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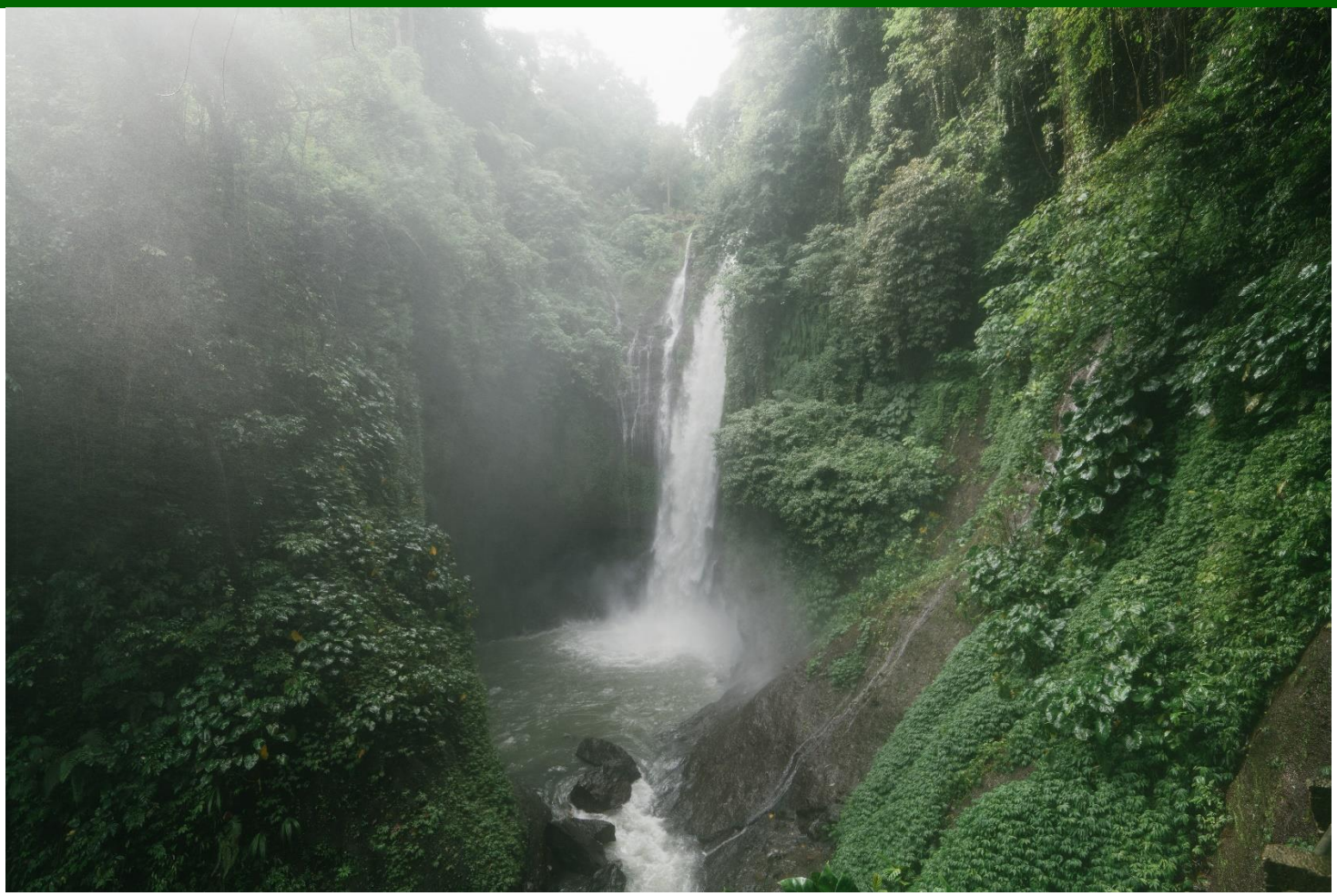
Forest Cover Change in Community Forests: An Assessment of Outcomes in Five African Countries



May 15, 2021

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AFRICA BIODIVERSITY COLLABORATIVE GROUP

May 15, 2021

African Biodiversity Collaborative Group

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About African Biodiversity Collaborative Group

The Africa Biodiversity Collaborative Group (ABCG, http://www.abcg.org/index) is a consortium of seven U.S. based international conservation non-governmental organizations (NGOs): African Wildlife Foundation (AWF), Conservation International (CI), the Jane Goodall Institute (JGI), The Nature Conservancy (TNC), Wildlife Conservation Society (WCS), World Resources Institute (WRI) and World Wildlife Fund (WWF). ABCG's overarching mission is to advance understanding of critical biodiversity conservation challenges and their solutions in sub-Saharan Africa. We aspire to produce applicable knowledge and put it into practice. ABCG creates innovative conservation solutions by fostering collaborative and adaptive learning opportunities that help practitioners improve, scale and replicate, while generating valuable user-driven knowledge disseminated globally. ABCG is supported by USAID to advance understanding of critical conservation challenges and their solutions in sub-Saharan Africa.

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COVER PHOTO: Waterfall. Photo Credit: Pexel, ArtHouse Studio

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TABLE OF CONTENTS

ACRONYMS

ABCG	Africa Biodiversity Collaborative Group
CBFM	Community Based Forest Management
CF	Community Forestry
CFCL	Concessions Forestières des Communautés Locales
CFE	Community Forest Enterprises
CFUG	Community Forestry User Group
CRL	Community Rights Law with Respect to Forest Lands
CSO	Civil Society Organization
DRC	Democratic Republic of the Congo
EIA	Environmental Impact Assessment
FAO	Food and Agriculture Organization
FSC	Forest Stewardship Council
GFW	Global Forest Watch
GIS	Geographic Information System
IPLC	Indigenous Peoples and Other Local Communities
JFM	Joint Forest Management
NDC	Nationally Determined Contribution
NFR	National Forest Reserve
NGO	Nongovernmental organization
NTFP	Non-Timber Forest Product
RRI	Rights and Resources Initiative
PES	Payment for Ecosystem Service
PFM	Participatory Forest Management
SMP	Simple Management Plan
VLFR	Village Land Forest Reserve

1. INTRODUCTION

Around the world, national governments are decentralizing public roles, responsibilities, and authorities in forestry, health care, education, public works, and other sectors (Moutoni 2019; Berkes 2009; Raik and Decker 2007; Agrawal and Ribot 1999, Ribot et al 2010; Ribot 2002; Oyono 2004; Wiggins et al. 2004). The rationale for most decentralizations is that these issues should be dealt with at the most immediate (*i.e*., lowest or least centralized level) competent administration level (*e.g*., consistent the principle of subsidiarity) (Uphoff 1986). The benefits often attributed to decentralization include improved bureaucratic efficiency, procedural equity among administrative levels, improved or increased service provision, greater citizen participation and engagement, and the maintenance of political stability (Ribot 2002).

Decentralization can take various forms (Ribot et al 2010; Ribot 2002), including:

1. *Democratic Decentralization*, where powers and resources are transferred to downwardly accountable and representative local governments;
2. *Administrative Decentralization*, where powers and resources transferred to upwardly accountable local branches of the central government; and
3. *Privatization*, where powers are transferred to non-state entities, such as communities, civil society organizations, and corporations (Ribot et al 2010; Ribot 2002).

In many countries, local and central governments manage most of the nation's forests and high rates of forest loss and degradation are often attributed to the failure of state management (RRI 2018). Since their widespread uptake in the late 1980s, forestry decentralizations have been pursued on the justification that effective forest management requires a diversity of institutions – state and non-state, including communities - to efficiently address the multifaceted problems of forest loss and degradation (Bwagalilo et al. 2019; Andersson and Ostrom 2008; Ostrom 2005; Rana and Chhatre 2017; Ribot 2002; Ostrom 1990).

The formal vesting of some degree of responsibility and authority for forest management to farmers and communities (*privatization* decentralization) – referred to as community forestry (CF) - is one aspect of the decentralization of public forestry (Vabi et al. 2000; Brown and Schreckenberg 2001; Edmonds 2002). The concept of CF was perhaps first developed by the Food and Agriculture Organization (FAO) of the United Nations in 1978 and defined as: "any situation which intimately involves local people in a forestry activity. It embraces a spectrum of situations ranging from woodlots in areas which are short of wood and other forest products for local needs, through the growing of trees at the farm level to provide cash crops and the processing of forest products at the household, artisan or small industry level to generate income, to the activities of forest dwelling communities" (FAO 1978).

CF often has multiple objectives, but most policymakers and practitioners agree that CF commonly aims to deliver at least two outcomes: 1) improved forest conditions moving towards sustainable forest management (and, as a result, improved biophysical conditions and ecosystem services); and 2) enhanced livelihoods of those managing the forests (whether individuals, households, local groups or

communities) (Gilmour 2016). Additional country or project-specific CF objectives may include combating poverty and inequity, empowering communities, supporting decentralization and devolution, advancing democracy, redressing deforestation, and enhancing biodiversity conservation.

CF empowers individuals, households, communities, and local groups (*e.g.*, cooperatives), to engage in forest-related economic activities, enabling them to capture benefits from the forests they manage and to improve their living conditions. As such, CF can create powerful incentives for communities to manage their forests in sustainable manners for long-term benefits. Forest-based economic activities can be for subsistence and domestic purposes, cultural purposes, and/or commercial purposes. While CF initially focused on the extraction and marketing of non-timber forest products (NTFPs), more countries (*e.g.*, Cameroon and Liberia) have introduced CF with an emphasis on timber harvesting (Moutoni 2019; Beauchamp and Ingram 2011; Oyono 2005; 2004; Oyono et al. 2012; Ezzine de Blas et al. 2009).

Box 1 | CF in Tanzania

Since its genesis in the early 1990s, CF in Tanzania - referred to as Participatory Forest Management – has taken two principal forms:

Community Based Forest Management (CBFM) on Village Land. Village Land is legally recognized as belonging to communities. Communities have the rights to manage and benefit from their forests for domestic or subsistence purposes with minimal government involvement. Sustainable commercial use of forest resources is allowed if the community establishes a government-approved management plan, although to date few communities have obtained commercial use rights to their forests. Communities have the option of obtaining an additional layer of legal recognition of their forest as Village Land Forest Reserves (VLFRs), but few do so.

Joint Forest Management (JFM) on Reserved Land. Outside Village Land, the government manages forests, including a network of National or Local Authority Forest Reserves. For a few of these the government has developed joint management programs with communities living next to the forest. Under JFM, forest management responsibilities and usufruct rights to some forest products are shared between the state and communities (Blomley et al. 2011; Blomley and Iddi 2009). In some cases, commercial use of some forest products is permitted with a government-approved management plan. Community representatives have the right to a place on JFM management boards or committees (Stevens et al. 2014).

While CF can involve various actors, particular government attention has focused on CF by communities, including indigenous peoples, which collectively-hold and manage forests as common property for the benefit of all members. Community CF can take various forms (Box 1.).

This report focuses on CF by communities (hereafter simply CF). The research was designed to better understand the relation between CF and forest conditions, specifically forest cover loss. Forest cover loss rates in CFs are compared with forest cover loss rates in protected areas (principally government managed) and at the national level. This report is intended for: 1) policymakers and lawmakers addressing forestry and forest management; 2) communities involved - or interested in - in CF and their supporters, including civil society organizations (CSOs) and nongovernmental organizations (NGOs); and 3) development professionals and donor agency officials engaged in forestry and CF specifically.

This Introduction is followed by a Background section which provides a summary of the current state and trends of forestry governance, and a brief review of the literature on the environmental outcomes of CF. A Methods section then details the data sets and geospatial analysis (geographic Information System/GIS analysis) conducted to assess forest loss change in CF in five African countries (Liberia in West Africa and Cameroon, Equatorial Guinea, Gabon, and the Democratic Republic of Congo (DRC) in Central Africa). A Findings section follows which presents the findings of the GIS analysis for each of the five research countries. The report ends with a brief Conclusion and Recommendations section.

