countries, to sustainably manage their forest resources as a way to support international efforts to limit climate change. However, their stated ambitions do not necessarily translate into commitments that are effectively implemented at national level and that would enable them to better fulfil their UNFCCC obligations. While international funding is available to developing countries, including those in Central Africa, the failure of these countries to submit the required national documentation at international level means their access to certain funding is severely curtailed.

Emerging themes

The previous edition of the State of the Forests of the Congo Basin, SOF 2015, focused on climate change. This theme is still topical but has new variants which were of increasing concern to forest management stakeholders between 2015 and 2021. These variants include the implementation of strategies and policies to fight 'imported deforestation' and the management of huge peatland areas, whose discovery in the Congo Basin created worldwide sensation. Finally, the COVID-19 pandemic, whose effect was felt around the world during the period this report was written, made it impossible to neglect the links between Central African forests and zoonotic diseases.

Central Africa countries faced with the fight against imported deforestation

Imported deforestation involves imported agricultural products that cause tropical deforestation (see Chapter 8). Countries such as those in the EU can be said to import deforestation (IDDRI 2017), as imports of raw materials or processed products are directly or indirectly linked to deforestation, forest degradation or the conversion of natural ecosystems outside the national territory (Gouvernement France 2017).

There seems to be consensus on the need to combat deforestation among various direct and indirect stakeholders involved in land management in Central Africa. Nevertheless, the policies and approaches adopted and implemented to this end can have serious social and economic consequences for producer and exporting countries in this region.

Importing countries in Europe and America adopt binding consumer-side policies under the influence of activist civil society organizations. At the end of 2021, the EU adopted legislation restricting the entry into its territory of products suspected of contributing to deforestation, with the underlying assumption that deforestation is only a tropical phenomenon and linked to the production of internationally traded commodities. The products most affected in Central Africa are palm oil; cocoa; rubber; wood; and, to a lesser extent, coffee.

The technical arrangements for implementing these policies and measures to combat imported deforestation in importing countries are still unclear or not yet determined. Barriers to the development of credible implementation strategies include the lack of consensus on how to define forests and, therefore, deforestation. Nevertheless, the certification approach has been applied to timber products for around 20 years and is increasingly applied to palm oil and cocoa. It offers a technical solution, both with regard to production units and territorial entities that have made commitments.

Central African producers and exporters are increasingly aware of and compliant with the new requirements of zero-deforestation policies and measures to combat imported deforestation adopted by developed importing countries. This is all the more relevant, given that Central African countries understand the threat that such policies pose to their national economies. Central African stakeholders have responded in two ways: 1) by diversifying their markets to export more to less demanding markets, and 2) by adopting sustainable management practices for the production of the commodities concerned, through increasing efforts to eliminate deforestation from production chains. Such approaches in Central Africa are being initiated not just by governments, but also by private-sector and civil society actors.

To limit the negative economic impacts that might be linked to the adoption and implementation of policies on imported deforestation in Europe in particular, Central African governments should prioritize negotiation activities, possibly as part of discussions between the Economic Community of Central African States (ECCAS) and the EU, with the goal of adopting more realistic implementation timetables as well as support measures for the States and various stakeholders of the commodities involved. The FLEGT experience in Central Africa could serve as an example and could be improved. Given that they share similar ecosystems, Central African countries could, as a starting point, include harmonizations in their technical approaches, for example, by agreeing on definitions of 'forest' and in determining ways to monitor deforestation.

The growing importance of peatlands in the management of forest ecosystems in the Congo Basin

Peatlands are wetlands with an accumulation of partially decomposed organic matter in the soil; they store the largest amount of terrestrial carbon per unit area (see Chapter 9). They cover almost 3 percent of global land surface, representing more than the total carbon stored in the earth's vegetation and almost twice as much carbon as found in its forests. Drained and degraded peatlands emit huge amounts of greenhouse gases. Therefore, protection and sustainable management of these natural environments, as well as urgent restoration actions, can help avoid carbon emissions and maintain the carbon stored in the peatland ecosystem.

