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Scoping Study of Research-to-Action Priorities for Reversing Environmental Degradation in Africa and ASIA (REDAA) Programme: Central Africa

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About the Report

This scoping paper was written to inform and enhance the focus and research direction for the Reversing Environmental Degradation in Africa and Asia (REDAA) programme. It was commissioned by the International Institute for Environment and Development (IIED). Summaries of all the scoping papers can be found at www.redaa.org/scoping-studies. For more information about this report, contact: enquiries@redaa.org

About the REDAA programme

REDAA is a programme that catalyses research, innovation and action at local, national and regional levels across Africa and Asia through a series of grant calls. Funded projects are interdisciplinary, often locally led and focus on solutions for ecosystem restoration and wildlife protection, enabling people and nature to thrive together in times of climate, resource and fiscal insecurity.

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EXECUTIVE SUMMARY

This report was undertaken for the Reversing Environmental Degradation in Africa and Asia (REDAA) programme and provides an examination of environmental degradation issues in Central Africa. It identifies research-to-action priorities (RTAPs) that the REDAA programme could potentially support, and where evidence could be strengthened and taken up, tools can be improved and well used, and governance systems can be enhanced to reverse degradation and restore ecosystems. We also identify priority ecosystems and emerging degradation hotspots across Central Africa where RTAPs might be located.

The report draws on a mixed methods approach encompassing both desk research and primary data collection. A literature review synthesized insights from over a hundred academic papers and grey literature published in the last decade. In addition, key stakeholder interviews were conducted with experts actively working on these issues in Central Africa. These interviews aimed to gather perspectives and first-hand experiences related to environmental degradation in the region. An online survey was also employed to broaden the scope of data collection and provide insight into the causes of degradation across Central Africa and challenges faced in reversing it. Eight people responded to the survey, including regional experts working in environmental science, forestry, ecology and governance.

Section 2 draws on insights from the literature review, survey and key informant interviews to identify landscapes and ecosystems across the Central Africa region that are experiencing high rates of environmental degradation. We identify these as: Lake Chad, Central Africa's drylands and deserts, mangrove forests, and the Congo Basin. For each area, we provide an overview of the socio-economic and political context, and environmental situation. The level of detail provided here is reflective of the information available and accessible to the research team at the time of this study.

Our research identifies Cameroon and the Democratic Republic of Congo (DRC) as countries in Central Africa that face significant environmental challenges, with a pressing need for immediate intervention. As such we expand our analysis of these countries and put forward potential locations within them where REDAA could focus attention (Tables 2 and 3). We identified these countries and locations for potential focus on the basis of our overall analysis and from consideration of factors like habitat loss rates, biodiversity impact, community effects, and long-term ecological damage.

Section 3 summarizes findings from our review of ongoing initiatives in the region that are actively addressing environmental degradation (see Annex 3 for a full list). These initiatives are critically examined to identify their effectiveness and challenges. We also assess common trends across these initiatives and identify opportunities for REDAA to build on existing work in the region. The regional initiatives focus on sustainable land use, reduced deforestation and economic development to enhance conservation and sustainable development. To address environmental challenges, these initiatives emphasize policy reforms, capacity building, transboundary cooperation and community engagement. REDAA can capitalize on these insights by fostering knowledge sharing, enhancing capacity, facilitating transboundary cooperation, empowering local communities, aligning with climate resilience strategies, and improving spatial monitoring and reporting tools. By adopting a

holistic approach, emphasizing community involvement, and collaborating with regional partners, REDAA has the opportunity to contribute significantly to environmental conservation and regeneration in the region. Collaboration and knowledge sharing are highlighted as essential elements for the success of such endeavours.

Section 4 draws on insights from across our literature review, our review of regional initiatives and regional and national policies and frameworks, and inputs from our key informant interviews to assess current evidence, tools and governance issues relating to environmental degradation. We identify key gaps, challenges and opportunities under these themes, which are summarized in the following three paragraphs.

Evidence

To develop evidence-based policies and interventions, there is a pressing need for more comprehensive data and enhanced technical capabilities for managing and processing satellite images, and making effective assessments of degraded lands. Knowledge-sharing initiatives, such as improving data availability, promoting collaboration among stakeholders, and implementing effective communication strategies, are also vital to facilitate informed decision making and targeted interventions. In particular, a deeper understanding of the drivers of deforestation, including the roles of timber extraction, agriculture and mining industries, as well as the socio-economic pressures, particularly from subsistence farming, is required. Addressing underlying issues related to data, including challenges in availability and interoperability, can be achieved by enhancing data-collection methods, improving data-sharing mechanisms, and promoting standardized reporting practices. Intensified research into local communities' perspectives and challenges could provide insights for developing effective interventions.

Tools

Our analysis of the wide array of approaches, technologies, decision support tools and participatory strategies in the region sheds light on some of the challenges hindering their optimal implementation. A broader range of financing mechanisms that are practical options at local level, including public–private financing mixes, are needed to scale up programmes combating environmental degradation. Moreover, the integration of scientific and traditional knowledge is paramount, necessitating the creation of tools that amplify stakeholder participation and community engagement. While satellite-based Earth observation can generate useful impetus for action in countries lacking relevant data from other sources, indigenous technological solutions can also play a pivotal role, from implementing sustainable forest management practices to building the capacities of university laboratories and national institutions for planning and management.

Governance

Further context-specific research is needed into effective governance structures and mechanisms that emphasize transparency, accountability and stakeholder participation in natural-resource management decision making. To promote sustainable forest management in the region, responsible practices such as reduced impact logging, proper road planning and maintenance, enforcement of concession boundaries, and forest certification are crucial. Stakeholder interviews highlighted the value of ecosystem-based adaptation approaches in addressing climate change impacts on vulnerable communities, providing both protection

from extreme effects and ecological benefits that contribute to the livelihoods of local populations. Community-based forest management initiatives in the DRC, emphasizing local-level responsibility, have shown promise in reducing deforestation rates, improving economic outcomes and regulating artisanal logging. However, the growing pressure from mining also necessitates careful planning and more effective policy guiding sustainable practices, especially in mining-related infrastructure.

Potential research-to-action priorities for REDAA

To help address some of the challenges and opportunities identified above, a longlist of potential RTAPs was developed during the study (see Annex 8). The team drew on its own analysis and the expert opinion it accessed to consolidate this longlist into a shortlist of four potential RTAPs for REDAA in Central Africa:

1. Develop comprehensive and efficient systems for monitoring deforestation and forest degradation
2. Create innovative tools for financing reforestation and ecosystem restoration
3. Empower local communities to actively engage in sustainable forest management and conservation efforts
4. Strengthen environmental governance, transparency and law enforcement to combat illegal activities threatening biodiversity and ecosystems.

We suggest that these RTAPs are actionable and grounded in the reality of Central Africa's environmental landscape. By focusing on monitoring deforestation rates, developing innovative financing tools and improving governance (and especially stakeholder participation), REDAA can play a pivotal role in addressing the region's environmental degradation challenges. However, it is essential to recognize that these priorities are not isolated but interconnected, reflecting the complex nature of environmental issues. Therefore, a coordinated, multi-pronged approach that combines data-driven monitoring, financial innovation and governance enhancement will be crucial for the success of REDAA's efforts in the Central African region.

Collaboration between local stakeholders, partners, governments and international organizations will be key to achieving lasting results. The REDAA initiative has the potential to catalyse sustainable environmental management in Central Africa, helping to preserve its rich biodiversity, mitigate climate change and improve livelihoods for the region's communities.

1. INTRODUCTION

1.1 BACKGROUND

This scoping study aims to identify research-to-action priorities (RTAPs) for Central Africa that the Reversing Environmental Degradation in Africa and Asia (REDAA) programme could potentially support. It looks for RTAPs in three themes: where evidence can be improved and taken up; where tools can be improved and well used; and where governance systems can be improved for environmental restoration and sustainable natural resource management. We also identify priority ecosystems and emerging degradation hotspots across Central Africa where RTAPs might be located.

The study examined published literature and reports, and consulted with experts from various fields, including environmental science, forestry, ecology and governance. By clearly delineating RTAPs (see Section 4), this report equips REDAA with a roadmap to its support for environmental preservation and sustainable development in Central Africa.

1.2 INTRODUCTION TO THE STUDY AREA

The Central Africa region has a rich and diverse array of ecosystems that boast a breathtaking array of natural wonders ranging from dense rainforests to sprawling savannas, meandering rivers and towering mountain ranges.

The region has the second-largest rainforest in the world, after the Amazon rainforest. Central Africa's forests cover an estimated 1.62 million km². They are home to biodiversity that is vital to the planet and that plays a central role in regulating the Earth's climate, maintaining the water cycle and sequestering carbon. Some of the planet's most iconic and charismatic wildlife live in Central Africa.

The savannas and grasslands of Central Africa provide crucial habitat for large mammals such as elephants, lions and giraffes. Additionally, the area's wetlands and river systems, including the mighty Congo River, support unique aquatic life.

Central Africa is also a living space for more than 180 million people, and the region faces various human-caused threats driven by factors such as population growth and economic pressures. These threats include poaching of vulnerable and protected species, deforestation, including by agri-industry (for oil palm and rubber), unsustainable and illegal exploitation of natural resources (timber, minerals, wildlife, etc.), and the impacts of human infrastructure projects (dams, roads etc.).

Forest cover loss, soil erosion and pollution are among the top issues driving degradation. From 2000–2010, Central African rainforests were already shrinking at an annual deforestation rate of 0.11%, accounting for 50–60% of the total deforested area in Africa (Mayaux et al., 2013). The 2020 Global Forest Resources Assessment found Africa to have the largest loss of primary forest from 2010 to 2020. Over the course of the same decade, Central and West Africa suffered an average annual loss of 818,000 hectares of primary forest (FAO, 2022), with this rate reportedly rising in the 2015 to 2020 period (Eba'a Atyi R et al., 2022).

Mayaux et al.'s 2013 study also showed a decline in biodiversity, with 11.4% of mammal species, 1.4% of bird species and 15.3% of amphibian species being threatened with extinction. Maisels et al. (2013) estimated that 62% of Central Africa's forest elephants (*Loxodonta cyclotis*, classified as vulnerable) also disappeared from 2002 to 2011. Bush meat hunting affects about 178 species (Abernethy et al., 2013). Up to 4.5 million tonnes of bushmeat are estimated to be extracted annually from the Central African forests, with an estimated annual value of up to US\$205 million (European Commission, 2018).

Climate change presents a substantial risk to the carbon stocks in the Congo Basin peatlands, mangroves and wetlands, as it raises temperatures, disrupts precipitation patterns and intensifies extreme weather events. These alterations expedite the deterioration of these ecosystems, releasing stored carbon and compromising their crucial function as carbon sinks. Additionally, the impact of climate change on mangroves, including sea level rise and more frequent severe storms, as well as the threat of saline intrusion to coastal wetlands, further underscores the vulnerability of these environments,

A historical perspective is crucial to understanding environmental degradation in Central Africa. The extensive exploitation of African forests was intricately tied to European colonization in the late 19th and early 20th centuries. Colonial powers, in many instances, claimed the rights to exploit vast expanses of forested lands for timber and agriculture. This often led to the displacement of original forests to make way for lucrative commercial crops like cocoa, coffee, palm oil, rubber and tea (Eba'a Atyi R et al., 2022). Afterwards, the era of foreign colonization left newly independent states with unstable and flawed foundations on which to build effective governance. Governments favoured foreign investments, particularly in the timber and extractive industries, and did little to empower citizens and build their capacity. Regional divisions and alliances, military involvements in local and transborder conflicts, and relations among businesses and leaders, have severely constrained the emergence of inclusive governance. This has helped perpetuate executive authority and sustained the influence of foreign governments and corporations, to the detriment of the national economy, social welfare and environmental management. Ideas about protected areas as 'people-free zones', imposed during the colonial period, have also been retained long after it (Dowie, 2009).

Today, a major reason why the region's environment is degrading so fast is its very rapid population growth. More resources are being used, placing pressure on the environment more rapidly in Africa than on any other continent. By 2050, Africa is predicted to have the largest population on the planet (United Nations, 2022).

However, reversing environmental degradation in Central Africa is still possible with concerted efforts by governments, communities and international organizations. And it would be beneficial. For example, a 2015 study of 42 African countries showed that the net benefits of taking action against soil erosion on 105 million hectares of croplands between 2016 and 2030 could yield as much as US\$62.4 billion per year (Kgomotso, 2022). More recently, in December 2020, African Ministers of Environment voted to adopt a green stimulus initiative that tied environmental incentives to economic and social recovery.

1.3 METHODOLOGY

This scoping paper employs a mixed-methods approach, combining desk research, interviews and surveys with key stakeholders to develop a comprehensive understanding of the challenges, causes and potential solutions to environmental degradation in Central Africa.

Literature review: Our literature review serves as the foundation for the analysis in this report. It helps identify evidence-based information, including degradation hotspots, evidence gaps, effective tools, and best practices for addressing environmental degradation in Central Africa. The review involved a thorough examination of published and grey literature, reports and data, using Google Scholar, SCOPUS, ScienceDirect and Elsevier. In total, over a hundred publications were consulted.

Interviews with key stakeholders: Stakeholder interviews were carried out to help understand local perceptions, challenges faced in addressing degradation, and potential solutions, as well as barriers to implementation. Key stakeholders were selected based on their expertise and influence on policy and decision making. Four stakeholders were interviewed (see Annex 1).

Online survey: The online survey broadened the scope of data collection and provided insights into the causes of degradation across Central Africa and challenges faced in reversing it. Eight stakeholders participated in the online survey, offering some diverse perspectives. The survey questions were designed to extract information on the causes of degradation and the specific challenges encountered (see Annex 2 for survey questions). This data helped in understanding the multifaceted nature of the issue and complemented the insights from interviews.