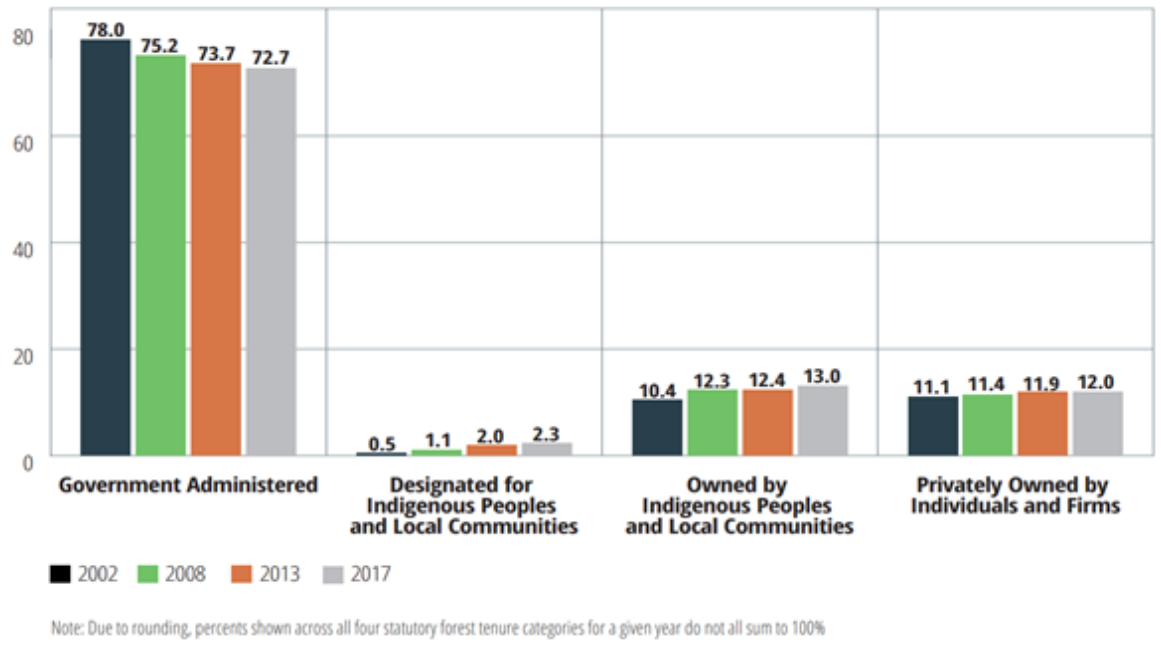
BACKGROUND

2.1 THE STATE OF FORESTRY GOVERNANCE

Despite widespread forest decentralizations, governments (central and local) around the world continue to maintain legal and administrative authority over most of their nation's forests. In 2017, governments administered 72.7% of total forest area across 41 forested countries in Africa, Asia and Latin America (RRI 2018). The amount of forest administered by governments, however, decreased between 2002-2017 (from 78% in 2002) although the rate of decline slowed over the 15-year period (Figure 1).

Figure 1 | Global Change in Statutory Forest Tenure in 41 Forested Countries by Percent (2002-2017).

Source: RRI 2018



While much of the government-administered forestland is claimed by Indigenous Peoples and other local communities (IPLCs) as their traditional land (LandMark 2020), in 2017, only 15.3% of forests across the same 41 forested countries were either legally owned by IPLCs (13%) or are public forestlands designated by governments for IPLC use (2.3%) (RRI 2018). This is an increase from 2002 when 10.9% of the forest in the 41 countries was owned or designated for IPLCs, although the pace of recognition has been slow since 2008.

Latin America has the highest proportion of forest area both legally owned by and designated for IPLCs, followed by Asia, and then Africa (RRI 2018). Despite positive steps by some African countries to legally recognize IPLC forest rights, the continent continues to lag behind other regions of the world. In 2017, IPLCs legally owned 5.2% of the forestland in 11 forested countries in Africa and 2.2% of the forest was designed for their use by government. The forest area owned by or designated for IPLCs increased only marginally over the 15-year period from 2002 to 2017. In two of the 11 countries - Gambia and Senegal – the forest area designated for IPLCs decreased since 2013 (RRI 2018).

2.2 CF FOREST MANAGEMENT OUTCOMES

CF outcomes remain inadequately documented, although there is a significant and growing body of literature assessing performance, especially regarding CF's two principal policy objectives of improved local livelihoods and improved forest management (Wollenberg et al 2007; Gilmour 2016; Maryudi et al 2012; Charnley and Poe, 2007; Beukeboom et al., 2010; Menton and Cronkleton, 2014). A careful review of the CF literature is beyond the scope of this study. This overview focuses on the recent comprehensive studies that synthesize information and findings on CF forest outcomes. Evidence worldwide shows mixed results – within and across countries and over time - regarding forest management and community livelihoods with sharp differences in economic and financial returns. Yet the weight of the literature is toward improved forest management.

Charnley and Poe (2007) provide an overview of the field of CF globally and describe four cases from the Americas - Canada, the United States, Bolivia, and Mexico. The authors found that the devolution of responsibility and decision-making authority remained partial, that local management resulted in the delivery of ecological benefits in many cases, but that few socioeconomic or livelihood benefits occurred. The authors concluded that CF remained a promising concept for achieving forest conservation and community development, but significant gaps remained between theory and practice.

Porter-Bolland et al. (2011) conducted a metastudy of peer-reviewed, published case studies - 40 protected areas and 33 community-managed forest cases - to assess the role of government-managed protected and community-managed forests for the long-term maintenance of forest cover in the tropics. The authors found that as a whole, community-managed forests presented lower and less variable annual deforestation rates than protected forests.

Stevens et al. (2014) examined more than 130 qualitative and quantitative case studies, meta-studies, and other reports on the intersection of IPLC forest rights, deforestation, and climate change, focusing on 14 countries, including Mexico in Latin America (Box 2), Tanzania in Africa (Box 3), and Nepal in Asia (Box 4). A GIS analysis of forest cover loss in community forests was also conducted. The authors found that forests managed by IPLCs with government-protected legal rights to their forestland showed lower deforestation rates and lower carbon dioxide (CO_2) emissions than areas outside community forests. In contrast when IPLCs have no or weak legal rights, their forests tended to be vulnerable to deforestation.

Gilmour (2016) published a review of the extent and effectiveness of 40 years of CF. The author concluded that the general impression from the literature is that in most countries, CF has resulted in

improved forest management as measured by an increase in forest area, tree density, productive capacity, biodiversity or a reduction in illegal logging, wildfires or other threats. Gilmour noted that, overall, communities and smallholder farmers have demonstrated in a wide range of settings that they are willing and able to manage forests sustainably to generate significant economic and other benefits. The author concluded, however, that the full potential of CF has yet to be realized in most countries with many hurdles in the way of effective implementation.

Lalisa et al (2019) working in five African countries - Ethiopia, Kenya, Cameroon, Uganda, and Tanzania – found that the countries are strong in devising policy and legal provisions and in articulating formalities for establishing CF. Major weaknesses were observed in monitoring CF performance, benefit sharing, and product management. The analysis of CF schemes was largely positive, including improved forest management, though with several cases of no considerable impact and few reports of negative impacts. Further, the contributions of CF schemes were constrained by weaknesses in the CF frameworks.

Box 2 | Mexico CF Forest Outcomes

Adapted from Stevens et al. 2014 and Bray and Merino-Perez 2002

In Mexico, much of the nation's forests were placed in the hands of IPLCs, in successive degrees of control, beginning in the early decades of the 20th century as a result of the Mexican Revolution and the subsequent agrarian reform processes. Perhaps 40% of Mexico's forests were transferred to *ejidos* and "agrarian communities" between 1950-1980, reaching an estimated 80%. Today, more than 70% of the country's forests are under the control of IPLCs, some for more than 80 years and many with decades-old logging enterprises. Mexico's community forests and associated community forest enterprises (CFEs) - in both temperate and tropical areas - are at a scale and level of maturity unmatched anywhere else in the world. Mexico's CF is a national laboratory for examining the social and ecological benefits of IPLC control over forests.

In 1986, a new Forestry Law was passed which recognizes IPLCs' full rights over their forests, including commercial use rights, although sale of community forestlands is prohibited. The 1997 Forest Law, with regulations issued in December 1998, put a stronger environmental regulatory framework on logging, further encouraging sustainable management principles and practices. A main objective of the law is to "Conserve, protect and restore forest resources and the biodiversity of their ecosystems." (Chapter 1, Article 1).

In the late 1990s, the Mexican government increased institutional and resource support for CF, establishing a Ministry of the Environment and launched several programs to support sustainable forest use, including training in market access. The government also paid for some community lands to receive Forest Stewardship Council (FSC) certification, which increased benefits to the IPLCs through the sale of certified timber. As of October 2010, some 8.1 million hectares of Mexico's forests were under community forest management plans.

Many researchers examining the social and environmental outcomes of CF in Mexico have found positive outcomes. For example, Bray and Merino-Perez (2002) found that many communities learned complex processes of industrial production and sustainably managed their forests. Their research shows that CFEs can be profitable and where community forests predominate, forest cover is maintained at rates similar to those of government-managed protected areas.

Stevens et al. (2014) notes that the practical management and livelihood support the IPLCs have received from the government has helped them sustainably manage their forests. For example, CF in the Yucatan Peninsula have recorded lower deforestation rates than even government-protected areas designated for strict conservation. From 2000 to 2005 the Calakmul Biosphere Reserve in Yucatan experienced an annual deforestation rate of 0.7%, compared with a rate of practically zero (0.002%) from 2000 to 2004 for nearby community-managed forests (Barismantov, and Antezana 2012; Bray 2010; Ellis and Porter-Bolland 2008).

From 1990 to 2006, *ejidos* without community forest programs lost up to 11 times more forest than *ejidos* with community forest management. Further, *ejidos* which have fully individualized parcels, with no common forest resources remaining, experience higher deforestation than the *ejidos* that retain common forest resources (DiGiano et al. 2013).

Hajjar et al. (2020) published a global analysis of CF outcomes using data on 643 cases in 51 countries. The authors found that the majority of cases reported positive environmental and income-related outcomes, but that forest access and resource rights were often negatively affected by policies to formalize CF. Environmental condition improved with CF in 56% of the 524 cases tracking environmental conditions and decreased in 32% of cases. Incomes increased in 68% of the 316 cases reporting on livelihoods, 26% showed no change in incomes, and 6.3% reported decreases in income.

Recent studies of CF have used quasi-experimental methods that control for pre-existing land characteristics to establish whether and to what extent IPLC management has led to changes in forest

Box 3 | Tanzania CF Forest Outcomes

Adapted from Bradley and Fortuna 2021 and Stevens et al. 2014

Tanzania has approximately 48.1 million hectares of forests covering about 55% of the land area. Tanzania is considered to have one of the more progressive legal frameworks for customary land rights recognition and participatory forestry in Africa. Customary land rights are recognized within the boundaries of villages and participatory forest management (PFM) has been mainstreamed as a government program within this framework. As noted (see above), there are two main PFM approaches - community-based forest management (CBFM) and joint forest management (JFM). Almost 22 million ha of forest land is held by communities. The majority of PFM forest is miombo woodlands, which cover more than 90% of the country's forestland (Lupala et al., 2015).

Research has demonstrated the effectiveness of PFM in improving forest management and a range of ecosystem services (Bradley and Fortuna 2021; Alden Wily 1997; 1999; 2000a; 2000b; 2002a; 2003b; 2004; Alden Wily et al, 2000; Alden Wily and Dewees 2001; Alden Wily and Mbaya 2001; Kajembe and Nzunda 2002; Robinson and Kajembe 2009; Persha and Meshack 2016; Vihemäki and Leonard 2010). A few examples are worth highlighting:

3. Blomley et al. (2008) found marked improvements in forest health on both CBFM and JFM as compared with government-managed forests. CBFM appeared to be more effective in improving forest condition and reducing overall levels of forest disturbance than JFM (see also Blomley et al. 2011; Blomley et al. 2010; Persha and Blomley 2009). Areas that were not under PFM (though still regarded as village forests) were subject to unsustainable practices such as agricultural expansion, wildfires, livestock grazing and illegal harvesting (Blomley et al, 2008; Burgess et al, 2010).
4. Working in Tanzania's Eastern Arc Mountains, Vyamana (2009) found that community members, perceived improvements in the environment, judged on the basis of forest regeneration, aesthetics values, and increased numbers of wildlife. In contrast, control communities with forests not under PFM and local government officials perceived deterioration of the forest.
5. Patenaude and Lewis (2014) reported positive forest outcomes from CBFM including, a reduction in uncontrolled logging and other forest disturbances, recovery of forest condition, decrease in soil erosion and overgrazing, improvement in water quality and quantity, reoccupation of beehives, and an increase in wildlife abundance.
6. Treue et al. (2014) compared forest outcomes of CBFM, JFM and government-managed forests and found that extraction of products was intense in forests close to Dar es Salaam (Tanzania's commercial capital), regardless of management regime. Further away from Dar es Salaam, however, harvesting levels in forests under CBFM and JFM, with one prominent exception, were broadly sustainable.
7. Rosa et al. (2018) found that National Parks, Game Reserves, and Conservation Areas were most effective in preventing forest cover loss and promoting forest cover gain. The rate of forest cover loss in CBFM was low although not as low as in the National Parks or other conservation areas. Government-managed multiple use areas, including Game Controlled Areas and State Forest Reserves, had the highest rates of forest loss, and tended to lose more forest cover than areas with no protection or any management status.