In Central Africa, the Central Congo peatlands are estimated to cover 145,500 km^2. They are located across both the Republic of Congo and DRC, making them the world's largest tropical peatland complex. They are estimated to store approximately 30 Gt of carbon, which is approximately as much carbon as all the above-ground forest biomass in Congo Basin, and equivalent to 15 years of the carbon emissions from the US economy.

To date, this vast peatland area has remained relatively intact, but several potential pressures threaten to disturb these highly sensitive ecosystems. Increases in areas used for logging, hydrocarbon exploration, and agriculture can all cause degradation and destruction of these critical habitats. Disturbances and drainage will not only release a large amount of greenhouse gases into the atmosphere, thereby contributing to global warming, but they will also have severe impacts on the regional climate.

Therefore, more research to inform policies and new intersectoral sustainable management plans and actions for urgent conservation of the Central Congo peatlands are paramount to ensure continuing provision of the ecosystem services and stability they provide.

As partners of the Global Peatlands Initiative, the governments of DRC and the Republic of the Congo are taking action, through national leadership and support from partners to develop consultative, intersectoral and scientifically informed peatlands management policies, strategies and plans. Any peatland policies, plans or investments need to be linked to both countries' commitments to regional and international global environmental agreements reinforced by targets of the SDGs. Most critical is that the intersectoral, interdisciplinary and multi-stakeholder participatory processes of developing policies, plans and programmes to conserve, restore and sustainably manage these peatlands needs adequate financing, innovation, institutional strengthening and access to knowledge.

Central African forests and zoonotic diseases

Emerging infectious diseases (EIDs), caused by "pathogens that are rapidly increasing in geographical spread, host range or prevalence", represent one of the major risks to human health and societies (see Chapter 10). In fact, these EIDs have been increasing in recent decades. More than 60 percent of known EIDs are due to an animal pathogen, and it is estimated that 75 percent of infectious diseases that have emerged in the past three to four decades have been caused by wildlife.

These zoonoses are diseases that are transmitted from animals to humans and triggered by complex interactions between humans, domestic animals and wildlife. In order to design and implement surveillance and control systems for these EIDs, it is essential to understand the mechanisms and factors that lead to this spill-over. Among the factors that cause these diseases, human density associated with anthropogenic and demographic changes is one of the main drivers of EIDs. The wide range of host wildlife is also an important factor to consider. Their predictive model indicates that low-latitude developing countries are the most exposed to EIDs from wildlife or those that are vector-transmitted. New models suggest that the risk of emergence is higher in tropical forest regions that have high levels of mammalian biodiversity and are subject to changes in land use due to encroachment by human populations and agricultural activities.

Landscape changes affecting Central African forests can impact several mechanisms which may or may not favour the emergence and re-emergence of pathogens. Tropical forests are home to a wide diversity of as yet unknown viruses and bacteria that represent a source of emerging pathogens. The transformation of landscapes takes place through human infrastructure development following a temporal sequence: 1) roads, enabling access to areas previously inaccessible to vehicles; 2) settlements or small villages, where wildlife resources can be extracted for local or more distant markets (e.g., urban centres); 3) sedentarization of human populations, which may then be accompanied by peasant or small-scale cultivation of certain areas in the forests that still dominate the landscape; 4) possible development of small urban centres, which little by little transform the surrounding landscape, with a gradual predominance of fields and more commercial crops (e.g., oil palm); and, finally, 5) areas where the forest had been predominant a few years or decades before but which now resemble agricultural land, with a few patches of protected or unprotected forest left.

These gradual landscape changes will have three main consequences on how diseases emerge:

1. An increase in the quantity and quality of human-wildlife contacts, and an intensification of hunting, agricultural practices and commercial exploitation of resources.
2. A transformation in the ecology of animal hosts of pathogens, thereby altering the ecology of diseases.