Identifying degradation landscapes across Central Africa: Based on insights from the literature review, survey and key informant interviews we identify landscapes and ecosystems across the Central Africa region that are experiencing high rates of environmental degradation. These include: Lake Chad, Central Africa's drylands and deserts, mangrove forests and the Congo Basin. Through our scoping, Cameroon and the DRC emerge as countries in Central Africa that face significant environmental challenges, with a pressing need for immediate intervention. After expanding our analysis of these countries, we put forward potential priority locations within Cameroon and the DRC where REDAA could focus attention.

Identifying and shortlisting research-to-action priorities: Based on the findings from the literature review, interviews, and survey, a preliminary list of research-to-action priorities are identified for the REDAA programme (see Section 4). These were then evaluated against criteria provided by IIED. This process short-listed four top RTAPs. The eight evaluation criteria were:

1. **Scale-appropriateness.** The issue can be usefully addressed with the scale of support that may be possible from the REDAA programme, e.g. a grant of ~GBP50,000 to GBP100,000 over six to 24 months, or a grant of between ~GBP200,000 and GBP1.5 million over four years.

2. **Timeframe-fitting.** The issue can be completely addressed within six months to four years, or a significant contribution to addressing the issue can be made and verified within six months to four years.
3. **Value for money.** The way in which the issue is addressed will provide good returns on investment, benefits to costs and value for money.
4. **Site-specific impact.** If the issue was addressed it would have major impact in a specific place.
5. **Cross-cutting impact.** If the issue was addressed it would have major impact on systems or processes that affect many places.
6. **Locally led.** The issue is best addressed by locally led action, especially action led by local communities and Indigenous Peoples.
7. **Intersectional.** The issue is best addressed through intersectional understanding and empowerment of vulnerable groups, including Indigenous Peoples, women, youth, migrant workers, landless labourers and displaced peoples.
8. **Cross-disciplinary and multi-stakeholder.** The issue is best addressed by fostering multi-stakeholder and cross-/trans-disciplinary collaborations.

2. HOTSPOTS OF ENVIRONMENTAL DEGRADATION IN THE REGION

Central Africa has experienced significant environmental degradation, particularly in areas with high population densities, and where deforestation, mining and agriculture is occurring. A recent IIED report focusing on sub-Saharan Africa (Booker et al., 2023) highlights several key factors driving changes in biodiversity across the continent, including climate change, habitat conversion, overharvesting, pollution, invasive species and illegal wildlife trade.

This section draws on insights from the literature review, survey and key informant interviews to identify landscapes and ecosystems across the Central Africa region that are experiencing high rates of environmental degradation. These include: Lake Chad, Central Africa's drylands and deserts, mangrove forests and the Congo Basin. We provide an overview of the socio-economic and political context, and the environmental situation of each area. The level of detail provided here is reflective of the information available and accessible to the research team at the time of this study.

After identifying Cameroon and the DRC as countries in Central Africa that face significant environmental challenges, with a pressing need for immediate intervention, we then expand our analysis of these countries and put forward potential locations within these countries where REDAA could focus attention.

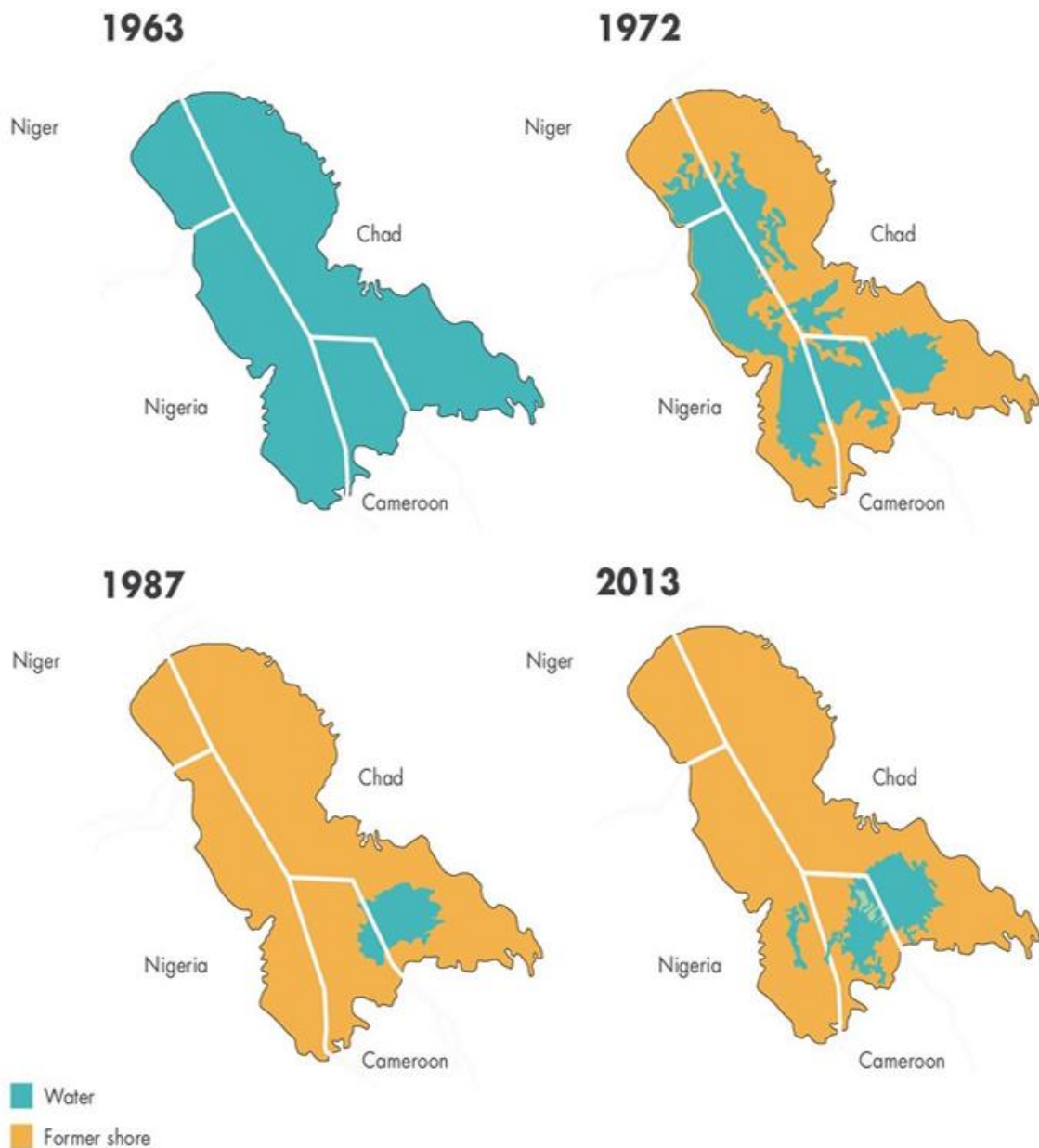
2.1 LAKE CHAD

Lake Chad is situated in the Sahel region of Africa. A few decades ago, its water area spanned parts of Cameroon, Chad, Niger and Nigeria. The lake has shrunk to a fraction of its previous area in recent decades, but it remains a crucial water source for millions of people.

2.1.1 Environmental context

From 1963 to 2013, Lake Chad experienced a 90% reduction in its water mass, leading to a significant shrinkage from 25,000 km² to 2,500 km² (Figure 1). The lake's diminishing size poses a severe threat to the resources and livelihoods of the region's 50 million inhabitants. Recurrent droughts, desertification, soil erosion, overexploitation of natural resources (such as trees for fuelwood), overfishing and unsustainable farming practices have led to a decline in agricultural productivity, increased poverty and food insecurity (Usigbe, 2019).

Figure 1: Changing surface area of Lake Chad, 1963–2013.



Source: Sow (2017)

2.1.2 Socio-economic and political context

The Lake Chad region faces significant socio-economic challenges characterized by its low development index, high poverty rates, limited educational opportunities, and inadequate access to fundamental social services, such as healthcare and education (Nagarajan et al., 2018; World Bank, 2020). In this region, the poverty rate surpasses 50%, while the literacy rate falls below 20% (World Bank, 2020). These socio-economic difficulties have been compounded by various factors, including historical governmental neglect, environmental degradation and ongoing conflicts (Nagarajan et al., 2018; Usigbe, 2019).

The political landscape in the Lake Chad region plays a pivotal role in shaping how challenges related to environmental degradation and socio-economic development are

addressed. Historically, the region has grappled with limited 'national integration' among differing groups of citizens, and marginalization of some groups. These factors have, in turn, fueled political tensions among the countries that share the lake (Nagarajan et al., 2018). The Lake Chad region has been plagued by conflicts, notably the Boko Haram insurgency in Nigeria. These conflicts have displaced communities, cost people their livelihoods and brought further economic hardship (Usigbe, 2019). Such conflicts have also strained political relations among neighbouring nations (Usigbe, 2019). The 2.8 million refugees in the Lake Chad area, coupled with an estimated 9.2 million people requiring humanitarian aid in the region, presents a very significant challenge (Mariama Sow, 2017).

Recognizing the significance of the political context, the international community, including organizations such as the United Nations (UN) and the European Union (EU), has been actively engaged in addressing the political and security dimensions of the Lake Chad crisis (OECD, 2014). There are also efforts to rescue Lake Chad from drying up by developing a water-transfer facility from the Congo Basin to the lake. However, technical difficulties, financial costs, unstable host environments and geopolitical rivalries reportedly stand in the way on the ground (Magrin & Mugelé, 2020). The UNDP has provided support to the region through various programmes, including by providing food assistance, capacity building and support for sustainable livelihoods, as well as support for peace building and conflict prevention.

2.2 DRYLANDS AND DESERTS

The Sahel is a transitional zone between North Africa's Sahara Desert and the more humid regions to the south. It experiences a semi-arid climate with an extended dry season and a brief rainy season. Encompassing several Central African countries, including Chad, northern Cameroon, northern Nigeria, Niger, Sudan and South Sudan, the drylands and deserts in the Sahelian transitional zone cover 20,000 km², the major portion of which is located in Chad (OSS, 2019). As well as the Sahel, Central Africa also features savannas and grasslands in certain areas, characterized by a climate that has periodic droughts and is generally drier than the densely vegetated rainforests.

2.2.1 Environmental context

The Sahel region is facing the severe challenge of desertification, a process through which once-fertile land progressively transforms into desert. The causes include overgrazing, deforestation and the impacts of climate change. The region also faces the challenges of land degradation and increases in extractive industrial activity, complicated by climate change (OECD, 2022). A primary contributor to the loss of biodiversity in the Sahel is agricultural expansion, particularly the adoption of land management practices that do not preserve soil and above-soil biodiversity.

For example, this region has witnessed alarming declines in the populations of its large mammals. According to the IUCN Redlist of Threatened Species, the scimitar-horned oryx (*Oryx dammah*), once widespread in the area, is now presumed to be extinct in the wild, with no confirmed reports of any wild oryx since 1988. Numerous gazelle species, including the critically endangered Dama gazelle (*Gazella dama*) and the vulnerable Dorcas gazelle (*Gazella dorcas*) and Red-fronted gazelle (*Gazella rufifrons*), were formerly abundant. Diminishing numbers of such species can have wider repercussions for ecosystems – the absence of their dispersal of plant seed, for example, impacts the regeneration of vegetation, alters species composition, and influences the overall structure of the ecosystem (Davies, 2017). Many large animal species are declining due to competition with livestock (WWF, 2017).

2.2.2 Socio-economic and political context

The Sahel and the savanna grasslands present shared socio-economic challenges for local communities. Water resources are scarce, and this has detrimental effects on agriculture, livestock and access to clean drinking water. This limits local people's livelihoods, health and well-being (FAO, 2021). Desertification and land degradation lead to soil infertility, making sustainable agriculture more challenging (UNCCD, 2021). This is exacerbating food security concerns in an already harsh climate, and communities often struggle to meet their nutritional needs (FAO, 2019). The looming spectre of climate change exacerbates these concerns, with the Intergovernmental Panel on Climate Change (IPCC) predicting a potential 20% reduction in rainfall for some African drylands by 2100, placing additional strain on communities and ecosystems (IPCC, 2021).

The political context in the region plays a pivotal role in shaping the environmental degradation challenges presented by drylands and semi-arid areas, and responses to them. Collaborative efforts among Central African nations will be essential if shared challenges, including water resource management and the impacts of desertification, are to be addressed (UNEP, 2020; World Bank, 2021; UNCCD, 2021).

2.3 MANGROVE ECOSYSTEMS

Mangrove ecosystems in Central Africa, located along the Atlantic coastline in countries such as Cameroon, Gabon, Equatorial Guinea, the Republic of Congo and DRC, play a vital ecological role (Murray et al., 2008; FAO 2023). These ecosystems, characterized by salt-tolerant trees, shrubs, and vegetation thriving in brackish waters, offer numerous environmental benefits (Ajonina et al., 2017). They serve as crucial breeding grounds for many marine species, including fish and shrimp, thus contributing to both local fisheries and global seafood supplies. Furthermore, mangroves act as natural buffers, shielding coastal areas from erosion, storm surges and tsunamis (Miranda et al., 2021). Their dense root systems trap sediments and filter pollutants, thereby enhancing water quality. Additionally, mangroves store significant amounts of carbon, playing a role in mitigating climate change (FAO, 2023c; Miranda et al., 2021).