Not all CF in Tanzania, however, has led to positive forest outcomes. Research has shown that in certain areas (*e.g.*, coastal regions), deforestation increased after adopting CF, possibly due to other factors, such as corruption and market influences (Brockington 2007, Blomley et al. 2008). Nzali and Kaswamila (2019) observed that CBFM in Mbarali district, southern Tanzania, lost on average 2.04 ha of forest every year through human activities, mainly farm expansion, charcoal business, and firewood. Persha and Meshack (2016) reported that JFM has no significant impact on deforestation and forest degradation in Tanzania.

outcomes. Many of these studies compare the rate of deforestation on land under IPLC management with the rate on land without it, controlling for observable land characteristics. Most such studies found that on net, IPLC management stems deforestation. For example, Blackman and Veit (2018; see also Ding et al. 2016) found that indigenous management reduced deforestation and forest carbon emissions in the Amazon. The average annual deforestation rates in indigenous forestlands in Bolivia, Brazil, and Colombia were two to three times lower than in similar land not managed by indigenous people. The authors were not able to discern a statistically significant effect in Ecuador.

As provided in Blackman and Veit (2018), other matching analysis produced similar results. Muller et al. (2012) found that indigenous communities in the Bolivian lowlands inhibited deforestation in the period between 1992 and 2004; Vergara-Aseno and Potvin (2014) found that indigenous communities in Panama cut deforestation between 1992 and 2008; Nelson et al. (2001) concluded that indigenous groups in Darién, Panama, reduced deforestation between 1987 and 1997; Nolte et al. (2013) found that indigenous groups in Brazil avoided significant deforestation between 2000 and 2005, especially in areas with high deforestation pressure; and Nelson and Chomitz (2011) found that protected areas under indigenous stewardship (not indigenous land per se) in Latin America reduced fire incidence, a proxy for deforestation, between 2000 and 2008. Pfaff et al. (2014), however, conclude that indigenous management in Acre, Brazil, did not have a significant effect on forest loss from 2000 and 2008 possibly because this part of the Amazon is affected less by exploitation and infrastructure than other areas.

Box 4 | Nepal CF Forest Outcomes

Adapted from and Bradley and Fortuna 2021 and Stevens et al. 2014

Government support for CF in Nepal began in the mid-1990s, with legislation and operational guidelines that legalized the establishment of community forestry user groups (CFUGs) (Bradley and Fortuna 2021). Today there are some 19,361 registered CFUGs throughout Nepal, involving perhaps 2.9 million households, about 33% of the rural population. The CFUGs manage almost 2.2 million ha of forest or 37% of the national forest estate (Bradley and Fortuna 2021).

While the state owns all public natural forests, the law does not set any time limits on forest rights under CF and CFUG actions. Forest rights are only suspended or retracted if there is an abuse of the rules by the CFUG. While CFUGs can use the forests for subsistence and commercial purposes, they are banned from clearing forests for agricultural use. About 80% of forest-related income is derived from timber sales (FAO, 2018; Bradley and Fortuna 2021). Pandit, Neupane and Bhattarai (2014) reported that income from CF made up 26% of total household income in 2014. By law approximately 35% of the income generated from CF activities must be invested in pro-poor programs (FAO 2018).

Nepal CF experiences are well-documented, particularly in the hills and mountains of the country, where 75% of the country's remaining forests are located (Stevens et al. 2014). For example:

8. Kanel et al. (2005) reported that community forests in several districts in Nepal showed "substantial improvement in forest condition," with denuded areas regenerated and existing forest enhanced. A study in four eastern hill districts showed that denuded forests had been regenerated and the condition of forests improved substantially following the introduction of the CF. The total number of stems per hectare increased by 51%, and the basal area of forests increased by 29% over a 10-15-year period. A separate study in two central hill districts found that shrubland and grassland had been converted into productive forests, increasing the forest area from 7 677 ha to 9 678 ha over a similar period. A further study in a mountain watershed at three different times (1976, 1989 and 2000) showed that over 25 years small patches of forest had expanded and merged, which reduced the number of patches from 395 to 175 and increased the net forest area by 794 ha (see Gilmour 2016).
9. Ojha and Kanel (2005) examined 25 years of CF in Nepal by reviewing 82 reports and articles, The authors found that: the legal and institutional framework was well developed (although some processes could be improved); conditions of community forests had improved overall compared to other forests; and increased participation and contributions of women through CF. Still, they noted: an unequal distribution of community forests in the country with the middle hills hosting most CFs; a general lack of evidence of any livelihood improvement as from CF; decision making dominated by wealthier families which also benefitted the most from CF, and the need for a more diversified enterprise-driven approach beyond timber and non-timber forest products.
10. Luintel et al. (2009) report that 93% of CFUGs in Nepal showed improvements in the condition of their community forests. In the Chitwan valley of Nepal, the researchers observed improvements in forest health from 1989 to 2000 in areas managed by CFUGs. Communities actively protected and restored degraded forests, helping achieve a 22% increase in vegetation density. In 2008, a forest assessment in the Koshi Hills showed a 21% increase in biomass over 14 years.
11. Pokharel and Niraula (2015) estimate that forest cover has increased up to 1.6% per year over the 30-year period from 1985 to 2015. Even in areas with high population growth and construction of roads, forests have been restored. For example, Niraula et al. (2013) found that in the Dolakha District of the middle hills of Nepal, forests were restored over a period of 20 years from 1990 to 2010 at a rate of 2% per year while the population grew by 2.3% annually. Niraula et al. (2013) also found that the rate of conversion of sparse forest into dense forest under CF was between 1.13% and 3.39% per year and the rate of conversion of non-forest area into forest was found to be between 1.11% and 1.96% per year. The authors concluded that CF has "resulted in more efficient use of forest resources, contributed to a decline in the use of slash-and-burn agricultural practices, reduced the incidence of forest fires, spurred tree plantation, and encouraged the conservation and protection of trees on both public and private land. The resulting reclamation of forest in landside areas and river banks and the overall improvement in forest cover in the area has reduced flash floods and associated landslides."
12. Oldekop et al. (2019) assessed all districts in Nepal and found that, on average, CF has contributed to reductions in deforestation and poverty. The authors compared changes in forest cover and poverty from 2000–2012 for subdistricts with or without CFs. Their results indicate that CF has, on average, contributed to significant net reductions in both poverty and deforestation across Nepal, and that CF increases the likelihood of win–win outcomes. The authors also found that the estimated reduced deforestation impacts of community forests are lower where baseline poverty levels are high, and greater where community forests are larger and have existed for longer periods of time.

2.2.1. Enabling Conditions and Incentives

Despite some positive forest and livelihood outcomes, there is widespread reporting that CF is underperforming and, in some cases, performing well below expectations. Some mixed outcomes may be attributed to the use of different methods to assess impact (*e.g.*, what is measured, how it is measured, and what baseline is used). Many researchers, however, have highlighted the importance of local conditional factors and the existence of various barriers and obstacles to achieving CF promises. Most countries that have pursued CF have policies in place to decentralize and devolve rights and responsibilities. However, in practice, decentralization and devolution have been only partially realized and many governments retain significant authority over forest management, with the result that CF faces major restrictions.

To understand why CF succeeds or fails, Baynes et al. (2015) examined the literature from Mexico, Nepal, and the Philippines and also drew on experiences in other countries in Asia, Latin America, and Africa. The authors identified five main interconnected factors which the literature suggests are often critical to the success of CF. These are: 1) government support for CF groups; 2) intracommunity forest groups governance; 3) material benefits; 4) socioeconomic status and gender-based inequality; and 5) secure land and tree rights.

Numerous authors have noted differences in CF frameworks, including in national laws, law enforcement, CF formalization procedures, community rights and responsibilities, and social and political contexts. Different enabling conditions create unique incentives (and barriers) for communities to benefit from forests and to manage them in sustainable ways. In Cameroon, for example, national law provides that a formal community forest must be no larger than 5000 ha and is granted for a period of 5 years (renewable). Communities must prepare forest management plans that are expensive and difficult for them to prepare on their own (Minang et al. 2019; Oyono et al. 2012; Oyono et al. 2007; Oyono 2005; 2004). In the Democratic Republic of Congo (DRC), however, a community forest can be as large as 50,000 hectares and is granted to the community in perpetuity (RFUK 2018).

Hajjar et al. (2020) notes that biophysical conditions, *de facto* tenure rights, national context, community user-group characteristics and intervention types are key predictors of positive CF outcomes. In Tanzania, Brockington (2007) documented the corrupt and violent practices of some village governments and the predatory relationship between village government and the central state and district governments. In Kenya, Kellert et al. (2000) noted that CF schemes increased the pressure to exploit natural resources by unduly fueling expectations and increasing access for forests. Similar intentions of exploitation were also reported of CF in Cameroon where timber companies prefinance and provide the technical assistance needed to acquire a formal community forest in exchange for the rights to log the forest (Oyono et al. 2012; Oyono et al. 2007; Oyono 2005; 2004; Assembe-Mvondo 2006; Piabuo et al. 2018; Minang et al. 2019). There has been criticism of these arrangements, often arguing that they result in elite takeover and control, and that they bring few benefits to communities (Ezzine de Blas et al. 2009; Cuny 2011).

Finally, several studies have analyzed the role of tenure security (often measured by the legal recognition or registration/documentation of rights) in CF forest outcomes. Tenure security creates incentives for communities and members to make land-related investments by providing them with high expectations of rights over the returns (Bledsoe 2006; Deininger 2003; Deininger and Feder 2009). Coupled with other measures (*e.g.*, REDD+ or other Payments for Ecosystem Services schemes), tenure

security can promote long-term investments by communities in land stewardship that generate positive environment and development outcomes (Notess et al. 2018).

Countries are at different stages of decentralizing forest rights and management responsibilities to communities. Studies point to incidents of formal forest rights not well implemented in practice or of devolved formal rights being more restrictive than existing customary or *de facto* rights already in existence. Katila (2008) analyzed the contents and extent of forest-related rights and responsibilities that have been devolved to the local level according to the legal frameworks in six developing countries - Laos, Nepal, Vietnam, Kenya, Mozambique and Tanzania. The author found that "devolution has mainly meant the transfer of use rights to the local level, and has not really changed the overall state control over forest resources. Management rights were mainly rather restricted or restricted, meaning that the right holder participates, or has a limited role in making decisions regarding the harvesting and management of the resource. There was a clear tendency to devolve the rights to enforce rules and to monitor resource use and condition more extensively than the powers to decide on the management and development of the resource. The empirical typology of the cases differentiated between five different types of devolution. The types can be characterised by the devolution of 1) restricted use and control rights, 2) extensive use rights but restricted control rights, 3) extensive rights, 4) insecure, short term use and restricted control rights and 5) insecure extensive rights.

Hajjar et al. (2020) found that with the formalization of CF, forest rights were often negatively affected. The authors found that 34% of the 249 cases reporting on resource access rights indicated an increase in forest rights after CF was implemented, 54% reported decreases in rights and 12% reported no change. The lack of clarity on rights has led to tenure insecurity and has constrained the sustainable management of forests for sustainable use, livelihood improvement and wealth creation (Barrow et al. 2016). Chomba et al (2015) found that national forest policies and actors in Kenya transferred minimal powers that enabled local communities to execute forest protection and conservation roles, while maintaining legislative powers and control of economic benefits centrally, and, that representation within CF was highly skewed in favor of small and already powerful local elites. These findings also mirror those of formal and customary land rights (Notess at al. 2018). In many places, governments for a variety of reasons are still reluctance to recognize existing customary rights or to grant significant statutory rights to communities.