3. Modification of wildlife communities driven by these modifications/adaptations of species to their environment that come about directly or indirectly (e.g., via interspecies competition). These changes will impact the dynamics of the sylvatic cycles of multihost pathogens and the risks of transmission between wildlife and humans. Thus, a rainforest bat community in a given area will no longer be the same when the landscape is transformed, and it will promote (or not) some pathogens at the expense of others.

The situation of Central African forests is therefore very dynamic, with changing landscapes, increasing human/wildlife contact and wildlife communities that are adapting to these changes. The rate of transformation of these forests will have an impact on the risks of emergence. Efforts to establish surveillance systems and health policies are often under-resourced and therefore complicated, yet they are essential in these forest ecosystems which still host a wide diversity of agents that are potentially dangerous to human and animal health. These surveillance systems should make it possible to contain epidemics as quickly as possible in order to protect local populations, limit the costs of the measures taken and avoid pandemics.

Given the importance of wildlife as a source of protein and income in Central Africa, a considerable part of zoonotic risk management in this region involves setting up surveillance systems within the bushmeat value chain, based on countries' 'One Health Strategies'. Such surveillance systems could easily be set up upstream of a chain, with the collaboration of hunters and the distribution of suitable collection equipment.

This approach, combined with high-performance diagnostic systems, would make it possible to establish an initial health assessment of the main pathogens susceptible of circulating within the most common species among the number of animals bagged. On the basis of this initial assessment, it would then be possible to set up more targeted screening programmes for the detection or monitoring of certain pathogens or species, depending on the risk identified. Information from the detection of circulating pathogens in the hunted animal species would help to identify the main risks to which human populations interacting with these hosts can be exposed. This approach works relatively well in some countries that have skilled human resources and that can effectively utilize well-equipped and efficient research laboratories after EVD epidemics.

Emerging infectious disease outbreaks are occurring with increasing frequency and have growing socioeconomic consequences which are difficult for African governments to cope with. The example of COVID-19 illustrates this. Many African governments have taken measures to prevent the spread of the pandemic. However, the jobs and livelihoods of local people are jeopardized by the simultaneous occurrence of disruptions to domestic supply and production combined with weak external demand, sharp declines in commodity prices, and the disruption of key service sectors such as tourism (ATIBT 2020a). The pandemic has also highlighted the fragility of economies and health systems that cannot cope with such situations and are dependent on donations from rich countries for health equipment and vaccinations.

The COVID-19 pandemic has had an impact on working conditions in the forest sector and disrupted the organization and smooth running of its activities. The result has been considerable repercussions on the social, economic and environmental equilibrium, affecting jobs, source of income, raw material resources, etc. (ATIBT 2020b) and thereby endangering production and trade of essential forest products as well as seriously jeopardizing the livelihoods of local people.

The intensification of the emergence of infectious pathogens has many underlying reasons, all of which are related to the increasing anthropogenic impact on nature in a context of growing social and environmental injustices and inequalities.

Tackling EIDs in the forests of Central Africa requires both symptomatic treatments (e.g., surveillance and control of emerging pathogens and diseases) and substantive treatments that will limit human impact on forests and biodiversity loss. Both approaches are necessary and essential, and the COVID-19 crisis has been a painful reminder of the need for in-depth changes in the way we manage the planet as a whole.

Sustainable management of forests in Central Africa: the issues at stake

Under the current circumstances, it is no mystery that achieving the goal of sustainable management of Central African forest ecosystems faces many challenges. This report focuses on three of these challenges: land use planning, restoration of degraded forest landscapes, and consideration of people's rights.

Land Use Planning

Land Use Planning (LUP) is, generally speaking, a policy that tends to organize human activities in a predetermined geographical area, based on a long-term objective (see Chapter 11). The aim of this policy is to strengthen social cohesion of that area at different levels. On a finer scale, the way in which the territory is organized establishes zones and sub territories, and for each of these it allocates objectives in line with the overall long-term objective of LUP.