2.3.1 Environmental context

Mangrove ecosystems in Central Africa face severe threats due to inadequate management and policy efforts, with significant ecological and socio-economic consequences (Corcoran et al., 2007). Deforestation poses a primary menace as mangroves are cleared for urban expansion, agriculture and aquaculture, fueled by rapid population growth and land demand (Richards & Friess, 2016). Moreover, many mangrove areas in the region lack essential legal protection and management, rendering them susceptible to exploitation (Gilman et al., 2017). Climate change compounds these challenges, with rising sea levels and higher temperatures negatively impacting mangrove health, while extreme weather events like storms and cyclones cause substantial habitat damage (Alongi, 2015). Overexploitation of resources, including timber and fisheries, further degrades these ecosystems, as unsustainable practices like overfishing and illegal logging exacerbate their decline (Huxham et al., 2015). Industrial activities, such as timber and petroleum extraction and gas-flaring,

introduce pollutants into mangrove environments, adversely affecting their health and the species they support (Alongi, 2015; Martin & Burgess, 2023b; One Earth 2021).

2.3.2 Socio-economic and political context

Mangrove ecosystems in Central Africa are indispensable to the well-being of coastal communities. These communities heavily rely on the resources provided by mangroves, including fish, timber and non-timber forest products, for their livelihoods (FAO, 2023c). However, despite these benefits, Central Africa's mangroves face a range of threats. Deforestation, urban development, and climate change pose significant challenges to the sustainability of these ecosystems (Kissinger et al., 2012).

2.4 THE CONGO BASIN

The Congo Basin, the sedimentary basin of the Congo River, is home to the second largest block of dense moist forest in the world (after the Amazon) and covers over 1.5 million square miles across several countries, including the DRC, Cameroon, Gabon, the Republic of Congo, Equatorial Guinea and the Central African Republic.

2.4.1 Environmental situation

Since 1980, the rate of forest loss has accelerated, with no fewer than 18 million hectares of tropical moist forest disappearing between 2000 and 2020, according to the 'State of the Forests 2021' report on the Congo Basin forests (Eba'a Atyi et al., 2022). Table 1, adapted from Vancutsem et al. (2021) in Dalimier et al. (2022), shows a considerable decrease in 'undisturbed' tropical moist forests in Cameroon, the Central African Republic, Republic of the Congo, the DRC and Gabon, as measured over five year periods from 2000 to 2020. Additional analysis shows the annual disturbance rate was considerably higher for the period 2015–2020 than for 2005–2015, increasing from 1.36 million hectares per year between 2005 and 2015 to 1.79 million hectares per year between 2015 and 2020 (Vancutsem et al., 2020 in Dalimier et al., 2022).

Table 1: Average annual change in area of undisturbed tropical moist forest in the Congo Basin computed over five-year time frames by country.

Study	Timeframe	Cameroon	CAR	RC	DRC	Gabon
Vancutsem et al. 2021	Annual rates in %					
	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

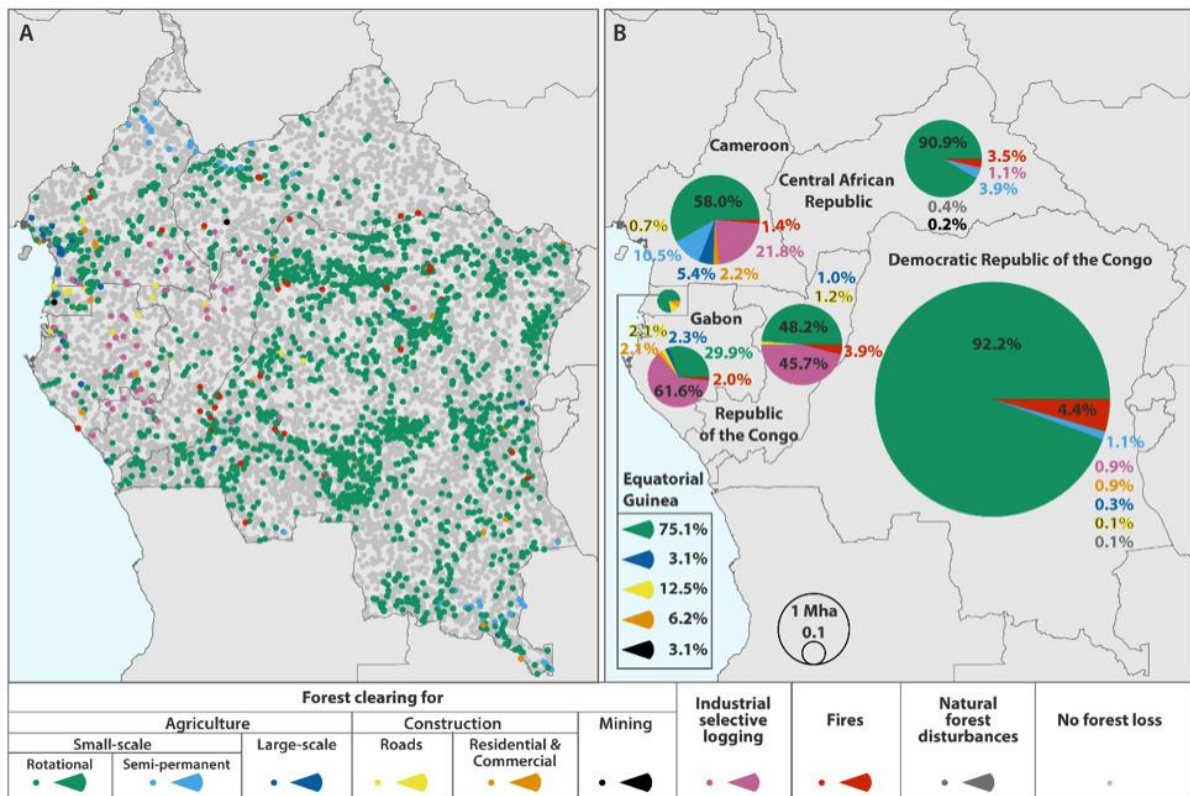
Adapted from Vancutsem et al. (2021) in Dalimier et al. (2022).

CAR: Central African Republic, RC: Republic of the Congo, DRC: Democratic Republic of the Congo.

In 2020, the Congo Basin experienced a troubling surge in primary forest loss, according to recent data from the Global Forest Watch (GFW, 2023). The loss exceeded 600,000 hectares, a 9% increase from the previous year. Both the DRC and Cameroon were among

the 10 countries globally with the highest primary forest loss (with the challenge of forest loss primarily in mind, we expand our analysis for these two countries below – see Section 2.5. Agricultural activities and overgrazing have had a significant impact, particularly in the Kasai and Upper Congo sub-basins – see Figure 2 (Tyukavina et al., 2018).

Figure 2: Forest disturbance in the Congo basin (2000 to 2014).



Source: Tyukavina et al. (2018).

The dominant type of erosion and degradation in the Congo Basin is the loss of topsoil through water erosion (sheet erosion), which occurs in 32% of the entire area, followed by a loss of nutrients and organic matter through chemical degradation (Mushi et al., 2019). Degradation in the form of nutrients and organic matter lost due to chemical pollution affects 21% of the area (Mushi et al., 2019).

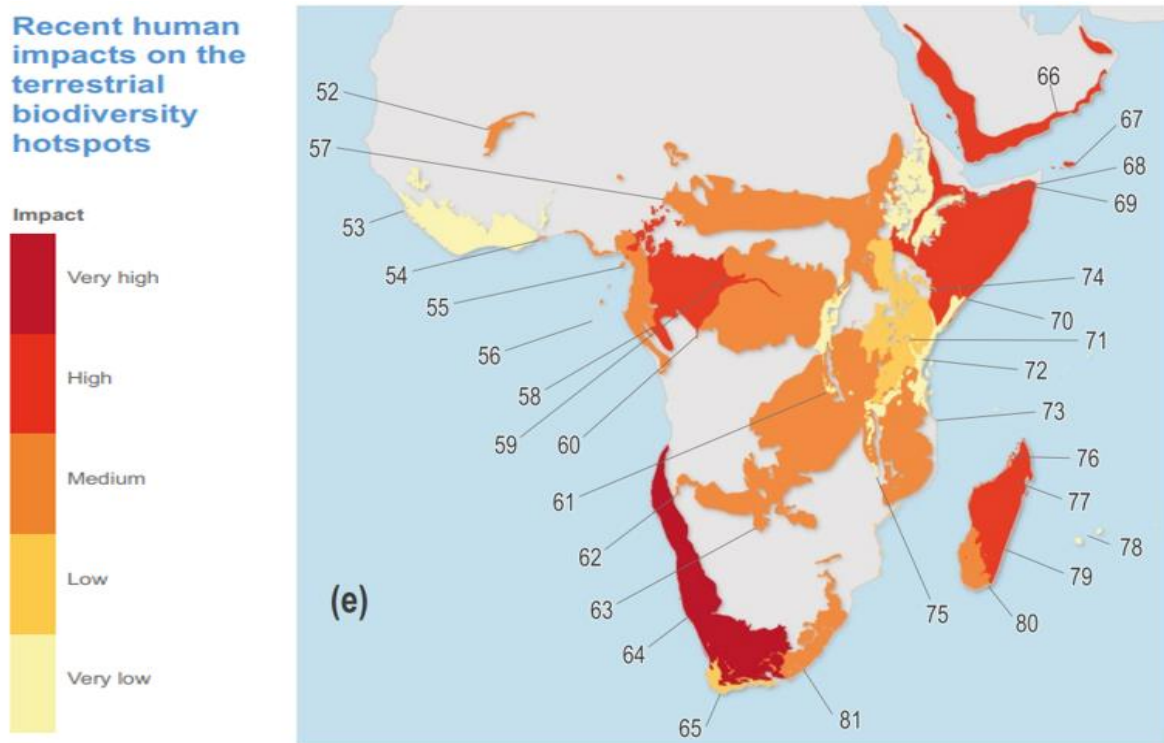
Habitat loss from activities like agriculture, logging and infrastructure development threaten the Congo Basin's valuable biodiversity. Costello et al. (2022) evaluated recent human impacts on the terrestrial biodiversity hotspots to be very high in Western Congo Basin Moist Forests, Northeastern Congo Basin Moist Forests and Central Congo Basin Moist Forests, and high in Cameroon Highlands Forests and Congolian Coastal Forests (Figure 3).

Forest elephants, gorillas, chimpanzees, and various primate species are decreasing in number due to habitat loss and also hunting. Various species are at risk of extinction.

The illicit trade in wildlife, involving items such as ivory, bushmeat and exotic pets, presents a significant danger to the distinct and varied species within the region, and contributes to population declines and ecosystem disruption. African apes (bonobos, chimpanzees and gorillas) and other mammals, such as the Central African elephant and forest buffalo are victims of national and transnational poaching networks. Attacks against park rangers

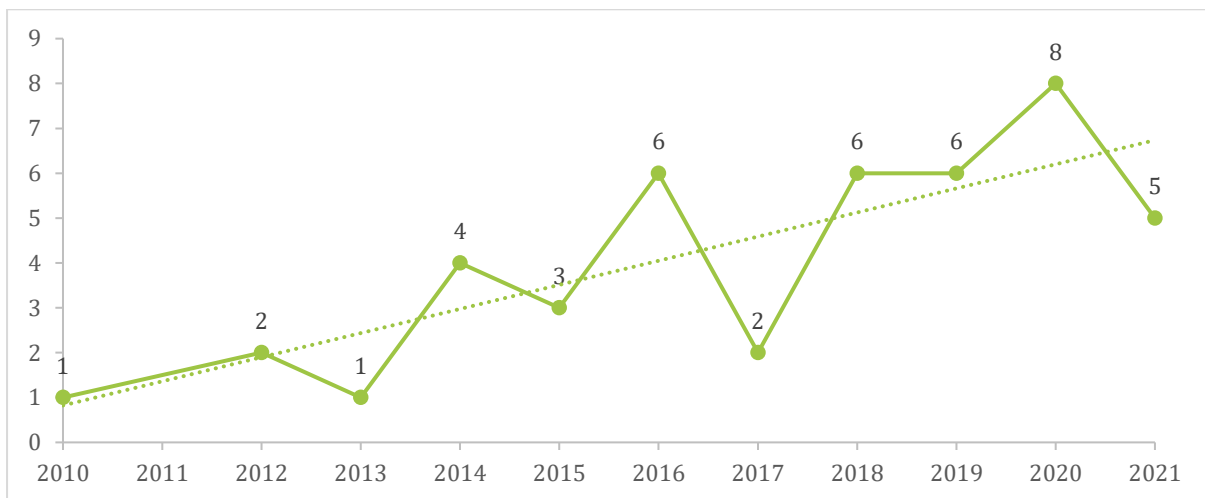
recorded by the Armed Conflict Location & Event Data Project (Ojewale, 2022) were considered merely sporadic a decade ago. However, attacks on rangers are now showing an upward trend (Figure 4).

Figure 3: Recent human impacts on terrestrial biodiversity hotspots across sub-Saharan Africa.



The following hotspots from Central Africa can be identified in the figure: Cameroon Highlands Forests = no. 55, Western Congo Basin Moist Forests = no. 58, Northeastern Congo Basin Moist Forests = no. 59, Central Congo Basin Moist Forests = 60. Numbers correspond with numbering on the map. Source: Costello et al. (2022).

Figure 4: Attacks on park rangers in the Congo Basin, 2010–2021.



Source: ACLED via Ojewale, 2022

Changes in climate patterns have the potential to impact the distribution and behaviours of species in the Congo Basin. Certain species might struggle to adapt to changing conditions, possibly leading to shifts in biodiversity.

To halt or reverse environmental degradation in the Congo Basin, a comprehensive approach is needed that addresses the root causes. This approach should include sustainable land-use practices, natural resource conservation and climate-smart agricultural practices. Additionally, local communities need better awareness of the importance of environmental conservation.