In a review of the literature, Seymour et al. (2014) "confirmed the existence of a large and growing literature in support of the proposition that strong indigenous/local tenure is associated with forest management outcomes that are at least as good (as) or better than outcomes for areas owned/managed by the State (such as protected areas). Taken as a whole, the literature would appear to provide broad support for more specific assertions that the following conditions are associated with better forest outcomes: security of tenure regardless of form; protected status (with better outcomes when combined with multiple use and/or indigenous territories); community-level management (local involvement/autonomy in rule-making); strong and established local institutions; positive economic incentives to justify the investment in forest management; support from NGOs; and supportive national policy." The authors found this literature to be relatively abundant for Nepal, Tanzania, Mexico and the Amazon (see also Gilmour 2016).

Some researchers have used matching analysis to specifically examine the effects of formal legal titling of indigenous forestland on forest cover. Blackman et al. (2017) found that titling of indigenous land in the Peruvian Amazon in 2002 reduced clearing by more than three-quarters and forest disturbance by

roughly two-thirds in just the first 2 years. Baragwanatha and Bayi (2020) found that indigenous lands in the Brazilian Amazon with full property rights (as measured by land demarcation and State recognition) showed a significant decrease in deforestation from 1982 to 2016, while the effect does not exist in indigenous lands without full property rights.

2. METHOD

The assessment of CF in Africa was conducted using spatial data and geographic information system (GIS) analytical tools. While some studies on the environmental outcomes of CF at the community and country level have been conducted and published (see above), the authors are not aware of any GIS analysis of forest cover loss in CFs across multiple countries in Africa. This study focuses on how CF contributes to improved forest management in Africa using a case study approach. A geospatial analysis of CF and forest outcomes was conducted for five countries in continental Africa: Liberia, Gabon, Equatorial Guinea, Democratic Republic of Congo (DRC), and Cameroon.

The countries were selected for multiple reasons. Gabon, Equatorial Guinea, and DRC are among the most forested countries in Africa (and the world) in terms of percentage of national land. DRC has the second most tropical forest behind only Brazil, and the seventh most forest (when considering all types) in the world behind Russia, Brazil, Canada, United States, China and Australia. Most land in all five countries is community land held under customary tenure arrangements although very little community land is formally registered or documented with the State in all five countries (note, the formalization of community land is a separate process from the formalization of community forests under CF). All five research countries include community forests that are held only under customary tenure arrangements and others that have been formally established and are recognized by the State (and still others that are in the process of being formalized).

Important differences in the research countries allow for comparative analysis. While CF laws and guidelines are in place in all five countries, the legal frameworks and enabling conditions vary significantly in the forest rights and responsibilities devolved to communities. Implementation and law enforcement also vary across the research countries. Moreover, the research countries vary in the years of CF experience and formal establishment. For example, Cameroon's formal CF policy framework was established in 1994 while DRC's CF framework started in 2008. Further, while CF in some research countries have been studied extensively, such as those in Cameroon (see above), others have received relatively little research attention, such as the community forests in Gabon and Equatorial Guinea.

Data availability was another key factor in the selection of countries for this analysis. The availability of spatial data on the boundaries of community forests varies in coverage and quality across the continent, with few countries having formally mapped these areas. Of the formally mapped areas, even fewer include descriptive attributes such as formalization status and/or date. The research also sought to better understand the role of CF formalization in forest management (those legally recognized by government although the legal recognition varies). Of the five research countries, however, only Cameroon had information on date of formalization for a significant number of the mapped community forests. Cameroon's data included boundaries of 682 community forests nationally, of which 510 (75%) had corresponding information on date of formalization.

The quality and accuracy of forest data was also a factor in the selection of geographies for this analysis. There are many ways to measure improved forest management, with this study focusing specifically on forest cover loss using a GIS analysis. Forest data were sourced from Global Forest Watch (GFW), which is the only available dataset on tree cover and loss with globally consistent coverage that spans a relatively significant time series (2000 to 2019, as of publication). However, the data are known for

having higher accuracy in areas of dense forest cover, as opposed to areas of low-density tree cover canopy, such as dry, sparse woodlands (GFW 2015). Therefore, this research limited the geographic coverage of this analysis to the humid tropics where quality and accuracy of forest data are greater. It meant that an assessment of CF forest outcomes in drier climates, such as in Tanzania, Namibia, Malawi, and Zambia was not conducted.

The analysis was performed using GIS software (ArcMap 10.7) and the datasets described in Table 1. All countries used baseline tree cover data for 2000, which is the point of departure for quantifying tree cover loss for the subsequent years of 2001 to 2019. The baseline tree cover data was further classified into areas of tree canopy cover over 30%, which is the default threshold for defining forest using the GFW data. To understand the difference between forest outcomes across different management scenarios, we estimated baseline tree cover (2000) and tree cover loss per year (2001 -2019) for three situations: within community forests, within protected areas, and nationally. The results for each country are described in the following sections.

Table 1 | Datasets and sources used in the analysis

Data	Source
Baseline tree cover (2000)	Global Forest Watch, 2020. Available at: http://data.globalforestwatch.org/
Tree cover loss 2001-2019	Global Forest Watch, 2020. Available at: http://data.globalforestwatch.org/
Community forests in Cameroon	Ministry of Forests and Wildlife (MINFOF), 2019. Available at: https://cmr-data.forest-atlas.org/
Community forests in DRC	Ministry of Environment and Sustainable Development (MEDD), 2019. Available at: http://cod-data.forest-atlas.org/
Community forests in Equatorial Guinea	National Institute of Forest Development (INDEFOR), 2017. Available at: https://gnq.forest-atlas.org/
Community forests in Gabon	Ministry of Environmental Protection and Natural Resources, Forest and Sea (MPERNFM), 2018. Available at: http://gab-data.forest-atlas.org/
Community forests in Liberia	Liberia Forestry Development Authority, 2019. Available at: http://data.globalforestwatch.org/
Protected Areas	World Database of Protected Areas (WDPA), 2020. Available at: https://www.protectedplanet.net
National administrative boundaries	Database of Global Administrative Areas (GADM) version 3.6, 2019. Available at: https://gadm.org/

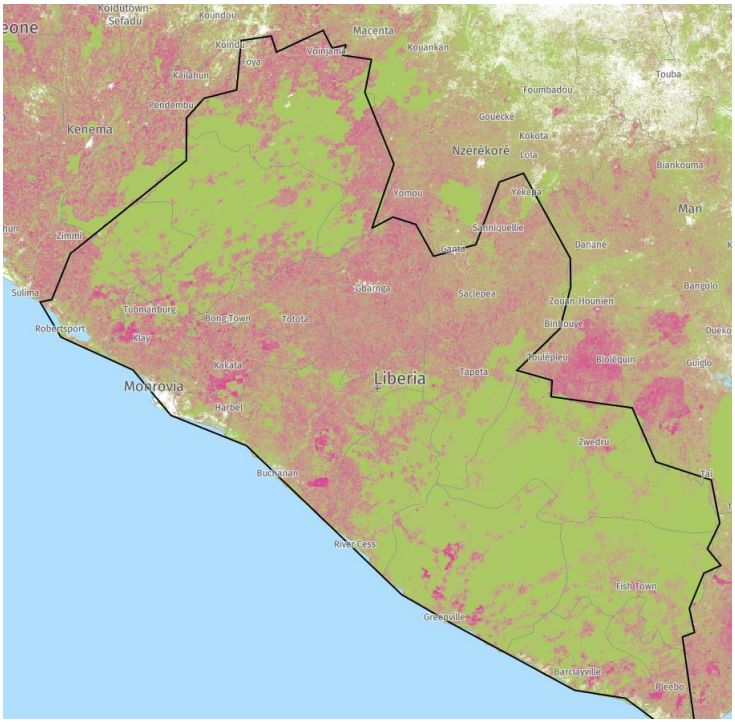
The GIS analysis evaluated the relationship between CF and forest cover change; however, this was not a matching study that controlled for confounding factors (see above). As such, one cannot assume that any forest cover loss within a community forest is necessarily the result of strengths or weaknesses in the CF management scheme as opposed to other factors (*i.e.*, it is not possible to infer causation from this analysis). This analysis seeks principally to evaluate whether community forests have experienced forest cover loss between 2001-2019, whether community forests are more or less vulnerable to forest loss than protected areas or the country in general, and whether forest loss in community forests, protected areas and the country are consistent across the five research countries. These findings are thus a starting point for further research on CF in Africa that can show more causal inference.

3. FINDINGS

4.1 LIBERIA

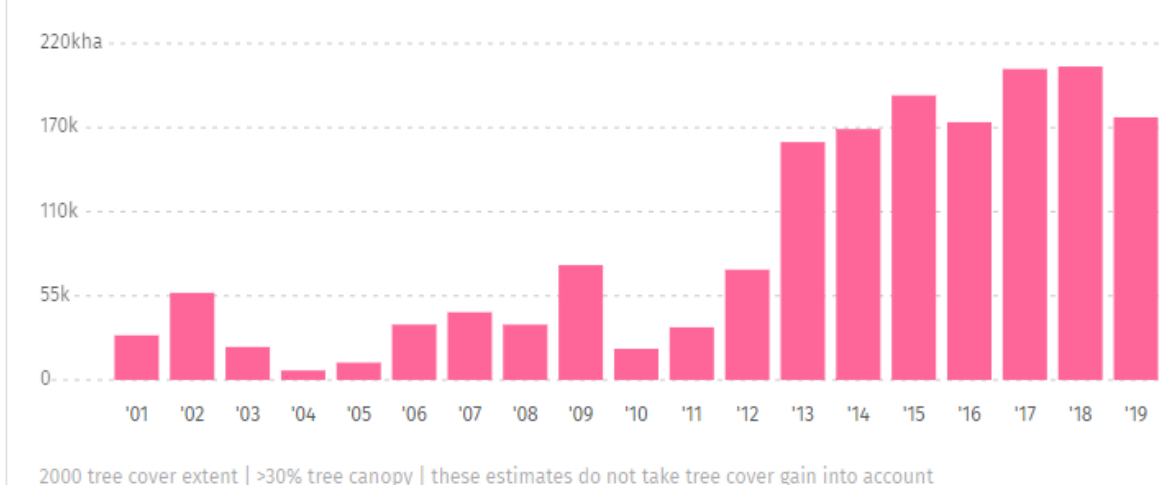
4.1.1. Overview (source: GFW 2020)

Figure 2 | Tree Cover in 2000 (green) and Tree Cover Loss from 2001-2019 (pink) in Liberia



1. In 2000, Liberia (Figure 2) had 9.38Mha of natural forest, extending over 97% of its land area. In 2019, it lost 170kha of natural forest, equivalent to 50.2Mt of CO_2 of emissions.
2. From 2001 to 2019, Liberia lost 1.70Mha of tree cover, equivalent to a 18% decrease in tree cover since 2000 (Figure 3).
3. From 2002 to 2019, Liberia lost 228kha of humid primary forest, making up 14% of its total tree cover loss in the same time period. Total area of humid primary forest in Liberia decreased by 5.2% in this time period.
4. Liberia has a total carbon store of 1.69Gt, with most of the carbon stored in biomass.
5. In Liberia, the land-use change and forestry sector is a net source of CO_2, emitting an average of 12.9tCO_2e per year from 1990 to 2017. This represents 73% of Liberia's total greenhouse gas emissions over the same period.
6. Between 2001 and 2019, a total of 516Mt of CO_2 was released into the atmosphere as a result of tree cover loss in Liberia. This is equivalent to 27.1Mt per year.

Figure 3 | Tree Cover Loss (2001-2019) in Liberia



CF was formally established in Liberia in 2009 with the passing of the Community Rights Law with Respect to Forest Lands (henceforth CRL). The CRL introduced CF to address the environmental and development challenges that were exacerbated by the Liberian civil war (1989-1997 and 1999 –2003). By the end of the final war, more than 250,000 people had been killed and nearly 1 million people had been displaced. Illicit logging had played a critical role in financing and prolonging the conflict, providing militia groups with a hard-to-trace commodity that could be easily exchanged for cash and arms in international markets. Much of this conflict timber was sourced from community land although the communities did not receive many benefits from the exploitation and, indeed, were negatively impacted by the resulting environmental damages. As a result, the post-conflict government prioritized the reform of the laws that govern logging and forestry (Manvell 2019).

The CRL is widely considered by experts to be among the most ambitious and progressive CF laws in Africa (along with the Ministerial Decree No. 025 - Concessions Forestières des Communautés Locales (CFCL) in the Democratic Republic of Congo, see below) (Manvell 2019). The law contrasts sharply with the Forestry, Wildlife and Fisheries Regulations (Law No. 94-01 of 20 January 1994) in Cameroon which provides communities with limited, time-bound forest rights over areas no larger than 5,000 ha (see below).