The various countries of Central Africa have made significant efforts in developing public policies to enable them to design their LUP, thereby creating the conditions for development compatible with both better management of their resources and economic development to combat poverty.

People's top expectation is for services and infrastructure, whether in the cities or in the countryside. In the latter, people demand roads (to better sell their agricultural products), schools and health centres. A good environment starts with having access to clean water. These demands bring them into conflict with conservation advocates, who, backed by evidence, argue for limiting road development in forest areas (Alamgir et al. 2017). Roads symbolize development and are expected by local stakeholders, but they are criticized by some scientists for their impact on biodiversity. These roads, sometimes initially laid out for logging, agro-industry or mining, are then used for all sorts of activities and especially small-scale subsistence farming, which takes over land along the roads. Today, road development has an undeniable impact on ecosystems, as they contribute to the direct causes of deforestation. This should not be the case. By making road development conditional on local governance models, such as contracts with local people who desperately need the roads for their development, it should be possible to reconcile environmental protection and inclusive development. These new governance models are still under construction but could build on local planning processes such as those being developed in Cameroon.

International agencies, development partners and environmental NGOs act on LUP through the creation of nature reserves, biodiversity corridors and global policies such as REDD+ (and its variations, such as forest landscape restoration). Two programmes have been remarkable in Central

Africa. The CARPE programme has promoted a landscape-wide approach to LUP, with the goal of reconciling conservation and improving people's lives. The EU ECOFAC programme that started in 1993 and has been going on for nearly 30 years takes into account the uses of Central African forest ecosystems. ECOFAC also strives to promote regional coordination processes for conservation while mainstreaming socioeconomic aspects. It is within this framework that it has supported the creation of protected areas decided on by the governments of Central Africa following the Rio Summit in 1992, including transboundary areas. This was the idea that produced the Network of Protected Areas of Central Africa (RAPAC).

Much remains to be done to invent ways of managing the links between the various territorial entities: between cities and countryside, between agricultural and forestry areas, between the interstices nestled between large parks or forest areas, and between countries in the case of transboundary parks or forest areas. Some tools for reconciling interests are already in place. Experiences in Rwanda and Cameroon show that through innovations in local governance it would be possible to implement LUP that allows for both national and local development, while sustainably limiting the degradation of renewable resources and ecosystems.

What are the best institutional arrangements to facilitate LUP implementation? We can see that LUP is very different from one country to another. For example, in Cameroon LUP is under the Ministry of the Economy, while DRC has a ministry solely dedicated to LUP. But which system is more effective than the other: a powerful ministry, or a specialized ministry?

This brief overview of the forms of LUP at work in the Congo Basin should be followed by real comparative studies per country, in order to provide some answers to the issues and questions mentioned above and in particular on their implementation. Despite the efforts already made under some programmes (e.g., CARPE and ECOFAC), we still lack data on the characteristics and effects of current LUP. There is thus a pressing need to provide information and awareness-raising on this critical topic of LUP, targeting policy-makers, the scientific community and the general public.

Forest Landscape Restoration (FLR)

FLR is a long-term process that seeks to limit continued degradation of existing forest ecosystems and/ or to repair them (i.e., forest rehabilitation), so as to sustainably improve the living environment of local people (see Chapter 12). Reducing forest degradation involves changing the rules of interaction between natural and social dynamics (e.g., patterns of resource appropriation). FLR may, of course, include forest rehabilitation actions, such as plantations, assisted natural regeneration, or water and soil management (e.g., terraces, anti-erosion ditches, mulching and soil conditioning) on areas that are individually owned or common property. However, FLR cannot be reduced to and confused with these actions. It is a long-term and changing process that involves adaptations to social, demographic or institutional change, or to change in stakeholder perception or environmental conditions.