The international community has recognized the importance of reversing environmental degradation in the Congo Basin. In 2005, the Congo Basin Forest Partnership (CBFP) was established to promote sustainable forest management and conservation in the region. The CBFP includes over eighty partners, including governments, civil-society organizations and international organizations. The partnership has been instrumental in developing policies and programmes that promote sustainable forest management, conservation and climate change mitigation in the region.

The international community has also provided support to the region through various initiatives, including the REDD+ programme – a climate change mitigation strategy that provides financial incentives to reduce emissions from deforestation and forest degradation in developing countries and promote sustainable forest-management practices. However, REDD+ has imposed restrictions on local forest practices, and this has limited communities' ability to manage for uncertainty because rigid rules 'lock-in' communities' natural capital through carbon contracts for both certified and non-certified REDD+ projects (Hajjar et al., 2021).

2.4.2 Socio-economic and political context

The countries within the Congo Basin have diverse economies. They heavily rely on natural resources such as minerals, timber and agricultural products for economic growth (World Bank Group, 2015). The forest contributes significantly to the region's economy. Aquila (2022) gives some estimates: forests contribute approximately 11% of the gross domestic product (GDP) for the Central African Republic, while for Cameroon and Gabon the contribution stands at around 3% each. In the DRC, forests generate approximately 17% of GDP, whereas in the Republic of Congo, Aquila (2022) estimates the contribution to be around 4%, and in Equatorial Guinea it stands at about 1.5%.

Mining is a prominent economic activity, particularly in certain countries like the DRC, which is rich in mineral resources such as cobalt and coltan (World Bank Group, 2021).

Subsistence agriculture is a common livelihood for many people in the Congo Basin, with small-scale farming providing food and income (FAO, 2023b). The socio-economic challenges in the region include poverty, low levels of education and limited access to healthcare and basic social services (World Bank, 2023a). The Congo Basin encompasses several of the world's most impoverished nations, with the DRC accounting for 60% of the rainforest in the Congo Basin. Nearly 62% of Congolese, or around 60 million people, live on less than US\$2.15 a day (World Bank, 2023b). The lack of education and limited access to healthcare has led to poor health outcomes, as well as limited knowledge about sustainable land-use practices and the importance of environmental conservation (UNDP, 2020).

However, Indigenous communities and local populations frequently maintain profound affiliations with the forest, depending on it for their cultural traditions and means of sustenance (World Bank, 2023a).

The political landscape in the Congo Basin countries varies. Some countries have experienced political stability, while others have faced conflicts and governance challenges (EU, 2018). Political instability, corruption and weak governance have, at times, hindered sustainable development and effective natural resource management in the region (Forest Trends, 2018). Fluid political dynamics have exerted influence on conservation endeavours, often disrupting their implementation. These disruptions stem from shifts in political leadership and the repercussions of conflicts (USIP, 2016). Conflicts, corruption and weak governance have all enabled unsustainable land-use practices, including deforestation, illegal logging and wildlife poaching (ICG, 2022). Enforcement efforts are under-resourced. A 2016 World Wildlife Fund (WWF) study involving forest rangers from twelve African countries, including Cameroon, revealed that 59% of rangers felt inadequately equipped, while 42% lacked sufficient training to perform their duties effectively.

2.4.3 International donors and conservation organizations

Two institutional donors stand out in the context of addressing environmental degradation in the region: the US government, via its Central African Regional Programme for the Environment (CARPE), and the European Union, via the Central Africa Forest Ecosystems programme (ECOFAC, from its French name *Ecosystèmes Forestiers d'Afrique Centrale*).

These two programmes have supported much work in the region on conservation policy, biodiversity information, mapping and satellite monitoring. They have also fostered regional collaboration and common practice (for example through the Congo Basin Forest Partnership, see below).

Annex 3 explores the major programmes of international donors and conservation organizations in the region. Some of the most prominent are:

- **Central Africa Forest Initiative (CAFI).** CAFI is a partnership between six Central African countries and multiple donors, including the World Bank, UNDP and the European Union. It focuses on reducing deforestation and promoting sustainable land use, offering financial incentives to countries that meet certain conservation targets.
- **Congo Basin Forest Partnership (CBFP).** This partnership involves governments, international organizations, NGOs and the private sector working together to enhance forest management, combat illegal logging and promote sustainable livelihoods for local communities.
- **World Wildlife Fund (WWF).** WWF operates in the Congo Basin, focusing on protecting wildlife and their habitats, promoting sustainable forestry practices, and engaging local communities in conservation efforts.
- **Rainforest Foundation UK.** This organization supports Indigenous Peoples and local communities in their efforts to protect their forest territories. They provide legal and technical assistance, helping communities secure their land rights and conserve their forests.

- **The Congo Basin Blue Fund.** This initiative, established by the African Development Bank, aims to protect aquatic ecosystems in the Congo Basin, including rivers and lakes, by improving water resource management and promoting sustainable development.
- **United Nations Development Programme (UNDP).** The UNDP supports various projects in the Congo Basin that focus on sustainable land management, biodiversity conservation and building the capacity of local institutions to manage natural resources. Beyond environmental sectors the UNDP has supported the region through programmes on food assistance, capacity building, sustainable livelihoods, peacebuilding and conflict prevention.
- **Global Environment Facility (GEF).** GEF provides funding for projects that address environmental issues in the Congo Basin, such as deforestation, biodiversity loss and climate change adaptation.
- **African Forest Forum (AFF).** AFF brings together forest stakeholders, researchers and policymakers to discuss and promote sustainable forest management practices in Africa, including the Congo Basin.
- **Congo Basin Adaptation Initiative (CBAI).** Led by the African Development Bank, CBAI aims to make ecosystems and communities in the Congo Basin more resilient to climate change.
- **Norway's International Climate and Forest Initiative (NICFI).** NICFI is pushing for implementation of REDD+ (Reducing Emissions from Deforestation and Forest Degradation Plus) programmes in the region, seen by some organizations as essential to ensure continued funding of conservation efforts.

2.5 DEGRADATION HOTSPOTS IN SELECTED COUNTRIES

While all countries in Central Africa face environmental challenges, here we expand our analysis of Cameroon and DRC based on the severity of the issues and the critical need for immediate intervention to address pressing environmental degradation. The selection of these countries emerged out the combined analysis from our literature review and stakeholder interviews, with consideration for factors like habitat loss rates, biodiversity impact, community effects and long-term ecological damage.

2.5.1 Cameroon

Cameroon boasts remarkable biodiversity, ranking fifth in Africa for fauna diversity and fourth for flora diversity (LIST, 2016; Ndobe & Mantzel, 2014). Yet, the ecoregion's rich natural heritage faces significant threats from deforestation and land use change, from bush-meat hunting, and from ivory poaching.

The heart of this biodiverse treasure is the Guinean forest, celebrated for its plethora of endemic species and acknowledged as a vital biodiversity hotspot. Remarkably, Cameroon leads in documenting the highest proportion (61%) of endangered and critically endangered species within the Guinean forests (UNEP-WCMC, 2022).

In 2020, Cameroon saw intensified forest destruction, with over 100,000 hectares of primary forests lost: nearly double the 2019 figure (Erickson-Davis, 20218). Conflict with Indigenous communities arose from the actions of Camvert, a palm-oil company, which cleared forested areas. Cameroon's deforestation drivers are primarily forest conversion for agriculture (accounting for 80% of forest loss), followed by fuelwood harvesting and illegal logging (Ndobe and Mantzel, 2014). Most deforestation activities are concentrated in the southwest of the country, home to some of Africa's most biodiverse rainforest areas.

Particularly concerning is the expansion of rubber plantations in southern Cameroon, which poses a significant threat to rainforests. Greenpeace reported a rapid increase in rubber plantation size, with estimates of 10,050 hectares deforested since 2011 and plans for an additional 20,000 hectares, and warned that this expansion jeopardizes the integrity of vital regions like Dja and the survival of its wildlife (Greenpeace, 2018).

Intervention opportunities arise from the Aichi Biodiversity Target 11 Country Dossier study on Cameroon, which identifies both protected and unprotected key environmental hotspot areas crucial for intervention. Priority should be given to those with no existing protection, especially in deforestation hotspots and the area listed in Table 2.

Table 2: Cameroon's biodiversity hotspots, deforestation zones and soil degradation.

Biodiversity hotspot areas	Deforestation areas	Soil degradation
<p>The Ebo Forest is home to one of the only two remaining populations of Preuss's red colobus, a critically endangered monkey that ranks among the most endangered primates worldwide (scidev, 2021a; scidev, 2021b).</p> <p>Tri-national Dja-Odzala-Minkebe is one of Africa's elephant poaching hotspots (IUCN/PACO, 2013).</p> <p>Bouabandjida National Park The northern part of the park is very difficult to access for conservation services. Anti-poaching activities are not properly carried out due to a lack of resources and accessibility. Poaching by foreign poachers is a major problem for the preservation of the animal species present in the park and, more generally, for its long-term survival (IUCN/PACO, 2013).</p>	<p>Cameroonian Highlands Forests. The main threats to this ecoregion are the unsustainable exploitation of firewood, overgrazing, fire damage, agricultural encroachment and hunting (CEPF, 2015). Forest cover has declined by more than 50% since the 1960s through conversion to cultivation because of the relatively fertile soils, derived from volcanic rock, and the reliable rainfall in this area. This has also resulted in a high human population density (Martin & Burgess, 2023a) resulting in the loss of endemic species and habitat degradation.</p>	<p>The Western Highlands, including areas around cities like Bafoussam and Dschang, experience soil degradation due to unsustainable agricultural practices, including deforestation, slash-and-burn farming and excessive use of chemical inputs (Njini et al., 2018).</p> <p>Douala faces soil degradation because of urbanization and infrastructure development, leading to soil compaction and sealing (World Bank, 2018)</p> <p>Regions with mining activities, such as the eastern part of Cameroon, have reported soil degradation due to excavation, soil erosion and chemical pollution from mining operations (Blanchard et al., 2018).</p>

2.5.2 Democratic Republic of the Congo

The DRC stands out as one of the world's most biodiverse regions, encompassing vast tropical rainforests spanning 1.55 million km². These provide over 50% of Africa's forest resources, serving as crucial contributors to global ecosystem services (UNEP, 2017).

Meanwhile, the DRC faces significant development challenges, as evidenced by its ranking of 179th out of 191 countries and territories worldwide in the 2021 Human Development Index.

Notably, data from 1990 to 2018 reveals concerning trends in forest cover within the DRC. During this period, there was a net annual deforestation rate of 2.12 ± 0.07% and an annual degradation rate of 0.12% (Achille et al., 2021).

Population growth emerges as a primary driver of deforestation, exerting substantial pressure on the country's natural resources. Subsistence agriculture, often near large-scale industries, remains a common cause of deforestation. Additionally, conflict and mining concessions have exacerbated forest cover loss, with adverse impacts on forest communities (Butsic et al., 2015; Mwitwa et al., 2012).

In 2021, the most pronounced forest cover loss occurred in northern regions of the country, particularly in Bas-Uélé, Mongala, Tshopo, Haut-Uélé and Ituri. These areas, including the Bili Uéré reserve, experienced notably high levels of deforestation. For instance, the Okapi Wildlife Reserve, home to the endangered okapi, lost 0.53% of its primary forest between 2002 and 2020, while Ituri and Haut Uélé exhibited much higher rates at 6.8% and 7.1%, respectively (Erickson-Davis, 2021). The ongoing threats and declining numbers of the okapi have led to its classification as endangered by the IUCN.

The Aichi Biodiversity Target 11 Country Dossier study on the DRC unveils significant opportunities for intervention. This comprehensive study identifies key environmental hotspots, including both protected and unprotected areas, where urgent action is essential. Priority should be accorded to regions currently lacking protection, particularly those falling within deforestation and biodiversity hotspots, as well as those specified in Table 3.

Table 3: DRC's biodiversity hotspots, deforestation zones and soil degradation.

Biodiversity hotspots	Deforestation areas	Soil degradation areas
Itombwe Massif: Located in the eastern part of the DRC, the Itombwe Massif is a biodiversity hotspot known for its unique and diverse flora and fauna. It is home to several endemic species, including the Itombwe golden frog (<i>Mantella aurantiaca</i>) and the Itombwe owl	Bas-Uélé region: The Bas-Uélé region, located in northern DRC, has experienced high rates of deforestation in recent years. This area has been affected by agricultural expansion and logging activities, leading to substantial forest loss (Global Land Analysis and Discovery, 2021).	Kivu region: The Kivu region in eastern DRC has witnessed soil degradation because of both agricultural practices and conflict-related factors. Extensive farming activities, including slash-and-burn agriculture, have led to soil

<p>(<i>Bubo itombwensis</i>) (IUCN, 2021).</p> <p>Kahuzi-Biega National Park: This UNESCO World Heritage Site in eastern DRC is famous for its population of eastern lowland gorillas. It is also a hotspot for other primates, such as the eastern chimpanzee and the eastern red colobus monkey (World Heritage List, 2021).</p> <p>Lomami National Park: Located in central DRC, Lomami National Park is part of the larger TL2 landscape, which is recognized for its high biodiversity. It is a stronghold for bonobos and supports various other wildlife species (Bonobo C. I., 2019).</p> <p>Okapi Wildlife Reserve: This reserve in northeastern DRC is a UNESCO World Heritage Site and is primarily known for its population of okapis, which are endemic to the region. It also hosts a wide array of other species, making it a biodiversity hotspot (World Heritage List, 2021).</p>	<p>Mongala region: Like Bas-Uélé, the Mongala region in northern DRC has witnessed significant deforestation, primarily driven by agricultural expansion and logging activities. The loss of forest cover in this region is a cause for concern (Global Land Analysis and Discovery, 2021).</p> <p>Tshopo region: The Tshopo region, also in northern DRC, is another deforestation hotspot. Agricultural activities, logging and infrastructure development have contributed to the degradation of forests in this area (Global Land Analysis and Discovery, 2021).</p> <p>Haut-Uélé region: The Haut-Uélé region in the north of the DRC has experienced notable deforestation, with pressures from agriculture and logging being major drivers of forest cover loss (Global Land Analysis and Discovery, 2021).</p> <p>Ituri region: located in the northeastern part of the DRC, has also seen significant deforestation. Factors such as agricultural expansion, logging and infrastructure development have led to the loss of primary forest cover in this region (Global Land Analysis and Discovery, 2021).</p>	<p>erosion and fertility loss in this area (Hirons et al., 2016).</p> <p>Equateur province: Equateur province in northwestern DRC has seen soil degradation linked to deforestation, slash-and-burn agriculture and the expansion of oil palm plantations. These activities have led to reduced soil fertility and environmental degradation (Hilson et al., 2018).</p>
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3. REGIONAL INITIATIVES

Numerous initiatives are under way to reverse the environmental degradation that has been taking place in Central Africa. By adopting their best practices, new initiatives can accelerate their contribution to reversing environmental degradation, thus improving the livelihoods of local communities in Central Africa.