The CRL was specifically designed to give communities in Liberia control over large logging operations and associated benefits on their land. The law provides for medium-scale community forest areas from 5,001 to 49,999 hectares although a community can also enter into direct commercial use contracts with logging companies or individual operators for areas smaller than 5,001 ha and for large-scale concessions of more than 49,999 ha (Manvell 2019). For large-scale contracts, communities have the legal rights to at least 55% of all revenue/income generated, significantly more than they historically received from logging concessions.

The CRL establishes steps by which a community can apply for and obtain a permit that would allow it to make decisions regarding its community forest (Mukpo 2019). Communities must go through nine steps to acquire a “Community Forestry Management Agreement,” including agreeing on the boundaries of

their forest with neighboring landholders and establishing formal community-level decision-making bodies - democratic management bodies with elected members that are representative of the community members. These bodies – together with outside technical experts - take the lead in preparing management plans for the forest. Communities that obtain a formal permit have the legal authority to sign an agreement with logging companies for commercial exploitation. In an effort to protect communities from predatory logging companies, the CRL stipulates that any agreement made with a company prior to completing the process and obtaining a formal permit is illegal (Manvell 2019).

In practice, CF in Liberia has been pursued in and around large forest blocks where external actors – local government, the national Liberia Forestry Development Authority, logging companies, and development and conservation initiatives - have brought neighboring communities together and helped them create the necessary local management bodies to gain legal recognition (Manvell 2019). Demarcating the boundaries of a community forest can cost tens of thousands of dollars, an unobtainable sum for most Liberian communities. This has opened the door for middlemen working with loggers to front communities the money to complete the process in exchange for an agreement to harvest trees once the permit is issued (Manvell 2019).

In 2019, ten years after the passage of the CRL, there were 133 pending community forest applications, covering a total of 43,000 square kilometers (16,600 square miles), or 45 percent of Liberia's total land mass. Not all community forests were analyzed in this study due to data availability. This analysis examined 48 community forests for which spatial data were available, including 38 formal community forests (those with a formal agreement in place) and 10 proposed community forests (those still in the process of obtaining an agreement). The 48 community forests are spread across the country and cover almost 10% of Liberia's total area (Figure 4).

The 48 community forests (averaging 19,611 ha) experienced cumulative forest area loss of 10.2% between 2001 and 2019 (Table 2). This translates into an average annual deforestation rate of 0.54%. The forest loss inside formal community forests was slightly less (10.0%) than within proposed community forests (10.6%). In comparing individual community forests, total forest area lost as a percent of the baseline forest cover area varied between 0.1% and 29%, indicating that some community forests experienced almost no loss while others experienced significantly more loss than the average. The community forests near protected areas had on average less forest loss than those further away. Some community forests closest to Monrovia, Liberia's capital, experienced the most forest loss.

In comparison, protected areas lost about 4.3% of their baseline forest area over the same 18-year period with an average annual deforestation rate of 0.23% (Table 2). Overall, Liberia lost about 18% across the entire country from 2002 to 2019 with an average annual deforestation rate of 0.96%. Deforestation in Liberia's community forests is more than twice the rate of protected areas but just more than half the national rate in the country.

Prior to the CRL in 2009, annual forest loss in community forests followed similar trends to the forest loss at the national level, with small peaks in forest loss occurring in 2002 and 2009 (Figure 5). After 2009, however, there was a marked decrease in forest loss at the national level and within community forests, followed by a sharp increase in forest loss at the national level and a more gradual increase in forest loss within community forests. In contrast, forest loss in protected areas did not experience significant increases in loss before the CRL. Forest loss in protected areas increased slightly in 2012 and thereafter but not to the level in community forests or at the national level.

While the variability in community forest loss over time cannot be reliably attributed to economic, political, or cultural conditions in given areas (a definitive relationship between formal establishment and forest cover stability is not proposed), the contrasting forest cover stability provides key insights for further implementation of CF as an environment and development solution. This change in forest cover stability coincides with the establishment and proliferation of CF and not unexpected given that communities with permits often log their forests in line with their management plans. Loss still occurs in Liberian community forests at a lower rate than at the national level and a higher rate than in protected areas where no logging is permitted.

Figure 4 | Percent Tree Cover Loss in 48 Community Forests in Liberia (2001-2019)

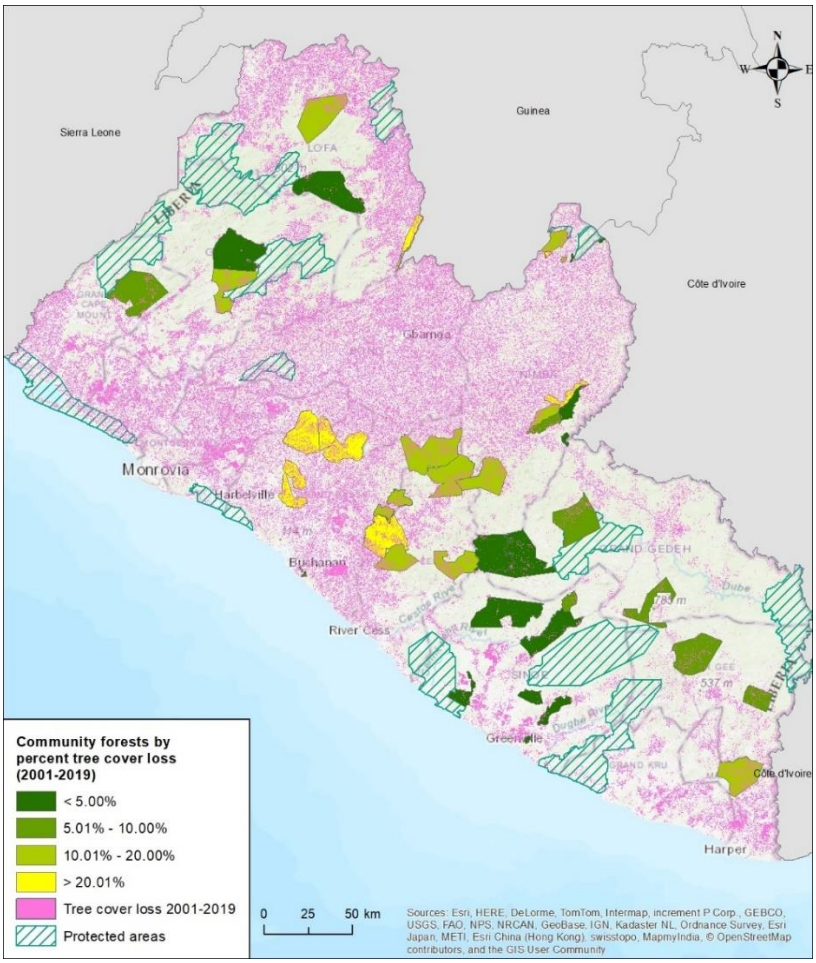
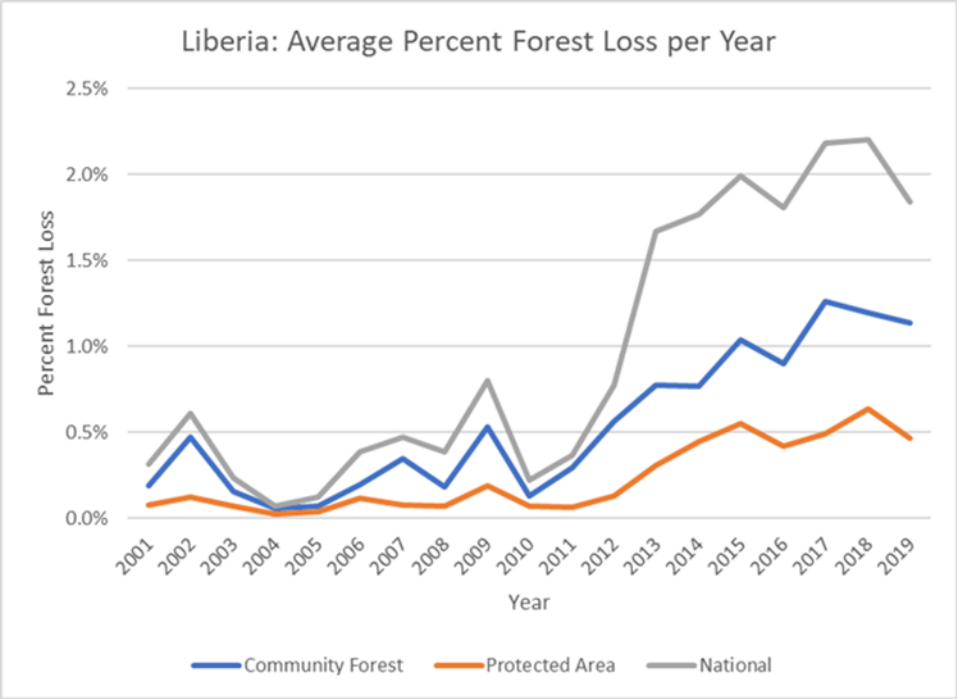


Table 2 | Forest Cover and Cumulative Forest Loss in 48 Community Forests in Liberia (2001-2019)

Area	Number of Units	Forest Cover in 2000 (ha)	Cumulative Forest Loss 2001-2019 (ha)	Percent Cumulative Forest Loss 2001-2019	Average Annual Forest Loss
Community Forests	**48**	**941,312**	**96,347**	**10.2%**	**0.54%**
Formal	*38*	*635,356*	*63,810*	*10.0%*	*0.53%*
Proposed	*10*	*305,955*	*32,538*	*10.6%*	*0.56%*
Protected Areas	**14**	**1,068,411**	**46,258**	**4.3%**	**0.23%**
Designated	*4*	*338,462*	*18,928*	*5.6%*	*0.29%*
Proposed	*10*	*729,949*	*27,330*	*3.7%*	*0.20%*
National	**N/A**	**9,384,779**	**1,709,363**	**18.0%**	**0.96%**

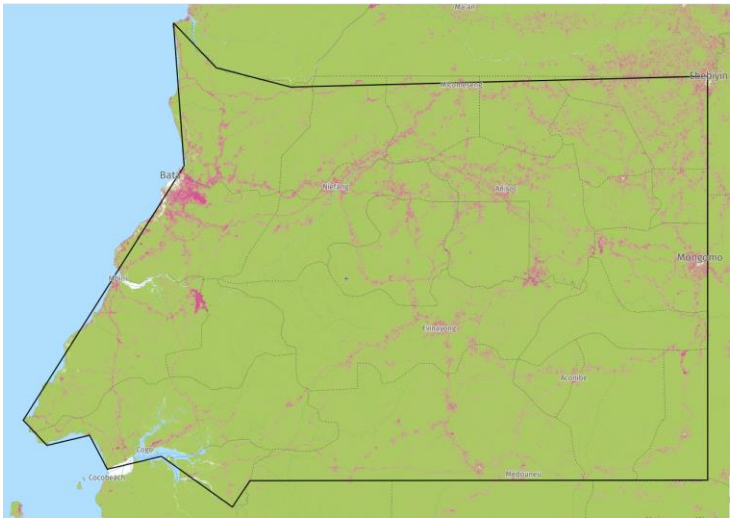
Figure 5 | Average Percent Forest Loss Per year in 48 Community Forests in Liberia



4.2 EQUATORIAL GUINEA

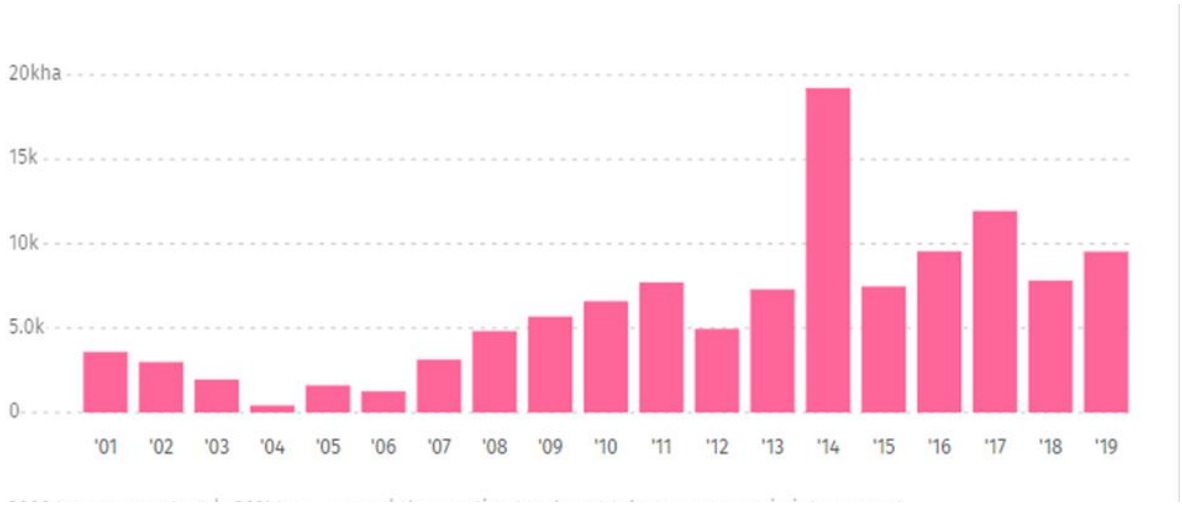
4.2.1. Overview (source: GFW 2020)