FLR requires shared vision at various levels, co-construction with stakeholders, and monitoring systems. It must be part of local land management via a decision-making process which precedes the setting out of its objectives and methods of action. This decision-making process determines the framework for long-term restoration of the ecosystems in question.

FLR is rightly seen as a priority for Central African countries. Given the critical mass of threats to the health of forest ecosystems in the subregion, national responses seem to be robust. While it is not a completely new idea, FLR in Central Africa is triggering new types of processes that build on recent climate change mitigation efforts such as REDD+.

Because we are at the very beginning of these processes, it is not possible to assess them at this stage. Many country commitments and strategies have been initiated within the framework of FLR, significant funding is being put in place, and some smaller projects are already underway. There is an urgent need to establish multicriteria monitoring and evaluation systems in order to steer this rehabilitation process.

In Central Africa, implementation of the FLR process reveals a lack of accompanying research in socioeconomic areas (including value chains) of (i) genetic resource conservation; (ii) species selection; (iii) germplasm improvement; (iv) planting techniques; (v) assisted natural regeneration; (vi) governance (including land-tenure issues and inclusive decision-making processes); and (vii) innovation and evaluation processes, particularly the assessment of ecological and socioeconomic impacts. Some of this research requires long-term arrangements that are difficult to maintain in Central Africa and are very rarely funded.

Forest landscape rehabilitation relies heavily on local populations, as in many cases it involves changes in agricultural and forest resource-management practices. FLR involves investing in developmental aspects that are too costly to be borne by these local populations alone. Meanwhile, governments in the region have great difficulty in providing basic services to their people, such as infrastructure and health care, education, access to electricity and drinking water, and accessible roads.

The financing of FLR therefore relies mainly on donors and the private sector. However, most donors spread out development projects over four to five years, with performance indicators associated with these durations. As rehabilitation is a long-term process, donors must also adapt their practices. Often, they want the local population to be involved, but they are not prepared to allow for the time needed on the ground to consult them beforehand. The financing of FLR may also be based on the principle of compensation or on corporate social responsibility.

Land restoration has long been seen as a way to revive ecosystems and build resilience to climate change, but it can also harbour great economic and business potential. The monitoring of FLR programmes currently being implemented in Central Africa should include indicators that can inform us about these different dimensions of restoration.

Considering local and indigenous populations

Considering indigenous peoples in forestry and conservation policies can no longer be overlooked by those operating in the sector, be they conservation organizations or logging companies. Over the past three decades, public and private initiatives supported by technical and financial partners have gradually strengthened the role of local communities and indigenous peoples in forest management. On this front, subregional and national legal and policy frameworks have become significantly denser. Legal instruments have, among other things, laid down (i) participation; (ii) consideration of usage rights; (iii) benefit-sharing; and (iv) free, prior and informed consent as fundamental requirements for responsible management of natural resources. The implementation of these provisions by private operators, especially certified operators, has had some tangible success through the development of infrastructure projects with socioeconomic benefits.

Such legal progress remains precarious, and implementation is often challenging given that some local communities lack the required managerial capacity. Current trends in development planning, land use planning policies and the consolidation of ultraliberal forest management approaches in the subregion, as well as land grabbing by national elites, suggest that the irrevocable legal recognition of community and indigenous forest rights are being sidelined. In the Congo Basin, occasional outbreaks of violence linked to efforts to claim these rights, coupled with a deep and legitimate desire for (sometimes unsustainable) development, are an ongoing concern.