Annex 3 explores how, by working towards sustainable land use, reducing deforestation, and supporting economic development, these initiatives are actively promoting the region's conservation and sustainable development. We examined the practical aspects of such initiatives to identify their effectiveness and challenges.

We found that, collectively, regional initiatives emphasize the importance of:

- **Policy reforms:** Implementing national frameworks, strengthening governance and promoting inclusive participation.
- **Capacity building:** Training local communities, law enforcement and experts in conservation methods.
- **Transboundary cooperation:** Collaborating across borders to protect shared ecosystems.
- **Community engagement:** Involving local communities in conservation efforts and sustainable resource management.

3.1 OPPORTUNITIES FOR REDAA

From these insights, we identify several opportunities for REDAA:

- **Knowledge sharing:** REDAA can collaborate with these initiatives to share knowledge and best practices in environmental conservation and sustainable development.
- **Capacity building:** Leveraging the expertise of these initiatives, REDAA can enhance the capacity of local communities and institutions in the region.
- **Transboundary cooperation:** REDAA can facilitate cooperation among countries in Central Africa for effective conservation across borders.
- **Community empowerment:** REDAA can focus on engaging local communities in environmental protection and livelihood improvement projects.
- **Climate resilience:** Many initiatives emphasize climate change mitigation, and REDAA too can align its efforts with climate resilience strategies.
- **Monitoring and reporting:** Building on the use of Spatial Monitoring and Reporting Tools, REDAA can enhance monitoring and reporting of environmental changes in the region.

In summary, REDAA can benefit from the experiences of these initiatives by adopting a holistic approach to environmental conservation, emphasizing community involvement, and working

closely with regional partners to address pressing environmental challenges in Central Africa. Collaboration and knowledge sharing will be key to the success of such efforts.

4. POTENTIAL RESEARCH-TO-ACTION PRIORITIES FOR REDAA IN CENTRAL AFRICA

This section draws on insights from across our literature review, our review of regional initiatives and regional and national policies and frameworks, and inputs from our key informant interviews to assess current evidence, tools and governance issues relating to environmental degradation in Central Africa. Where possible we identify key gaps, challenges and opportunities under these themes, and then offer a short list of four RTAPs for REDAA in Central Africa. A longlist of RTAPs is also provided in Annex 6.

4.1 EVIDENCE

The availability of reliable and current data on environmental trends in Central Africa, such as deforestation rates, carbon emissions and biodiversity loss, is inadequate. It is challenging, for example, even to reach a consensus on the primary causes of deforestation and forest degradation in Central Africa, due to insufficient data on recent trends in tree-cover loss and a lack of the technical capacity to manage and process satellite images (FAO, 2023a).

Certainly, to gain a better understanding of the factors driving environmental degradation and to develop evidence-based policies and interventions, more data is required. Strengthening national capabilities to enable effective assessments and to map degraded lands, as recommended by the United Nations Sustainable Development Goals (SDGs), is necessary to reduce and ideally reverse deforestation. Research is also needed into the effectiveness of existing policies, institutional arrangements and governance structures related to environmental conservation in Central Africa.

There is also a notable need for increased knowledge sharing. Priority actions could include strengthening data availability, promoting data sharing and collaboration among stakeholders, and developing effective communication strategies to disseminate research findings to decision makers and the public. Our key stakeholder interviews identified underlying structural and operational issues concerning data and information, including challenges related to data availability, the interoperability of systems and an inability to generate comparable reports. By enhancing data-collection methods, improving data-sharing mechanisms and promoting standardized reporting practices, the region could facilitate informed decision making and targeted interventions.

In particular, research is needed to better understand what is causing and driving deforestation. Timber extraction, agriculture and mining industries are all partly responsible. However, our interviews with key stakeholders also reinforced a crucial finding from the literature: that subsistence farming is often a primary driver of deforestation in Central Africa, reflecting a significant socioeconomic pressure. So, as well as recording what is happening where, intensifying research into ongoing initiatives and issues related to local communities (the 'why' rather than the 'what') could offer a deeper understanding of the challenges local people face, and thus help develop effective interventions.

4.2 TOOLS

In addressing the critical challenge of environmental degradation in the Central African region, various approaches, technologies, decision support tools and participatory methods are actively deployed. Our analysis identifies some challenges associated with their implementation. Expert interviewees in particular suggested that more effective financing mechanisms are needed to scale up programmes to reverse environmental degradation. They also suggested that integration of scientific and traditional knowledge be prioritized to enhance stakeholder participation and community engagement in research and decision-making processes. Moreover, Indigenous technological solutions should be developed to implement sustainable forest management practices, building the capacities of university laboratories for effective planning and management. Additionally, more effective utilization of satellite-based Earth observation is needed as the basis for planning in data-limited countries and in enhancing national data sources (Giuliani et al., 2020).

4.3 GOVERNANCE

We reviewed regional and national policies, frameworks and community initiatives aiming to reverse environmental degradation in DRC and Cameroon (see Annex 4 and 5). More research is needed to better understand the region's governance structures and mechanisms and identify areas for improvement, such as transparency, accountability and stakeholder participation in decision-making about natural-resource management.

However, it is clear that to foster sustainable forest management in the region, it is imperative to adopt responsible practices such as implementing reduced impact logging techniques, properly planning and maintaining roads, enforcing concession boundaries and obtaining forest certification (e.g., via the Forest Stewardship Council). With the assistance of the Forest Law Enforcement Governance and Trade (EU FLEGT) action plan, countries in the Congo Basin have made significant progress in managing their production forests. Over a span of ten years, approximately 40% of the exploited forests have implemented effective sustainable-management plans. Additionally, around 18% of the forests utilized for production have received certification, indicating adherence to recognized standards of sustainable practices (Texier & Mayoux, 2014).

Key stakeholder interviewees identified ecosystem-based adaptation approaches as valuable in addressing climate change impacts on vulnerable communities. These approaches offer win-win outcomes by not only protecting communities from the extreme effects of climate change, but also providing a range of ecological benefits that contribute to the livelihoods of local populations.

Earlier studies indicated that community-based forest-management initiatives in the DRC can potentially reduce deforestation rates and bring economic benefits for local communities. The progress reported by Hoare (2010) was attributed to transferring responsibilities to the local level, and making interventions more efficient and effective. Artisanal logging had been largely regulated and formalized, and the performance of industrial timber companies also showed improvement, while revenues for the forest authorities increased. Recognizing the constraints posed by limited state resources for forestry management, attributed to the country's socio-political and socio-economic challenges, a law was enacted in February 2016 to establish regulations governing the management of concessions by forest communities. Subsequently, in 2018 and 2019, the Ministry of Environment formed a

steering committee to oversee the national strategy on community forestry in the DRC (CBFP, 2021). Enforcing this law in the DRC offers the potential for a cost-effective and efficient approach to forest management.

Furthermore, timber extraction, whether commercial or artisanal, is far from the only pressure on forests. With the growing expansion of mining, it is crucial to prioritize carefully planned and sustainable mining practices, especially concerning mining-related infrastructure (Grantham et al., 2020).

4.4 A RESEARCH-TO-ACTION PRIORITY SHORTLIST FOR REDAA

Based on the review and the analysis of issues related to environmental degradation in Central Africa, and the reflections provided above and in Section 3, a long list of potential research-to-action priorities was proposed (see Annex 6). After reviewing this longlist against the REDAA criteria (see Section 1.3), and consulting key informants and experts from the region, we short-listed RTAPs for REDAA that are of a manageable size and duration, aiming to ensure they are both feasible and effective in addressing environmental issues in the region. These are listed below.

We propose one RTAP under the theme of evidence, one under the theme of tools, and two under the theme of governance. Under each RTAP we also suggest specific actions REDAA might take.

4.4.1 Evidence

RTAP 1. Develop comprehensive and efficient systems for monitoring deforestation and forest degradation.

Potential actions for REDAA to support:

- Support projects using advanced remote sensing technologies, including satellite imagery and drones, to generate frequently updated monitoring information on deforestation rates.
- Train local technicians and communities in data collection, interpretation and reporting.
- Establish a centralized database accessible to national stakeholders and international partners to store and share deforestation data.
- Promote information sharing between international organizations and Central African countries to enhance cross-border deforestation control efforts.

4.4.2 Tools

RTAP 2. Create innovative tools for financing reforestation and ecosystem restoration.

Potential actions for REDAA to support:

- Support work to establish a regional fund dedicated to financing reforestation and ecosystem restoration initiatives, with contributions from governments, international donors and private investors.

- Explore options for carbon payments, ecotourism revenue and green bonds to generate funding for restoration projects.
- Develop public–private partnerships to leverage private sector resources and expertise in restoration efforts.

4.4.3 Governance

RTAP 3. Empower local communities to actively engage in sustainable natural resources management and conservation efforts.

Potential actions for REDAA to support:

- Establish community-led conservation committees to facilitate local participation in decision making and resource management.
- Promote sustainable livelihood alternatives for forest-dependent communities, such as agroforestry, ecotourism and non-timber forest product collection.
- Support training and capacity-building programmes for local community members on sustainable land use and conservation practices.
- Develop and support implementation of policies that ensure rights and benefits for Indigenous and local communities within conservation and management efforts.

RTAP 4. Strengthen environmental governance and law enforcement.

Improve environmental governance, transparency, and law enforcement to combat illegal activities threatening biodiversity and ecosystems.

Potential actions for REDAA to support:

- Enhance law enforcement efforts through training and equipment provision, and by deploying surveillance technologies.
- Promote the inclusion of environmental impact assessments in development projects, with a focus on restoration and conservation.
- Develop and enforce policies that support alternative livelihoods for communities dependent on forest resources, reducing their reliance on unsustainable or illegal activities.
- Foster collaboration and information sharing among law enforcement agencies, local communities and conservation organizations to combat environmental crimes.

ANNEXES

ANNEX 1. STAKEHOLDERS INTERVIEWED

Respondent number	Area of expertise	Type of organization	Role/thematic expertise
1	Central Africa	Multilateral organisation	Global director for environment, natural resources and blue economy
2	Cameroon	University	Agricultural research for development
3	DRC	Government organisation	Peatland management coordinator
4	Cameroon	International research organization	Director of landscapes governance research

ANNEX 2. SURVEY QUESTIONNAIRE

REDAA priority action areas – Central Africa Region

As a follow-up to our discussion during the interview, UNU-INRA shared the action areas to be ranked according to priorities. Based on these rankings, one action area for each thematic area will be selected as the most appropriate course of action for REDAA intervention. See below criteria for identifying priorities.

1. **Scale-appropriate:** The issue can be usefully addressed with the scale of support that may be possible from the REDAA programme, e.g. a grant of between about GBP50,000 and 100,000 over 6–24 months, or a grant of between about GBP200,000 and 1,500,000 over 4 years.
2. **Timeframe-fitting:** The issue can be completely addressed within 6 months to 4 years, or a significant contribution to addressing the issue can be made and verified within 6 months to 4 years.
3. **Value for money:** The way in which the issue is addressed will provide good returns on investment, benefits to costs and value for money.
4. **Site-specific impact:** If the issue was addressed it would have major impact in a specific place.
5. **Cross-cutting impact:** If the issue was addressed it would have major impact on systems or processes that affect many places.
6. **Locally led:** The issue is best addressed by locally led action, especially action led by local communities and indigenous peoples.
7. **Intersectional:** The issue is best addressed through intersectional understanding and empowerment of vulnerable groups including Indigenous Peoples, women, youth, migrant workers, landless labourers, and displaced peoples.
8. **Cross-disciplinary and multi-stakeholder:** The issue is best addressed by fostering multi-stakeholder and cross/trans-disciplinary collaborations.

1. Evidence - Priority Action Area

- a) Monitor and report on rates of deforestation and forest degradation for comprehensive and up-to-date data on the extent and severity, and drivers of environmental degradation.
- b) Intensify research on ongoing initiatives, socio-economic drivers of deforestation, issues around community participation and effective stakeholder coordination and promotion of community ownership of natural resources.
- c) Intensify close interaction between national stakeholders and international agencies involved in data and information systems to improve national capacities, data accessibility and support technical workflows Which could address inter-institutional and cross-country issues related to data sharing, harmonization and systems interoperability

- d) Strengthened Country-to-country information exchange mechanisms to facilitate technical dialogues on reversing environmental degradation target identification and comparability across countries.
- e) Strengthening national capabilities to enable effective assessments and mapping of degraded lands, as recommended by the United Nations Sustainable Development Goals.