Figure 3 | Tree Cover in 2000 (green) and Tree Cover Loss from 2001-2019 (pink) in Equatorial Guinea



1. In 2000, Equatorial Guinea (Figure 6) had 2.64Mha of tree cover, extending over 98% of its land area. In 2019, it lost 9.53kha of tree cover, equivalent to 4.28Mt of CO_2 of emissions.
2. From 2001 to 2019, Equatorial Guinea lost 118kha of tree cover, equivalent to a 4.4% decrease in tree cover since 2000 (Figure 7).
3. From 2002 to 2019, Equatorial Guinea lost 58.8kha of humid primary forest, making up 52% of its total tree cover loss in the same time period. Total area of humid primary forest in Equatorial Guinea decreased by 2.6% in this time period.
4. Equatorial Guinea has a total carbon store of 726Mt, with most of the carbon stored in biomass.
5. In Equatorial Guinea, the land-use change and forestry sector is a net source of CO_2, emitting an average of 5.55tCO_2e per year from 1990 to 2017. This represents 26% of Equatorial Guinea's total greenhouse gas emissions over the same period.
6. Between 2001 and 2019, a total of 53.0Mt of CO_2 was released into the atmosphere as a result of tree cover loss in Equatorial Guinea. This is equivalent to 2.79Mt per year.

Figure 7 | Tree Cover Loss (2001-2019) in Equatorial Guinea



Tree cover loss in Equatorial Guinea has steadily increased since 2007 with a significant spike in 2014. In 2019, the country lost 9.53kha of tree cover. In 2020, forests still covered approximately 93% of Equatorial Guinea's surface, a total of about 2.5 million ha. The country's forests are considered by experts to be the richest in the Congo Basin in terms of biodiversity (fauna and flora).

Between 80% and 90% of the population relies on the forests to meet its needs for food, timber, fuel, income/trade, medicines as well as cultural aspects. Up to 42% of rural income comes from various non-timber forest products. Most forest management and timber extraction by most smallholder farmers and communities are informal and underdeveloped. Logging is principally carried out by international logging companies operating in government-issued forest concessions with little involvement of and few benefits going to rural communities.

Equatorial Guinea's forests are governed by the 1997 Law on the Use and Management of Forests (No. 1/1997) (hereafter Forest Law). The law calls for sustainable forest management to address the growing forests degradation and loss, and to meet the country's climate mitigation commitments. It provides for establishment of a National Forest Reserve (NFR) that is divided into conservation and production areas. In 2013, the NFR covered about 50% of the national territory, with 61% of the NFR assigned to production and 39% to conservation. Production NFR is divided into three categories:

1. National Forests (state-managed forest concessions);
2. Forest Plots (forest remnants in agricultural areas); and
3. Community Forest Reserves (by law forests that are adjacent to and associated with communities).

CF is recognized in the 1997 Forest Law but is not a new concept or approach. The government has long acknowledged that CF can drive economic development and diversification, lead to fairer forest benefit sharing, and improve forest management. *Reservas de poblado* (populated or town reserves), for example, were recognized in the previous forest law of 1948 although it did not meaningfully advance CF. Over the years, CF has slowly gained legal status and communities have been granted more rights over their forests.

The 1997 Forest Law establishes that there is no private property in the NFR (Article 5) but provides for the state to recognize, delimit, and grant permanent use rights to rural communities over Community Forest Reserves. Most rural families and communities, however, have not been granted formal rights over their traditional forests. Rather, most hold their forests under customary tenure arrangements (Nguema and Pavageau 2013; Obiang-Mbomio and Pérez-Terán 2014; GEF 2018). More recently, however, the 2009 Land Ownership Law (No. 4/2009) recognizes the rights of farmers over land which they have customarily held and used. This suggests that farmers can claim rights to forestlands if they traditional used the land.

Under the 1997 Forest Law, communities must be formally granted rights over their forests by the government before they can harvest forest products or partner with an outside entity to do so, such as a logging company. To acquire forest rights, the government requires communities to prepare an inventory of the community forest and a "simple management plan" (FAO 2010). To promote fair benefit sharing, the government has made it compulsory for logging companies to build roads, schools, clinics, and other public works in their concession areas. In addition, 70% of the taxes from forest production in community forests is earmarked for projects that benefit the communities (FAO 2010).

The number of community forests has grown over the years and, in 2016, there were more than 70 community forests, covering about 100,000 ha. Today, community forests represent about 7% of the Production NFR. This study examined a total of 75 community forests in mainland Equatorial Guinea for which spatial data were available. The community forests are small (averaging 1,347 ha) and cover approximately 3.8% of Equatorial Guinea's total area (Figure 8). Most community forests are in western and northern mainland Equatorial Guinea. Over the 18-year period from 2001 to 2019, community forests lost about 6.2% of their baseline forest cover which translates into an average annual deforestation rate of 0.33% (Table 3).

In comparing individual community forests, total forest area lost as a percent of the baseline forest cover area in the 18-year time period varied between less than 2% to more than 6%. Community forests with below average, average, and above average forest loss are located across mainland Equatorial Guinea. Several community forests that share a border with the Monte Alén National Park (Parque nacional de Monte Alén), however, have experienced little forest loss.

Forest loss in community forests was higher than in the protected areas and across the country. Protected areas in Equatorial Guinea lost only 1.5% of their baseline forest cover from 2001 to 2019 for an average annual deforestation rate of 0.08%. This cumulative forest lost across the entire country during this 18-year period was 4.5% with an average annual deforestation rate of 0.24% (Table 3).

The rate of forest loss increased in community forests and across the nation in 2006 and continued through 2019, with a spike in forest cover loss in 2014, including in protected areas (Figure 9). It is unclear what led to this spike. Forest cover loss in community forests is not unexpected given that communities harvest forest products in community forests, which is not allowed in protected areas. Higher national rates of forest loss may be due to much of the country's forests being remote and isolated from development.

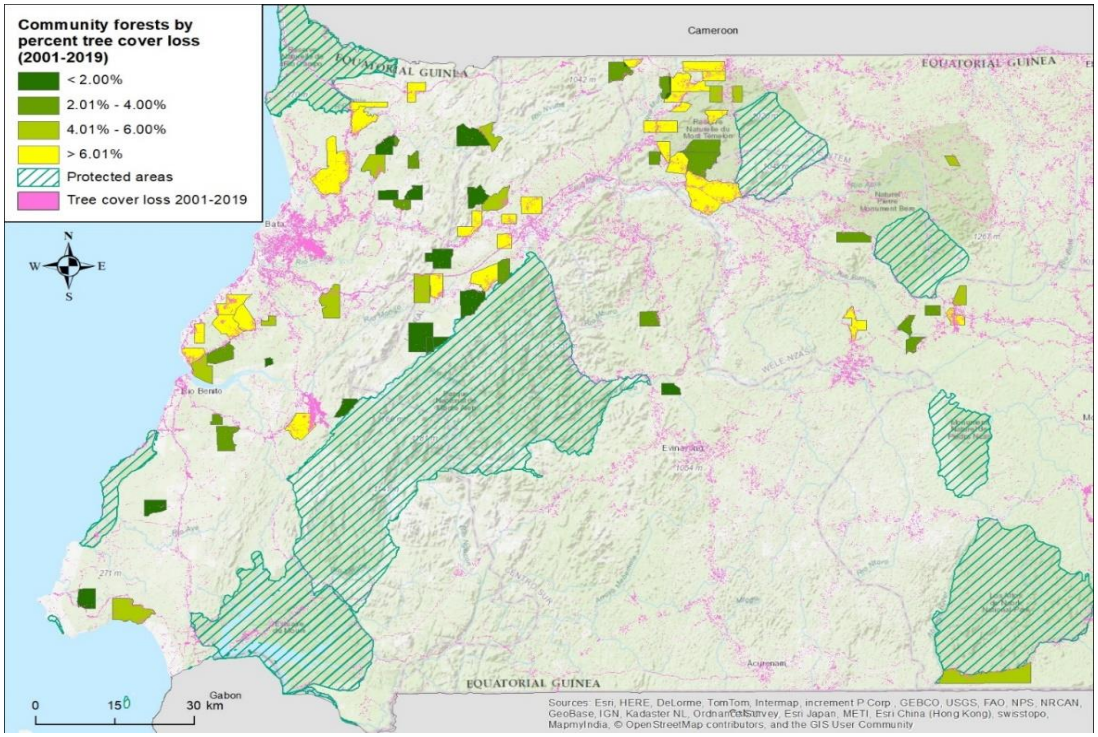
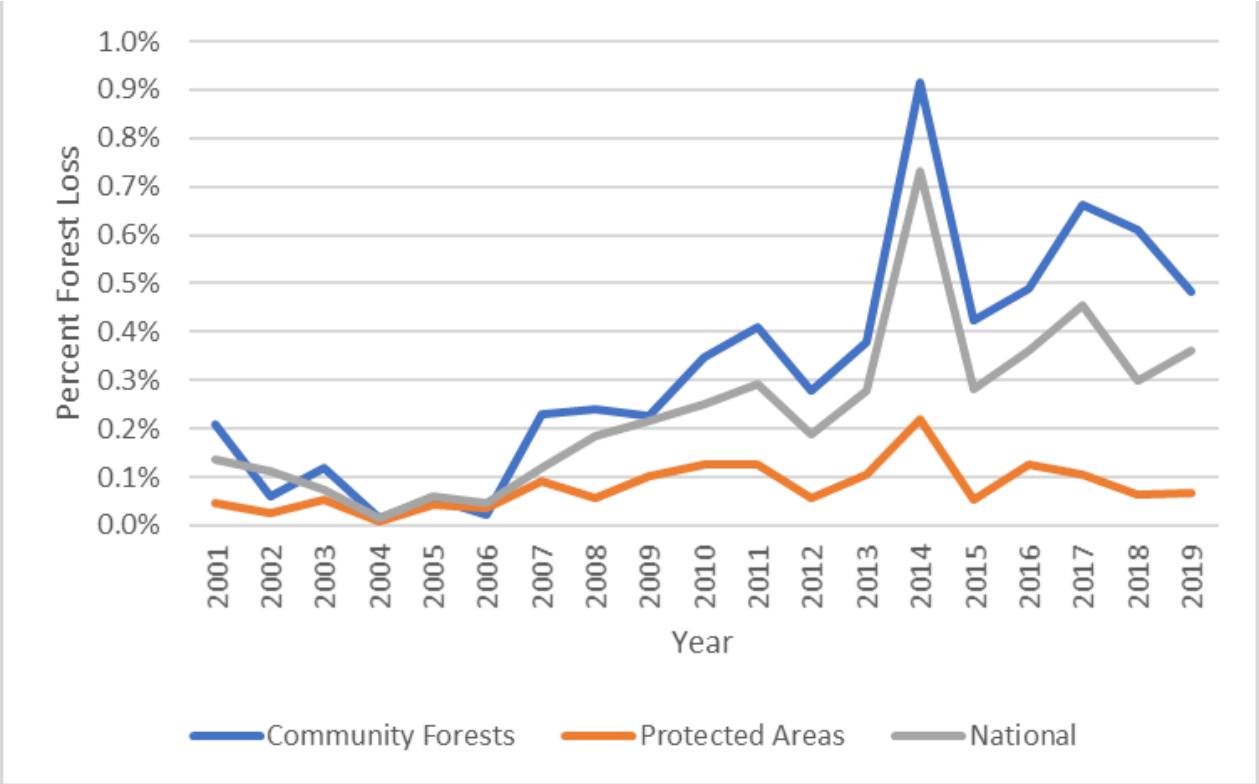