Yet, there is another better possible path and future. First and foremost, enabling conditions for this optimistic scenario, public and political dialogues could complement the necessary reforms, as part of processes that genuinely mainstream local and indigenous peoples' demands. Secondly, national land use planning programmes, which may use different names, could map out customary lands of village communities and – as far as realistic – the territories on which indigenous peoples

Box C1 NaturAfrica: Mainstreaming the needs of people and the planet to address the conservation and sustainable management of biodiversity in priority landscapes in Africa

Chantal Marijnissen, Philippe Mayaux and Filippo Saracco

The 2019 European Green Deal (Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions (COM/2019/640 final) mentioned that "The EU will launch a 'NaturAfrica' initiative to tackle biodiversity loss by creating a network of protected areas to protect wildlife and offer opportunities in green sectors for local populations." NaturAfrica takes an integrated management approach to extensive landscapes: the Key Landscapes for Conservation and Development (KLCD). It focuses on protected areas but is of particular importance to local communities. NaturAfrica is based on three pillars: (i) conservation of biodiversity in areas of high biodiversity value, (ii) green economy and local development by and for the benefit of local communities and (iii) inclusive landscape governance which respects the opinions and interests of each stakeholder.

This initiative takes an innovative people-centred approach while preserving ecosystems and wildlife that are vital to all.

KLCDs were identified in *Larger than Elephants: inputs for an EU strategic approach to wildlife conservation in Africa*,[1] a publication which followed broad consultation of stakeholders, including national institutions, civil society and the private sector. The EU will concentrate its support to these landscapes and provide visibility to African natural parks via a response that includes fighting against biodiversity loss, creating sustainable jobs, improving security and the rule of law.

In Central Africa, some 20 KLCDs have been identified, ranging from the Sahelian savannas to dense humid forests, not to mention aquatic and coastal ecosystems..

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1 European Commission, 2016. Larger than Elephants: inputs for an EU strategic approach to wildlife conservation in Africa, European Commission, 500p, doi:10.2841/123569

depend for their livelihoods (allowing for several uses in the same space). This would not threaten governments' sovereignty over forests and land, but it would allow for local and indigenous peoples' land rights to be mapped out and finally recognized. Thirdly, land titles, or any other means of irrevocably securing the forest lands of local and indigenous peoples, could be gradually given, on a case-by-case basis. It is a compromise scenario, but a win-win one that should appease the most vindictive few at local level and remove a thorn in legislators' and policymakers' side.

These various possibilities underscore the need to better consider the diversity of customary rights in forest land management and to put the government back at the centre of forest management, with regulations tailored to realities on the ground. (see Box C1).

Final remarks

In their present state, the forests of Central Africa are relatively well preserved. They act as a lifeline for all of humanity, faced with the climate crisis and biodiversity loss. The continuity of the human species depends on the sustainable management of these rather fragile ecosystems. The fate of the Congo Basin forests must therefore be viewed as a joint responsibility of the Central African countries and of the international community, which have all for long benefited from these forests and placed their hopes in them for a secure future and a shared well-being.

This is why the forest ecosystems of the Congo Basin should be subject to equitable and fair agreements between, on the one hand, the States and stakeholders of Central Africa (the direct managers of these resources) and, on the other, the international community (including multinational private sector and philanthropic organizations), which provides the financial means and capacities for the protection and sustainable management of those forest ecosystems.

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The “State of the Forests of the Congo Basin” report is published periodically to present the state of the forest ecosystems of Central Africa and how they are managed. Following the 2015 edition devoted entirely to climate change, the 2021 report takes up several themes and is presented in four parts.

The report begins by examining the state of the resource, which is increasingly recognized across the world as a forest area crucial for carbon sequestration and for the conservation of biological diversity. The Congo Basin forest ecosystems are then put into perspective within the global context of discussions that can guide the management and governance of the entire world’s tropical forests for decades to come. The report then addresses topical issues such as peatland management and the relationship between the biodiversity management and the emergence or re-emergence of zoonotic diseases. And COVID-19 features notably in the chapter on this topic. Finally, the report identifies the main challenges that need to be addressed to achieve sustainable management of forest ecosystems in the Congo Basin, with the goal of ensuring that management contributes to improving the livelihoods and living environment of local communities and indigenous peoples.

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