Please give reasons for your answers

2. Tools - Priority Action Area

- a) Strengthen national and regional information systems and increase technical capacity to appropriately monitor and control land degradation using available tools, such as Collect Earth and Trends (using drones, GPS, ...). Improving access to quality and high-resolution data
- b) Strengthen capacities and knowledge to adopt ecosystem-based adaptation approaches to maximize synergies between environmental conservation and rehabilitation efforts
- c) Integration of scientific and traditional knowledge, develop tools that will increase stakeholder participation and community engagements to have a voice in research and decision-making processes
- d) Establish and strengthening the capacities of local actors in the field of gender and climate change. Formulate principles to ensure that the gender dimension is taken into account in reversing environmental degradation plan process as well as in sectoral and subnational policies, projects and programmes to advance climate change adaptation
- e) Developing tools for innovative financing mechanisms, including more financing options for scaling up reverse environmental degradation programmes, such as different types of public-private financing mixes.
- f) Develop indigenous technological solutions implementing sustainable forest management practices, and building the capacities of university laboratories and national institutions, and providing the monitoring and evaluation department with competent managers and technicians with a strong technical capacity for planning and management

Please give reasons for your answers

3. Governance- Priority Action Area

- a) Financial incentives/subsidies- Research to adopt policies that support smallholder farmers' implementation and adoption of sustainable agricultural practices (financial incentives, subsidies)
- b) Policy and regulatory support: Advocate for developing and enforcing strong environmental policies and regulations.

- c) Prioritize carefully planned and sustainable mining practices, especially concerning the development of mining-related infrastructure
- d) Identify innovative ways and mechanisms of encouraging and fostering stakeholder partnerships and coordination in environmental management.
- e) Improve transparency, accountability, and stakeholder participation in decision-making processes related to natural resource management. Improving law enforcement, and promoting alternative livelihoods for forest-dependent communities.
- f) Intensify programmes to address challenges of policy incoherence, effectiveness of existing policies and legal frameworks and build capacity at local and national levels as well as promote social inclusion.
- g) Strengthening environmental governance, promoting eco-tourism, carbon payments, or different types of bonds or blended finance, supporting reforestation efforts, transformed the region into a model of environmental sustainability and resilience

Please give reasons for your answers

4. Are there any other comments, ideas or suggestions you would like to share with us? / Y a-t-il d'autres commentaires, idées ou suggestions que vous aimeriez partager avec nous ?

ANNEX 3. INTERNATIONAL AND REGIONAL INITIATIVES

Initiative	Protected area location and size/country of intervention	Main threats	Goals	Achievements	Intervention strategies
Central African Forest Initiative (CAFI)	Central African Republic Democratic Republic of the Congo (DRC) Cameroon Republic of Congo The Republic of Equatorial Guinea Gabon	Corruption threatens to undermine the initiative's objectives. If corruption and its drivers are left unchecked and undetected, support to CAFI's intended beneficiaries is threatened, ultimately causing irreversible harm to the second largest tropical rainforest in the world.	<p>To support governments in the region to implement reforms and enhance investments to halt drivers of tropical deforestation</p> <p>To catalyse high-level policy dialogue and scaled-up funding to support ambitious reforms and on the ground action to reduce forest-related emissions and poverty</p> <p>To recognize and preserve the value of the forests in the Central African region to mitigate climate change, reduce poverty and contribute to sustainable development</p>	<p>27,000 pilots in perennial and food-crop agroforestry</p> <p>The first 30,000 farmers directly supported</p> <p>4,500 ha of fast-growing trees planted to provide fuelwood</p> <p>16,500 ha of savannas collectively protected for natural regeneration</p> <p>Nearly 100,000 improved stoves produced</p> <p>Lower energy expenditure in the area: 17% in Goma, 17% in Bukavu, 19% in Lubunbashi, and 13% in Kinshasa</p> <p>Over 7.5 million ha covered by community-developed plans</p> <p>1,200 inclusive local development committees with the participation of women</p>	<p>Developing and implementing National Investment Frameworks (NIFs) endorsed at the highest level by national institutions with cross-sectoral mandates</p> <p>Providing funding based on the achievement of policy and programmatic milestones that are spelled out in letters of intent</p> <p>Encouraging donor coordination and alignment of bilateral assistance to partner countries based on NIFs</p> <p>Promoting inclusive participation of all stakeholders</p>

<p>Central Africa Regional Program for the Environment (CARPE)</p>	<p>DRC Republic of Congo Central African Republic</p>	<p>Habitat destruction Poaching Bushmeat trade Environmental destruction from civil and military conflicts Growing population Mining Agricultural expansion</p>	<p>First phase: To gather baseline information on Central African forest ecosystems and build human and institutional capacities.</p> <p>Second phase: To support sustainable natural resource management practices on the ground, improving environmental governance and strengthening natural resource monitoring capacity.</p> <p>Third phase: To protect and manage forests and wildlife in the selected landscapes. To reduce the rate of forest degradation and loss of biodiversity.</p>	<p>A massive landscape management system introduced, which is improving the management of over 50 million ha of fragile and highly sensitive tropical forest throughout seven Central African countries</p> <p>Tens of thousands of individuals have been trained from government, local and international NGOs and communities in a variety of conservation methods and techniques</p> <p>Creation of a regional African organization based in Kinshasa, DRC, capable of analysing satellite remote-sensing data</p> <p>National civil society has been trained and motivated to work hand-in-hand with local communities, governments and the international community to educate and organize local groups to play an active role in forest and biodiversity conservation programmes</p>	<p>Implementing a large network of partners: conservation NGOs and federal agencies, which count among them the Department of Interior, NASA, and the US Department of Agriculture</p> <p>Strengthening the monitoring of changes to forest cover, greenhouse gas emissions and biodiversity capacity by utilizing remote sensing techniques</p> <p>Increasing local, national and regional natural resource management capacity by training experts in the region and disseminating satellite-derived products to all users</p> <p>Large-scale ecosystem management approaches through the “landscape program”</p> <p>Policy reform to support sustainable forest management systems and, more directly, to support local communities’ in obtaining clear access rights to forest resources and associated ecosystem service payments</p>
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<p>Central Africa World Heritage Forest Initiative (CAWHFI)</p>	<p>TRIDOM-TNS (more than 250,000 km², covers 17 protected areas including 6 in Cameroon, 5 in Congo, 4 in Gabon and 2 in the Central African Republic), and three outstanding sites on the World Heritage List:</p> <p>Dja faunal reserve (Cameroon, covers 5,260 km²),</p> <p>Lope okanda landscape (Gabon, 5,119.91 km²)</p> <p>Sangha trinational (Cameroon, Congo, Central Africa Republic, 7 463 km²)</p>	<p>Commercial hunting and poaching</p> <p>Deforestation by agro-industry and mining, and oil exploration</p> <p>Infrastructure project</p> <p>Illegal exploitation of natural resources</p> <p>Impacts of armed conflicts</p> <p>Illegal occupation of sites, invasion</p> <p>Agricultural expansion linked to demographic pressure</p>	<p>Strengthen the management of protected areas while improving their integration within the region's various ecological landscapes</p>	<p>Deforestation is stabilized, fauna is preserved</p> <p>Inscription of three sites on the World Heritage List. Two additional new sites are potential nominations for the World Heritage List</p>	<p>Strengthening the institutional and functional framework</p> <p>Better surveillance of territories with the organization of 3,500 patrols</p> <p>Capacity-building and training of 350 eco-guards</p> <p>An unprecedented transboundary inventory of threatened mammal populations</p> <p>Raising awareness about the importance of heritage protection to 3,000 local stakeholders</p>
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Great Green Wall	<p>Approximately 15 km wide and almost 8,000 km long stretching across 11 countries, from Senegal in the west all the way to Djibouti in the east across Chad.</p>	<p>Climate change Droughts Violent conflicts (Boko Haram) Poverty Population growth Agricultural expansion Unplanned irrigation Poor governance Lack of funding</p>	<p>Restore 100 million ha of degraded land, and promote sustainable land and water management in the drylands of Africa</p>	<p>18 million ha of land restored Over 350,000 jobs created Around US\$90 million in revenues generated from 2007 to 2018 Rural poverty reduced and close to 120,000 jobs in farm-related activities created</p>	<p>Planting the right types of vegetation in the right place Regulating and promoting the practice of Farmer-Managed Natural Regeneration (FMNR) Working with communities, governments and NGO partners to rehabilitate degraded land and manage land and water resources Promoting sustainable management practices Supporting and strengthening community-based natural resources management</p>
Central Africa Forest Ecosystems Conservation (CAFEC)	<p>Tri-National Sangha – DRC and Republic of Congo Protected areas (21,470 km²): Nouabale-Ndoki National Park</p>	<p>Bushmeat trade Poaching</p>	<p>Goal: To build local and national capacity to implement land-use management plans designed to reduce greenhouse gas emissions and conserve biodiversity based on participatory and inclusive approaches that engage key stakeholder groups</p>	<p>Reducing deforestation, forest degradation and greenhouse gas emissions, resulting in increased carbon sequestration in the Congo Basin Managing more than 12.8 million ha of high conservation-value habitat in established protected areas</p>	<p>Strengthening the capacities of the protected area with a public-private partnership Working with forest concessions to fight against poaching</p>

	<p><u>Leconi-Bateke-Lefini</u> – Republic of Congo</p> <p>Protected areas (35,164 km²):</p> <p>Lefini Faunal Reserve</p> <p>Lesio-Louna Gorilla Sanctuary</p> <p>Ogooue-Leketi</p>	<p>Unsustainable logging</p> <p>Slash and burn agriculture</p> <p>Wildfire</p> <p>Unsustainable firewood harvesting and charcoal production</p>	<p>Objective 1: To develop approaches and strengthen capacity to sustainably manage forest landscapes</p> <p>Objective 2: To mitigate biodiversity threats in targeted forest landscapes</p>	<p>Training more than 300 eco-guards and 50 wildlife law enforcement agents and judicial officials</p> <p>Introducing SMART (Spatial Monitoring and Reporting Tool) technology across all eight landscapes, providing real-time data and improving the efficiency and effectiveness of anti-poaching and enforcement patrols</p>	<p>Improving management of protected areas</p> <p>Increasing wildlife law enforcement and prosecution activities</p> <p>Improving farming techniques</p> <p>Developing a REDD+ programme addressing uncontrolled burning and firewood management</p>
	<p>Lake Tele Lake Tumba – DRC</p> <p>Protected areas (126,440 km²):</p> <p>Lac Tele Community Reserve (LTCR)</p> <p>Ngiri Triangle Nature Reserve</p> <p>Tumba-Ledima Nature Reserve</p> <p>Mabali Scientific Reserve</p>	<p>Poaching</p> <p>Bushmeat and ivory trade</p> <p>Slash-and-burn agriculture</p> <p>Bushfires</p> <p>Firewood and charcoal</p> <p>Artisanal logging</p>		<p>Developing and disseminating a variety of outreach materials to improve people's knowledge of existing laws and the rights of local communities and resource users, with a special focus on engaging women and disadvantaged groups</p>	<p>Management of reserves and community reserves</p> <p>Promotion of sustainable alternative activities</p> <p>Development of REDD+ financing mechanisms</p>

	<p>Salonga – DRC Protected areas (33,361 km²): Salonga National Park</p>	<p>Poaching Bushmeat and ivory trade Unsustainable fishing</p>			<p>Capacity building for the management of protected areas Land development Environmental law enforcement Reduction of the impact of extractive industries Integration of REDD+ through the Mai Ndombe programme</p>
	<p>Maringa – DRC Protected areas (74,544 km²): Lomako- Yokokala Wildlife Reserve Kokolopori Bonobo Nature Reserve Iyondji Community Bonobo Reserve Luo Scientific Reserve Yala Community Forest Reserve</p>	<p>Slash and burn agriculture Poaching Commercial and illegal logging Charcoal production</p>			<p>Ensuring the sustainable management of targeted forest landscapes through implementation of REDD+ Mitigating threats to biodiversity in targeted forest landscapes through the development of conservation tools and techniques Supporting the improvement of living conditions and resource management practices of surrounding communities Intensification and sedentarization of agricultural activities</p>

	<p>Maiko – DRC</p> <p>Protected areas:</p> <p>Maiko and Kahuzi Biega National Parks</p> <p>Tayna and Itombwe Nature Reserves</p> <p>Kisimba-Ikobo Primate Reserve</p>	<p>Population pressure</p> <p>Slash-and-burn agriculture</p> <p>Illegal activities such as animal hunting and artisanal mining</p> <p>Insecurity, political instability and corruption</p>			<p>Improving the management of protected areas</p> <p>Clarification of land tenure</p> <p>Education and commitment of women and men in the conservation of biodiversity</p> <p>Strengthening the capacity in park management</p>
	<p>Ituri-Epulu-Aru – DRC</p> <p>Protected areas:</p> <p>Okapis Wildlife Reserve (RFO)</p> <p>Mai-Tatu Community Reserve</p>	<p>Poaching of elephants for ivory</p> <p>Unsustainable commercial hunting</p> <p>Deforestation and degradation due to unsustainable practices</p>			<p>Strengthening of RFO management and law enforcement support,</p> <p>Incentives for communities in the reserve and community-based natural resource management areas to strengthen conservation support,</p> <p>Development of a REDD+ project</p>
	<p>Virunga – DRC (790,000 ha)</p>	<p>Political insecurity</p> <p>Poaching</p> <p>Oil exploitation</p>	<p>To reduce adverse impacts of climate change and threats to biodiversity in the Virunga Landscape</p>	<p>Targeted forest landscapes sustainably managed</p> <p>Biodiversity threats in targeted forest landscapes mitigated</p>	<p>Strengthen the implementation of land-use management plans</p> <p>Strengthen forest protection and create community forests</p>