Figure 8 | Percent Tree Cover Loss in 75 Community Forests in Equatorial Guinea (2001-2019)

Table 3 | Forest Cover and Cumulative Forest Loss in 75 Community Forests in Equatorial Guinea (2001-2019)

Area	Number of Units	Forest Cover in 2000 (ha)	Cumulative Forest Loss 2001-2019 (ha)	Percent Cumulative Forest Loss 2001-2019	Average Annual Forest Loss
Community Forests	75	100,997	6,235	6.2%	0.33%
Protected Areas	14	493,220	7,408	1.5%	0.08%
National	N/A	2,640,674	118,054	4.5%	0.24%

Figure 9 | Average Percent Forest Loss Per Year in 75 Community Forests in Equatorial Guinea



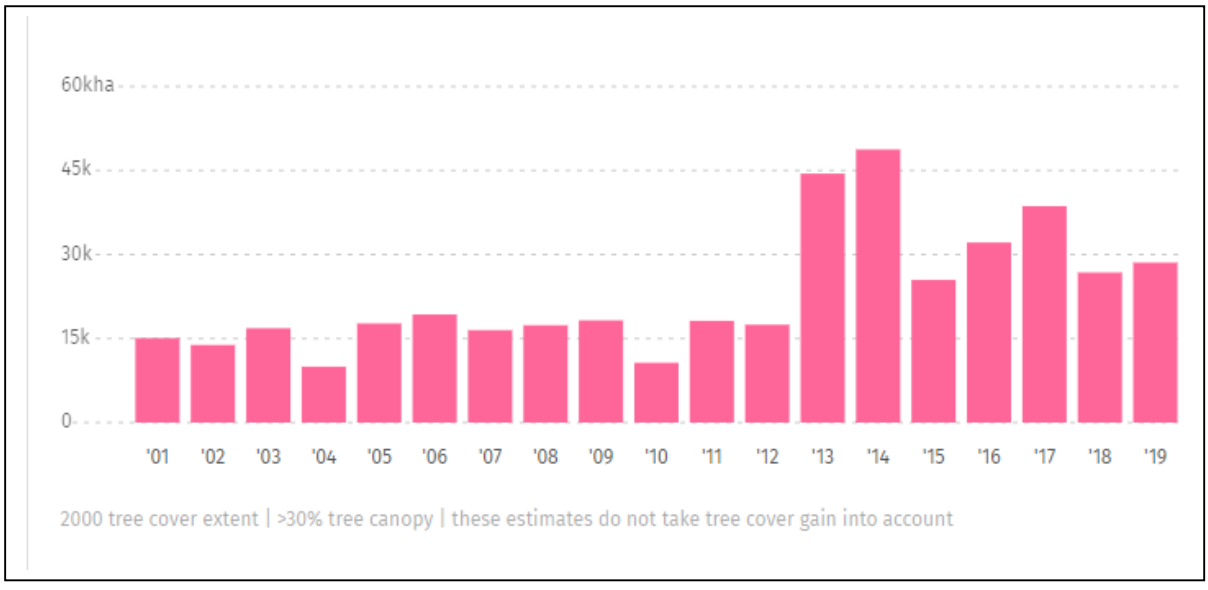
4.3 GABON

4.3.1. Overview (source: GFW 2020)

1. In 2000, Gabon (Figure 10) had 24.27Mha of natural forest, extending over 93% of its land area. In 2019, it lost 28.5kha of natural forest, equivalent to 12.1Mt of CO_2 of emissions.
2. From 2001 to 2019, Gabon lost 436kha of tree cover, equivalent to a 1.8% decrease in tree cover since 2000 (Figure 11).
3. From 2002 to 2019, Gabon lost 239kha of humid primary forest, making up 57% of its total tree cover loss in the same time period. Total area of humid primary forest in Gabon decreased by 1.1% in this time period.
4. Gabon has a total carbon store of 6.65Gt, with most of the carbon stored in biomass.
5. In Gabon, the land-use change and forestry sector is a net sink of CO_2, sequestering an average of 23.2tCO_2e per year from 1990 to 2017. This represents an offset of 100% of Gabon's total greenhouse gas emissions over the same period.
6. Between 2001 and 2019, a total of 188Mt of CO_2 was released into the atmosphere as a result of tree cover loss in Gabon. This is equivalent to 9.89Mt per year.

Figure 10 | Tree Cover in 2000 (green) and Tree Cover Loss from 2001-2019 (pink) in Gabon

Figure 11 | Tree Cover Loss (2001-2019) in Gabon



In Gabon, tree cover loss remained steady at about 15,000 ha per year from 2001 to 2012, but increased significantly in 2013 and 2014 before falling some although not to pre-2013 levels. In 2019, the country lost 28.5kha of forest. Today, forests still cover approximately 90% of Gabon's land area.

Gabon represents a case of colonial continuity in land relations. Laws first instituted in 1899 deemed the country as "a land without owners" (*terra nullius*) which allowed France, the colonial power - at no cost - to lawfully (in accordance with French law) take and allocate land at will to its own sponsored enterprises. By 1900 most of the country was under French conglomerates (Alden Wily 2012).

Since 1960, Gabon's independent governments have retained these colonial norms. There is no independent national land policy - the nearest document to a land policy is a 1911 explanation of colonial land policy. The French colonial 1909-1910 legal provisions still provide the basis for governing land in Gabon (Alden Wily 2012). The state is the major landowner with up to 90% of its area under government control and largely defined as "private government land." There are more liberal provisions in Gabon's natural resource laws, but these are not consistently applied. The rule of law is lax, especially on matters concerning commercial exploitation.

Traditional rights to land and natural resources are rarely acknowledged and formal procedures to secure tenure are narrow in their scope and inaccessible to most rural people (Alden Wily 2012). While some customary use of land is recognized and allowed, families and communities cannot secure full ownership of their traditional forests. As a consequent, most people are technically landless, existing as mere occupiers and users of government property. Rural people are routinely displaced to make way for concessions (*e.g.,* mining, logging, oil palm, and rubber plantations) and conservation (*e.g*., protected areas).

Unlike land, Gabon's forests are regulated by more recent laws. In 1982, the government enacted the Guidance Law on Water and Forests (Law 1/82 - Loi d'orientation en matière des Eaux et Forêts). The law established the general legal framework regulating logging activity, hunting, and the use of other forest products. It provided for logging zones, logging permits, size of logging concessions, wood processing development, and other aspects of the forest sector. Law 1/82 did not, however, include any meaningful language on CF.

In 2001, the Forest Code (Law No 16/01) was enacted which replaced Law 1/82. The new law governs forests management on Gabon's public lands and introduces the concept of CF. The main goals of the Forest Code are to foster: 1) sustainable development of forests; 2) industrialization of the timber sector; 3) sustainable conservation of natural resources; and 4) greater local stakeholder involvement in the management of natural resources (FLI 2014).

The Forest Code permits local communities to establish a community forest and then carry out logging operations themselves or hire the services of independent loggers or logging companies. Gabon's forestlands are divided into specific zones or classified forests. These areas are further divided into Areas of Private Domain (*domaine privé*) - public lands which are granted by the government to private entities, such as a logging company or community, for a specific, finite period of time. When granted, these areas are designated as registered productive forest property or community forests (Rural Forest domain or *Forêts Rurales*). They are then assigned, managed, and monitored by the terms of a contract between the holder and the government (FLI 2014). Community forests are subject to the same laws

and regulations as large-scale logging concessions, including, for example, the requirement to prepare and implement a forest management plan.

Income generated from a community forest remains with the community. The 2001 Forest Code requires companies to share the revenues from timber harvesting with the local communities in which they are operating, however, it does not specify how exactly this should take place in practice. An implementing decree published in 2014 provides a benefit-sharing agreement template, but it does not provide enough detail to make benefit sharing become a reality. As a result, the Ministry of Forests requested a guidance document for revenue sharing.

With support from ClientEarth, an international NGO, forest communities and other stakeholders prepared the *Technical Guide on Benefit Sharing*. The *Technical Guide* was approved by the government in May 2016 and provides step-by-step instructions on how benefit-sharing agreements should be designed and implemented. Together, the 2001 Forest Code, 2014 implementing decree, and 2016 *Technical Guide*, allow local communities to share in revenues generated from timber harvesting by setting up a development fund. Development funds help ensure that communities meaningfully participate in the preparation of benefit-sharing agreements and in the creation of local projects financed by the development fund (Gaworecki 2016).

Relatively few formal community forests have been established in Gabon although several communities have received temporary community forest permits. The Forest Code does not provide a precise definition of the rural domain and over the years the government has allocated land for various uses, including agroforestry, from the rural forest domain. Such allocations have limiting the areas where community forests can be established. Further, as is the case in other African countries, the administrative procedure for establishing a community forest is time consuming, expensive, and difficult for communities to navigate without external assistance, discouraging some communities from even embarking on the process.

This study includes 38 community forests in Gabon for which spatial data were available (Figure 12). The community forests average about 4,200 hectares in area and cover less than 1% of Gabon's total area. Community forests had a cumulative loss of baseline forest area of 6,767 hectares from 2001 to 2019 – a loss of 4.2% (Table 4). The cumulative forest loss in community forests in the 18-year time period translates into an average annual deforestation rate of 0.22%. There is little difference in the deforestation rates in *attribuo* (formal), *convention provisoire* (provisional agreement) or *projet* (projected) community forests in Gabon. Forest loss in Gabon's community forests increased slightly in 2011 and through to 2019, but never reached higher than 0.4% in a year (Figure 13).

Across the 38 community forests, the total area lost from 2001 to 2019 as a percent of the baseline forest area varied between 0.58% and 22.43%. Community forests with below average, average, and above average cumulative forest loss are located across Gabon (Figure 12).

Cumulative forest loss in the 38 community forests from 2001 to 2019 is higher than at the national level (1.8% with an average annual deforestation rate of 0.10%) and in protected areas (1.3% with an average annual deforestation rate of 0.07%) (Table 4). Over time, forest loss within community forests occurs with more variability than at either the national level or in protected areas (Figure 6). Distinct peaks of forest loss occur in community forests in the years 2003 and 2014, followed by dips in forest loss in 2004 and 2015. Overall, however, forest loss is relatively low in community forests, protected areas, and across Gabon.

Figure 12 | Percent Tree Cover Loss in 38 Community Forests in Gabon (2001-2019)