				<p>A reduction in deforestation and forest degradation rates in Virunga National Park</p> <p>Reduced household consumption of charcoal and fuelwood in participating households has led to energy cost savings</p> <p>More than 3,597 community members, (including 2,263 men and 1,334 women) and ICCN staff have been trained and taught skills to improve biodiversity conservation and REDD+</p>	<p>Strengthen local governance</p> <p>Enhance community's capacity in biodiversity conservation and REDD+</p> <p>Promote sustainable livelihood alternatives</p> <p>Facilitate access to family planning and health services in communities where health-sector partners are active</p> <p>Strengthen Protected Area management capacity</p> <p>Enhance law enforcement and increase prosecutions</p>
Reducing emissions from deforestation and forest degradation (REDD+)	PIREDD Sub-Ubangi – DRC: Sub-Ubangi	<p>The expansion of slash-and-burn agriculture</p> <p>Urbanization</p> <p>Mining</p> <p>Energy requirements</p> <p>Poor practices in honey-harvesting operations and the collection of caterpillars</p>	<p>Integrate the REDD+ vision into local development.</p> <p>(1) Strengthen sustainable land management to encourage planned development that reduces forest degradation</p> <p>(2) Support agricultural projects with low impact on the forest (agroforestry, reclamation of savannas, improvement of agricultural routes, etc.) through the</p>	<p>Good agricultural practices have been introduced in the intervention area through agroforestry and intercropping</p> <p>Affected households have adopted good agricultural practices in their fields through the cultivation of coffee, cocoa, fruit trees and caterpillars</p> <p>The project facilitated the distribution of seedlings of coffee, cocoa, caterpillar trees, fast-growing trees and fruit trees</p>	<p>Improving production through the provision of seeds and plant materials and agricultural advisory services</p> <p>Support for capacity building of the Ministry of Agriculture and the Ministry of Rural Development, and project management</p> <p>Improving the capacity for planning and sustainable land management through the implementation of management plans to minimize the impact on the forest</p>

		Intense logging	<p>establishment of REDD+ criteria for the evaluation of grant applications</p> <p>(3) Strengthen capacities of actors to integrate REDD+ into local development</p>	<p>to members of farmers' organizations, households in community-led development groups and private planters</p> <p>Roughly 1,490 have been established in the four territories of the province of Sud Ubangi</p>	
	PIREDD Equator	<p>Slash-and-burn agriculture</p> <p>Illegal logging</p> <p>Production of wood energy</p> <p>Strong demographic growth</p>	<p>Address the drivers of deforestation and promote resilient development, based on local livelihoods in six pilot sectors and outskirts of the city of Mbandaka, in the province of Equateur, through six implementation components: governance, land use planning, family planning/demography, agriculture, forestry, and energy</p>	<p>Agricultural investments that respect the forest and improve the livelihoods of rural populations, including the vulnerable and marginalized (women, Indigenous Peoples, etc.)</p> <p>Reduction of the share of non-sustainable wood energy: wood energy is produced from sustainable sources of supply (outside natural forests), in woodlots established on the outskirts of major population centres and in the savannas and around dwellings in rural areas</p> <p>Deforestation and degradation resulting from forest exploitation are reduced thanks to more sustainable management</p>	<p>The promotion and implementation of various local and community models of forest management</p> <p>Support local communities in the application procedures for various local and community models of sustainable forest management and in securing land rights, in particular within the framework of integrated programmes.</p> <p>Support strategy for integrated programme areas defined with the Permanent Multisectoral Technical Committee for Family Planning, based on needs analysis.</p> <p>Promotion and implementation of various local forest management models</p>

				<p>Human activities are better planned, optimizing the use of space and reducing the impact on forests</p> <p>Good governance is ensured, allowing effective, cross-cutting and integrated, transparent, equitable and sustainable implementation of REDD+, based on results and integrating all stakeholders' information, consultation, participation and ownership. This also includes gender, which guarantees the balance between men and women.</p>	<p>Agricultural supervision and production/distribution of inputs system in place in each Integrated REDD+ Programme at the end of year 2 of implementation, for the wide dissemination of sustainable agricultural technologies in line with sedentarization. Respecting the zoning plans.</p>
	PIREDD Mai-Ndombe – DRC	<p>Agriculture (slash and burn)</p> <p>Production of charcoal to supply the city of Kinshasa</p> <p>Illegal artisanal logging</p> <p>Artisanal forest exploitation</p> <p>Bushfires</p>	<p>Reduce 27.7 million tons of CO₂ and improve the livelihoods of 150,000 people, including 75,000 women and 15,000 Indigenous Peoples, make agriculture in the forest more sustainable, and protect primary forests</p>	<p>In the savanna zone, the communities have agreed to introduce oil palm into their agricultural activities in view of the present (PES) and future economic benefits that they will derive once the plantations have reached maturity. Out of a target of 1,650 ha, the project set up with the communities 1,693 ha, i.e. 102.6% compared to the final target and 172% compared to the target of Phase 1.</p>	<p>Partnership coordination</p> <p>Stakeholder consultations, meetings, national validation workshops and working groups, with specific attention to Indigenous peoples</p> <p>Benefit-sharing mechanism</p>

				<p>The project has created 1,800 ha of forestry plantations and protected a 9,751 ha area</p> <p>The production and implementation of 480 Natural Resource Management Plans (PGRN) out of the 600 expected</p> <p>A total of 4 Territorial Plans and 1 Provincial Plan has been produced and validated</p> <p>The project has revitalized the Permanent Multisectoral Technical Committee for Family Planning (CTMP-PF) in the province of Mai-Ndombe</p> <p>In total, 480 CLDs have been structured/revitalized since the launch of the project. Also, the project has made CARGs operational at the sector and territory levels</p>	
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	PIREDD Kwilu	<p>Slash-and-burn agriculture</p> <p>Illegal logging</p> <p>Production of wood energy</p> <p>Demographic growth</p>	<p>Avoidance of deforestation and carbon sequestration through the promotion of agroforestry</p> <p>Improve population living conditions through agroforestry</p>	<p>In 2020: planting was implemented on 456 ha (303 ha of 33 villages, 153 ha of 20 concessions) for Season B 2019</p> <p>In 2021: 494 ha (354 ha of 51 villages, 140 ha of 44 concessions) for Season B 2020 and 738 ha (543 ha of 53 villages, 195 ha of 23 concessions) for Season A 2021</p> <p>Capacity-building of agents for monitoring the application of REDD+ policies and measures in order to incorporate them into the SNSF has been carried out</p>	<p>Reforestation for mixed agroforestry (acacia, oil palm, fruit trees, cassava, etc.)</p> <p>Strengthening of the province's policy and governance in the implementation of REDD+</p> <p>Capacity-building training for provincial administrators</p> <p>Protection of the local environment through the involvement of villagers</p> <p>Promoting women's participation in traditional societies in rural areas requires a time-consuming process and careful dialogue</p> <p>Public awareness</p>
	PIREDD Mongala – DRC	<p>Slash-and-burn agriculture</p> <p>Illegal logging</p> <p>Production of wood energy</p> <p>Bushfires</p>	<p>Sustainably reduce deforestation and forest degradation and improve the living conditions and incomes of the inhabitants of MONGALA province (including women, young people and Indigenous Peoples).</p>	<p>18.8 ha have been reforested by people affected by the consciousness awakens</p> <p>Revitalization of the Provincial Forest Advisory Council with the holding of a quarterly consultation meeting on forest governance</p> <p>The communities of 10 groups have defined their needs for post-harvest processing equipment</p>	<p>Communication strategy and deployment of “awareness-raising” teams</p> <p>Sensitization of the province (elected, executive, government, provincial administrations)</p> <p>Support for the marketing of agricultural products and support for the search for concerted solutions to the problems of the movement of goods and people</p>

				<p>Training of Field-School Farmers-fertility (CEP-F)</p> <p>Four CEP-Fs have chosen to specialize in rainfed rice cultivation, including one CEP-F composed entirely of women. These FFS received 11 improved varieties of rice</p> <p>Two students from the Faculty of Agronomy of the Free University of Bumba have started their research on the effects of the FFS fertility system around rice and maize crops</p> <p>Characterization of intra- and inter-community conflicts in 11 additional priority groups (the results will be integrated into the Simple Land Development Plans) (total of 15 groups)</p> <p>Five Simple Land Development Plans drawn up and validated (which the project nevertheless wishes to review and improve)</p> <p>Conduct a socio-economic study in the three territories of the province of Mongala</p>	<p>Dissemination of sustainable agricultural technical itineraries: improved fallow land, sedentarization of farms, improvement of the quality of plant material, promotion of fruit trees</p> <p>Support for reforestation initiatives for the eventual use of timber and energy production.</p> <p>Strengthening access to inputs and information on family planning</p> <p>Strengthening the administrative, financial, IT, and reporting capacities of Technical Development Services (CPEDD, IPA, IPDR, CPSR) and providing equipment (computers and safes)</p>
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	<p>PIREDD Oriental – DRC</p> <p>Sites: Bas-Uele, Ituri, and Tshopo</p>	<p>Slash-and-burn agriculture</p> <p>Artisanal exploitation of timber</p> <p>Production of wood energy (charcoal and firewood)</p> <p>Artisanal mining</p> <p>Industrial logging</p> <p>Weak governance of natural resources</p> <p>Demographic pressure</p> <p>Rehabilitation of road infrastructure</p> <p>Rapid urbanization of cities</p>	<p>Reduce deforestation and forest degradation, and sustainably improve the incomes of local communities.</p> <p>(1) Improve the governance of natural resources (forests and lands)</p> <p>(2) Reduce the impact of economic activities and population dynamics on forests in target areas</p>	<p>The governance of natural resources (forests and land) is improved in the target areas</p> <p>The impact of economic activities and population dynamics on forests is reduced in the target areas</p> <p>4,000 ha of reforested land</p> <p>12,200 improved stoves distributed</p> <p>The overall carbon impact of the programme is thus estimated at approximately 10.8 million tons CO₂ equivalent</p> <p>Improved income of programme beneficiaries</p>	<p>Structuring and capacity building of multi-actor and multi-sector consultation structures</p> <p>Support for the development of concerted land and resource use plans</p> <p>Support for the clarification and registration of land rights</p> <p>Transparent implementation of REDD+ interventions</p> <p>Improving the prevalence of modern contraceptive methods in the target areas</p> <p>A better understanding of demographic dynamics</p> <p>The overall carbon impact of programme interventions, conservatively estimated</p>
<p>The African Forest Landscape Restoration Initiative (AFR100)</p>	<p>25 country partners in Africa including Cameroon, Chad, DRC, Central African Republic</p>	<p>Corruption</p>	<p>To bring 100 million ha of degraded land into restoration by 2030</p>	<p>111 million ha of commitments, signalling the continuing drive across Africa to bring back productivity to its land</p> <p>Where: Cameroon committed 15 million ha, Central African Republic 3.5 million ha, Chad 1.4 million ha, the Republic of Congo 2 million ha, and DRC 8 million ha</p>	<p>Brings together political leadership with financial and technical resources to support a large-scale Forest Landscape Restoration (FLR) movement across Africa</p> <p>Provides a platform to work together more effectively to accelerate restoration successes</p>

					<p>International partners support national efforts and deploy resources to partner countries</p> <p>Engages all relevant stakeholders in the assessment of restoration opportunities and identification</p> <p>Step-wise approach to engage supporting countries and partners in planning and implementing FLR activities</p> <p>Restores the environment in ways that provide multiple benefits in areas both economic and environmental.</p> <p>Includes multiple simultaneous restoration strategies and objectives within a single area.</p> <p>Implements forest landscape restoration with nationally driven systems so as to maintain coherence, as without strong guidance measures to ensure the goals of the programme are reached, this is likely to be less or possibly minimally effective</p>
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Sources: Berk and Lungungu, 2020; Cawhfil, 2012; CBFP, 2013; CBFP, 2021; CEPF, 2015; Conseil National Climat Gabonais, 2020; Davies, 2017; Guanabara and Ltda, 2020; Hajjar et al, 2021; Kissinger et al, 2012; OSAN, 2013.

ANNEX 4. REGIONAL AND NATIONAL POLICIES AND COMMUNITY INITIATIVES TO REVERSE ENVIRONMENTAL DEGRADATION AND ASSOCIATED RESEARCH-TO-ACTION PRIORITIES

Country	Regional, national and community initiatives	Challenges	Recommendations	Research-to-action priorities
Cameroon	<p>Harmonized action plan (2020-2030) to combat land and forest landscape degradation in Cameroon</p> <p>National Plantation Development Programme</p> <p>National Development Strategy (NDS30)</p> <p>Framework for Forest Landscape Restoration (FLR)</p> <p>National REDD+ Strategy</p> <p>National Land Degradation Neutrality Target Setting Programme (PDC/NDT)</p> <p>National Consultative Commission for the Environment and Sustainable Development (CNCEDD)</p> <p>Inter-ministerial Committee on Environment (CIE)</p> <p>Regional Committees on Environment</p> <p>the National Coordinating Committee (NCC) serving as the National Coordinating Body (NCB) for the implementation of the UNCCD</p>	<p>Low funding for restoration initiatives</p> <p>Poor contact with remote areas</p> <p>Transparency</p> <p>Low government funding for its activities</p>	<p>Create an appropriate environment to facilitate the adoption and integration of these policies to support restoration activities</p> <p>Strengthen institutional monitoring and coordination of operations</p> <p>Ensure the adequate participation and involvement of women, Indigenous Peoples and local decentralized structures in restoration</p> <p>Complete governance and equity assessments, to establish baselines and identify relevant actions for improvement</p>	<p>Research to evaluate effectiveness of ongoing initiatives and identify best practices to enhance the development of more effective policies and strategies</p> <p>Research into effective systems for monitoring and reporting on progress of initiatives towards environmental targets</p> <p>Research to assess the effectiveness of existing policies and legal frameworks for best environmental management</p> <p>Research to identify strategies for promoting gender equality and social inclusion</p>

	<p>Cercle de Concertation des Partenaires for MINFOF-MINEPDED (CCPM)</p> <p>Inter-Regional Committee for Drought Control in the North (CILSN)</p> <p>National Environmental and Sustainable Development Fund</p> <p>National Biodiversity Strategy and Action Plan (NBSAP)</p> <p>National Waste Strategy</p> <p>National Strategy for Sustainable Water and Soil Management (SNGDES)</p> <p>National Communications on Climate Change</p> <p>The 2020-2045 National Forest Plantation Development Programme (NFPDP)</p>			
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<p>DRC</p>	<p>National Biodiversity Strategy and Action Plan 2019–2025</p> <p>Programme for Preservation of Congo Basin Ecosystems</p> <p>REDD+ National Strategy</p> <p>National adaptation plan to climate change (2022–2026)</p> <p>Framework on Climate Change and Environment</p> <p>National REDD+ Strategy</p>	<p>The negative impact of infrastructural development, forest and mineral resource exploitation and agro-pastoral policies</p> <p>Transparent and results-based planning, monitoring and assessment of policies and programmes, and projects relating to the management of natural resources</p> <p>The participation and involvement of all stakeholders, including Indigenous communities and women, in the preparation, implementation and monitoring of projects identified</p>	<p>Prioritize carefully planned and sustainable mining practices, especially concerning the development of mining-related infrastructure</p> <p>Monitor and report on rates of deforestation and forest degradation for comprehensive and up-to-date data on the extent and severity, and drivers of, environmental degradation</p> <p>Intensify close interaction between national stakeholders and international agencies involved in data and information systems</p> <p>Strengthen Indigenous People's networks; formulate principles to ensure that the gender dimension is taken into account in environment planning processes as well as in sectoral and subnational policies, projects and programmes to advance climate change adaptation</p>	<p>Research to understand the challenges and opportunities for community participation in environmental management</p> <p>Research to identify best practices, promote and enhance traditional practices of environmental preservation, and promote community ownership of natural resources</p> <p>Research to identify the impacts of climate change on natural resources and identify strategies for building resilience to climate change</p>
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Sources: Gilbey, 2018; Global Mechanism for the UNCCD, 2019; Leggett, 2020; List, 2016; Mcbreen and Nicolo, 2023; Ministry of Environment, Protection of Nature and Sustainable Development Republic of Cameroon, 2022; Republic of Cameroon, 2020; Republic of Gabon, 2020; UNCCD, 2016; UNEP-WCMC, 2022; UNDP, 2021; US Fish and Wildlife Service, 2022; WWF, 2017.

ANNEX 5. INTERNATIONAL AND REGIONAL FRAMEWORKS AIMING TO REVERSE ENVIRONMENTAL DEGRADATION, AND RECOMMENDATIONS FOR IMPROVEMENT

Regional policies/ framework	The mission of the framework	Actions to reach these targets	Tools/strategies	Recommendations
The post-2020 global biodiversity framework	2030 action targets: to put biodiversity on a path to recovery	<p>Reducing threats to biodiversity</p> <p>Meeting people’s needs through sustainable use and benefit-sharing</p>	<p>Integrating biodiversity values into policies, regulations, planning, development processes, poverty reduction strategies, accounts and assessments of environmental impacts at all levels of government and across all sectors of the economy</p> <p>All businesses (public and private, large, medium and small) assess and report on their dependencies and impacts on biodiversity, from local to global, progressively reduce negative impacts by at least half and increase positive impacts</p> <p>Ensuring that people are encouraged and enabled to make responsible choices and have access to relevant information and alternatives, considering cultural preferences, to reduce by at least half the waste and, where relevant, the overconsumption of food and other materials</p> <p>Establishing, strengthening capacity and implementing measures in all countries to prevent, manage or control potential adverse impacts of biotechnology on biodiversity and human health; reducing the risk of these impacts</p> <p>Redirecting, repurposing, reforming or eliminating incentives harmful to biodiversity, in a just and equitable way, reducing them</p>	<p>Develop innovative financing mechanism for biodiversity protection</p> <p>Address policy regulatory frameworks (research to identify key policy and regulatory)</p>

			<p>by at least US\$500 billion per year, including all of the most harmful subsidies, and ensure that incentives, including public and private economic and regulatory incentives, are either positive or neutral for biodiversity</p> <p>Increasing financial resources from all sources to at least US\$200 billion per year, including new, additional and effective financial resources, increasing by at least US\$10 billion per year international financial flows to developing countries, leveraging private finance, and increasing domestic resource mobilization, taking into account national biodiversity finance planning, and strengthen capacity building and technology transfer and scientific cooperation, to meet the need for implementation, commensurate with the ambition of the goals and targets of the framework</p> <p>Ensuring that relevant knowledge, including the traditional knowledge, innovations and practices of Indigenous Peoples and local communities, with their free, prior, and informed consent, guides decision making for the effective management of biodiversity, enabling monitoring, and by promoting awareness, education and research</p> <p>Ensuring equitable and effective participation in decision making related to biodiversity by Indigenous Peoples and local communities, and respecting their rights over lands, territories and resources, as well as by women and girls, and youth</p>	
		Enhancing the integrity of all ecosystems, reducing the rate of extensions	<p>Reducing the risk of extension by enhancing or maintaining the abundance and distribution of threatened populations of species</p> <p>Safeguarding the genetic diversity of wild and domesticated species connectivity and integrity of natural systems</p>	

	The 2050 Vision: a world of “Living in harmony with nature”	Maintaining or enhancing nature’s contributions to people through conservation and sustainable use	Accounting for nature and its contributions to people and inform all relevant public and private decisions Ensuring the long-term sustainability of all categories of nature’s contributions to people, with those currently in decline restored, contributing to each of the relevant Sustainable Development Goals	Prioritize carefully planned and sustainable mining practices, especially concerning the development of mining-related infrastructure.
		Sharing fairly and equitably the benefits of the utilization of genetic resources with a substantial increase in both monetary and non-monetary benefits shared, including for the conservation and sustainable use of biodiversity	Increasing the share of monetary benefits received by providers, including holders of traditional knowledge Increasing non-monetary benefits, such as the participation of providers, including holders of traditional knowledge, in research and development	
		Closing all the gaps between the available financial and other means of implementation	Making adequate financial resources available to implement the framework available and deployed, progressively closing the financing gap up to at least US\$700 billion per year by 2030 Deploying or making adequate other means available, including capacity-building and development, technical and scientific cooperation, and technology transfer to implement the framework to 2030 Planning adequate financial and other resources for the period 2030 to 2040	

Land Degradation Neutrality (LDN) target setting process	Enhance countries preparedness to achieve LDN by 2030	Government leadership stakeholder engagement	<p>Identification of stakeholders</p> <p>Assessment of interest of identified stakeholders in LDN</p> <p>Establishment of a national LDN working group</p> <p>Participation of representatives of key stakeholders in an LDN working group</p> <p>Organization of a national LDN target setting inception workshop</p>	<p>Use of adequate evidence in setting LDN targets</p> <p>Consultation of key stakeholders</p> <p>Inclusion of integrated ecosystem management</p> <p>Strengthening natural resource governance and equity</p> <p>Establishment of synergies with other conservation and development approaches and targets</p> <p>Leveraging of innovative funding</p>
		Setting the LDN baseline	<p>Identification and mobilization of stakeholders involved in LDN baseline setting and data provision/processing</p> <p>Agreement on methodological approaches among stakeholders (LDN working group)</p> <p>Involvement of stakeholders in the analysis of (sub)national trends and drivers of land degradation and existing land management practices</p> <p>Organization of a validation workshop on the results of the LDN assessment and proposed LDN baseline</p>	
		Assessing land degradation trends		
		Identifying drivers of land degradation		
		Defining national voluntary LDN targets		
		Mainstreaming LDN in land use planning	<p>Identification of LDN targets and associated measures</p> <p>Organization of a validation workshop on LDN targets and measures</p>	
		Identifying measures to achieve LDN		
		Facilitating action towards LDN	<p>Mobilization of stakeholders to commit on action to achieve LDN</p> <p>Facilitation of the political commitment to achieving national voluntary LDN targets</p> <p>Establishment of LDN-related partnerships</p>	

		Monitoring progress towards LDN	Involvement of stakeholders in LDN monitoring, including the analysis and interpretation of related results. Endorsement of an LDN TSP report by an LDN national working group	
		Reporting on LDN		
Strategic Framework for Landscape Restoration (FLR)	Regaining ecosystem functionality and enhancing human well-being across deforested and degraded landscapes.	Maintaining and enhancing natural ecosystems within landscapes	Planting of trees on formerly forested land. Native species or exotics and for various purposes, fuelwood, timber, building, poles, fruit production, etc.	Strengthening governance and institutions and balancing equity and efficiency
		Managing adaptively for long-term resilience	<p>Natural regeneration of formerly forested land</p> <p>Enhancement of existing forests and woodlands of diminished quality and stocking by reducing fire and grazing and by liberation thinning, enrichment planting, etc.</p> <p>Establishment and management of trees on active agricultural land through planting or regeneration, to improve crop productivity, provide dry season fodder, increase soil fertility, enhance water retention, etc.</p> <p>Establishment and management of trees on fallow agricultural land to improve productivity, through fire control, extending the fallow period, etc.</p> <p>Establishment and enhancement of forests on very steep sloping land, along water courses, in areas that naturally flood and around critical water bodies</p> <p>Engaging stakeholders and supporting participatory governance</p>	

AFR100	Restoring 100 million hectares of deforested and degraded land in Africa by 2030	<p>Strengthening the value of protected areas</p> <p>Securing endemic plant species and maintaining a genetic pool</p> <p>Securing source of fuelwood and build materials</p>	<p>Providing staff and technical support for cost-efficient monitoring and evaluation frameworks for FLR</p> <p>Producing three self-paced e-learning courses for people interested in advancing their knowledge of FLR</p> <p>Managing forests and land-based systems</p> <p>Managing land-use changes from agriculture</p> <p>Boosting African political determination</p> <p>Building project pipelines and developing the capacity of entrepreneurs and project developers</p> <p>Channelling finance directly to implementers</p> <p>Improving monitoring</p>	<p>Strengthening environmental governance, promoting ecotourism, carbon payments, or different types of bonds or blended finance, supporting reforestation efforts, transforming the region into a model of environmental sustainability and resilience</p>
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ANNEX 6. A PRELIMINARY LONGLIST OF POTENTIAL RESEARCH-TO-ACTION PRIORITIES

Thematic area	RTAP
Evidence	Generate comprehensive and up-to-date data on the extent, severity and drivers of environmental degradation, especially by improving monitoring and reporting on rates of deforestation and forest degradation.
	Intensify research into socio-economic drivers of deforestation.
	Research how to foster community participation in natural resource management, and how to generate effective stakeholder coordination.
	Research how to promote community ownership of natural resources.
	Strengthen interactions between national stakeholders and international agencies involved in data and information systems so that national capacities grow, data accessibility improves, and institutions and countries can share data and harmonize their systems.
	Strengthen country-to-country information exchange mechanisms so technical dialogues on reversing environmental degradation can happen more easily.
Tools	Strengthen national capabilities in mapping degraded lands, as recommended by the United Nations Sustainable Development Goals (SDGs).
	Strengthen national and regional information systems and increase countries' technical capacity to monitor land degradation using tools such as Collect Earth and Trends (using drones, GPS).
	Strengthen capacities and knowledge on ecosystem-based adaptation approaches because these will maximize synergies between environmental conservation and rehabilitation efforts.
	Develop tools to integrate scientific and traditional knowledge.
	Develop tools to give communities a voice in research and decision-making processes.
	Develop tools for innovative financing mechanisms, including more financing options for scaling up programmes to reverse environmental degradation, such as different mixes of public and private financing.
	Develop tools to implement Indigenous sustainable forest-management practices.

	Build capacity on monitoring and evaluation within university laboratories and national institutions.
Governance	Establish and strengthen local decision makers' understanding of how gender issues and climate change thinking need to be 'mainstreamed' into governance.
	Formulate principles to ensure that women are not disproportionately disadvantaged in work to reverse environmental degradation.
	Plan sectoral and subnational policies, projects and programmes to advance climate change adaptation.
	Strengthen governance and institutions by working to balance equity and efficiency.
	Use financial incentives/subsidies to support smallholders' implementation and adoption of sustainable agricultural practices.
	Policy and regulatory support: advocate developing and enforcing strong environmental policy to regulate how biotechnology is developed and used.
	Prioritize carefully planned and sustainable mining practices, especially concerning the development of mining-related infrastructure.
	Identify innovative ways to encourage and foster stakeholder partnerships and coordination in environmental management.
	Improve transparency, accountability and stakeholder participation in decision-making processes related to natural resource management.
	Improve law enforcement and promote alternative sustainable livelihoods for forest-dependent communities.
	Intensify programmes to address incoherence and ineffectiveness in existing policies and legal frameworks in ways that build capacity at local and national levels and promote social inclusion
	Strengthen environmental governance, promote ecotourism, carbon payments, or different types of bonds or blended finance, support reforestation efforts, transform the region into a model of environmental sustainability and resilience.

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