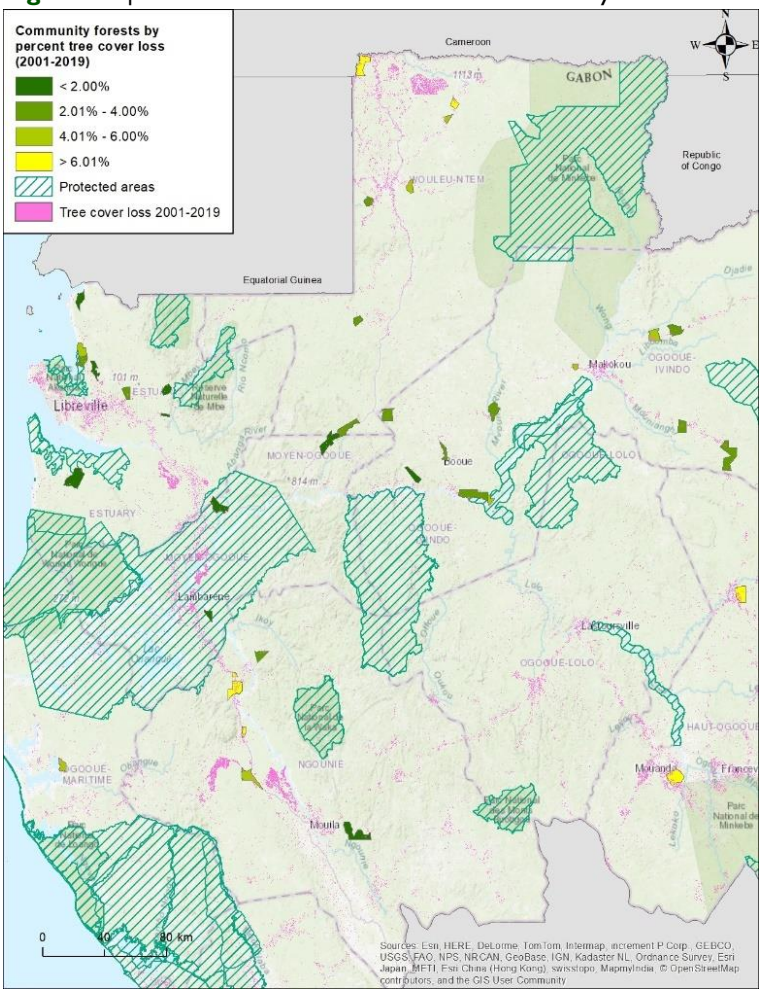
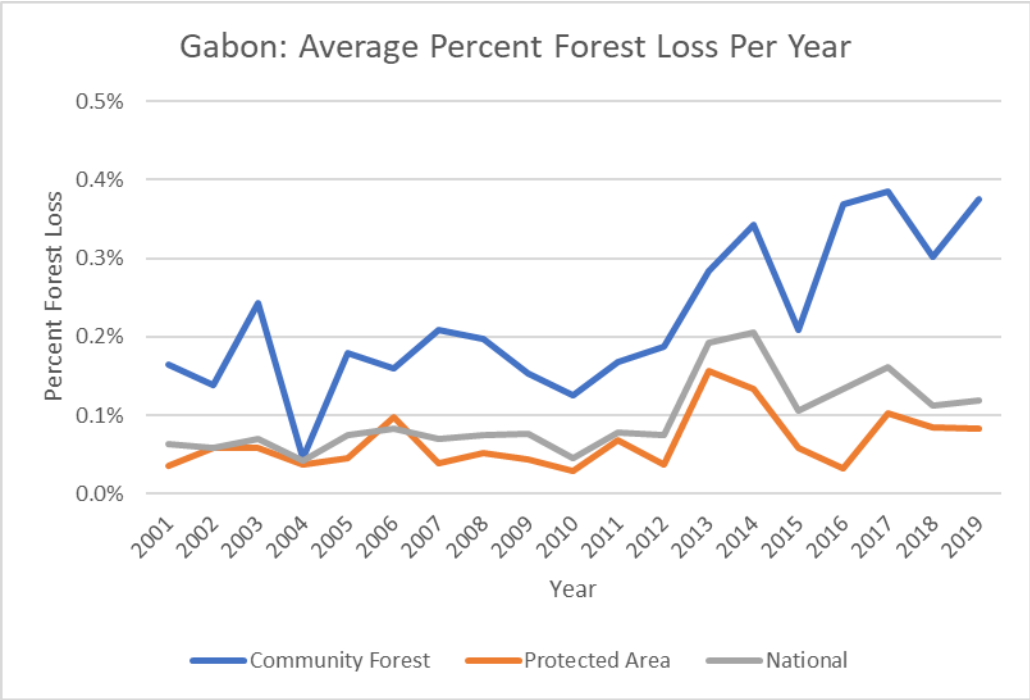


Table 4 | Forest Cover and Cumulative Forest Loss in 38 Community Forests in Gabon (2001-2019)

Area	Number of Units	Forest Cover in 2000 (ha)	Cumulative Forest Loss 2001-2019 (ha)	Percent Cumulative Forest Loss 2001-2019	Average Annual Forest Loss
Community Forests	**38**	**159,785**	**6,767**	**4.2%**	**0.22%**
Attribuo (formal)	*16*	70,493	3,188	4.5%	0.24%
Convention Proviso ire (provisional agreement)	*13*	47,692	1,729	3.6%	0.19%
Projet (projected)	*9*	41,600	1,851	4.4%	0.23%

Protected Areas	**30**	**4,881,384**	**61,210**	**1.3%**	**0.07%**
Designated	*29*	*4,880,000*	*61,206*	*1.3%*	*0.07%*
Inscribed	*1*	*1,384*	*3*	*0.2%*	*0.01%*
National	**N/A**	**24,272,891**	**446,039**	**1.8%**	**0.10%**

Figure 13 | Average Percent Forest Loss Per Year in 38 Community Forests in Gabon



4.4 CAMEROON

4.4.1. Overview (source: GFW 2020)

1. In 2000, Cameroon (Figure 14) had 31.28 M ha of natural forest, extending over 66% of its land area. In 2019, it lost 120k ha of natural forest, equivalent to 45.5Mt of CO_2 of emissions.
2. From 2001 to 2019, Cameroon lost 1.32Mha of tree cover, equivalent to a 4.2% decrease in tree cover since 2000 (Figure 15).
3. From 2002 to 2019, Cameroon lost 608k ha of humid primary forest, making up 47% of its total tree cover loss in the same time period. Total area of humid primary forest in Cameroon decreased by 3.2% in this time period.
4. Cameroon has a total carbon store of 7.98Gt, with most of the carbon stored in biomass.
5. In Cameroon, the land-use change and forestry sector is a net source of CO_2, emitting an average of 122tCO_2e per year from 1990 to 2017. This represents 61% of Cameroon's total greenhouse gas emissions over the same period.
6. Between 2001 and 2019, a total of 519Mt of CO_2 was released into the atmosphere as a result of tree cover loss in Cameroon. This is equivalent to 27.3Mt per year.

Figure 14 | Tree Cover in 2000 (green) and Tree Cover Loss from 2001-2019 (pink) in Cameroon

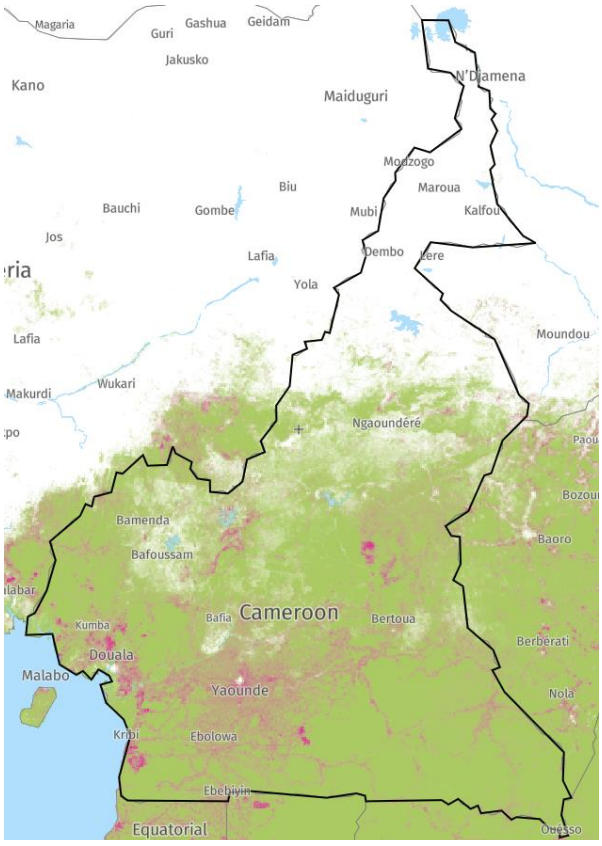
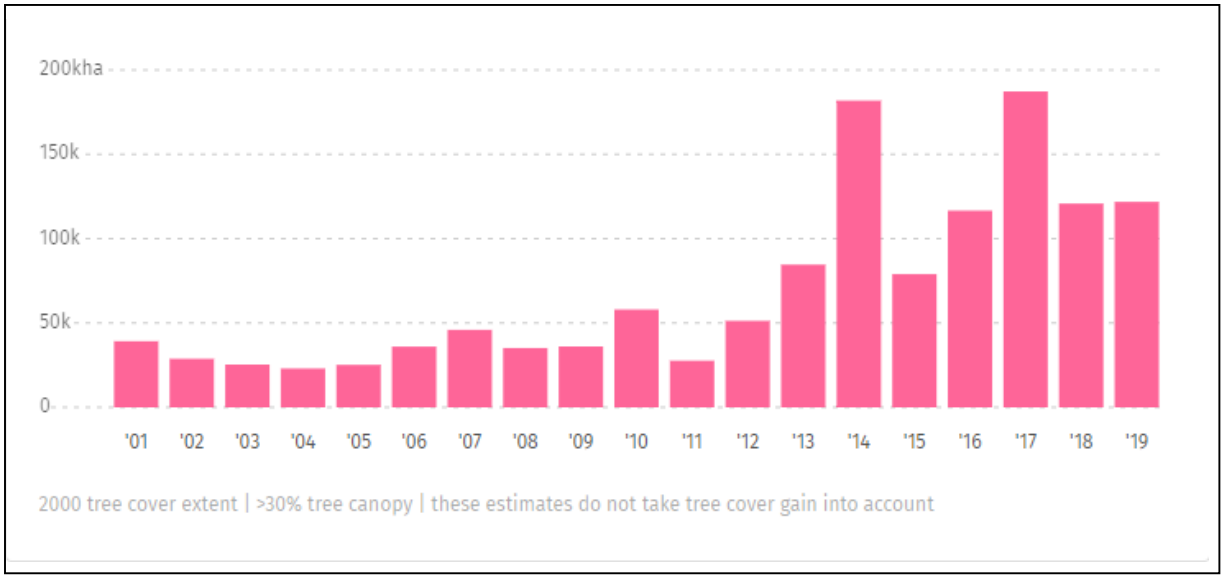


Figure 15 | Tree Cover Loss (2001-2019) in Cameroon



In 1994, Cameroon became the first Congo Basin country to adopt the concept of CF in a significant and meaningful way into its legal framework. Community forests are defined in Law No. 94-01 of 20 January 1994 to lay down Forestry, Wildlife and Fisheries Regulations (hereafter Forest Law) as "that part of non-permanent forest estate (not more than 5000 ha) that is the object of an agreement between government and a community in which communities undertake sustainable forest management for a period of 25 years renewable" (MINEF 1998). CF was introduced in Cameroon as a means of improving community engagement in forest management, enhancing forest conservation, and reducing poverty for forest-dependent people.

In 1995, the prime minister signed a corresponding implementation decree (No. 95-531-PM of 23 August 1995) specifying details of the new Forest Law. Together, the 1994 Forest Law and this implementation decree laid out a new classification of forests, new management units (including CF), logging rights, and conditions and norms for the management of forests in Cameroon (Ekoko 2000, Djeumo 2001).

For communities to be granted a community forest and exploit forest products, they must complete several steps and fulfil a number of conditions (MINEF 1998): The community must:

1. Constitute itself as a legal entity and appoint a community forest manager who will represent the community in negotiations with government on CF matters. By law the entity could be a common initiative group, an economic interest group, a cooperative, or an association – each presents the community with unique opportunities and challenges. Common initiative groups and associations account for more than 90% of all CFs;
2. Delineate and map the intended community forest area;
3. Develop and submit for government approval a Simple Management Plan (SMP) for the first 5 years (a new simple management plan must be prepared every 5 years thereafter); and
4. Prepare and submit for government approval an Environmental Impact Assessment (EIA).

Since 1994, various legal texts, decrees, and circulars have been issued by the government to address specific challenges and shortcomings in the 1994 Forest Law so that CF can fulfil its stated objectives. The following reforms are particularly noteworthy because of the impact they had on promoting CF in Cameroon:

1. In 1997, the government established the Community Forestry Management Unit to support the implementation of CF in Cameroon. The government also established a Sub-Department of Community Forestry (Sous-Direction des Forêts Communautaires) in the Forestry Ministry which helped institutionalize CF and anchor CF in the broader forestry strategy in Cameroon.
2. In 1998, the government released the Manual of the Procedures and Norms for the Management of Community Forestry (MINEF, 1998) which provides the rules and detailed procedures for CF from creation to management, including conditions for timber exploitation.
3. In 2001, the government banned industrial logging on community forests (Ministerial Circular/February 2001) and provided modalities and conditions for artisanal logging in community forests (Ministerial Decision No. 1985/D/MINEF/SG/FC).
4. The government also introduced Environmental Impact Notice (EIN) in lieu of the more costly EIA as an exploitation requirement for CF. The EIN is now the main tool to ensure CF activities do not result in negative environmental outcomes.
5. In 2010, the government introduced pre-emption rights for communities which prioritizes the identification and allocation of forests to community over commercial logging companies.

6. Also in 2010, the government introduced Provisional Management Plans which allow communities to exploit their community forests for the first 2-years. These plans allow communities to raise funds to develop the more costly and time-consuming SMPs.

A number of community forests have been established under the Forest Law. By 2015, there were more than 250 community forests in Cameroon and by 2019, the number had grown to more than 430 community forests and covered about 1.7 million ha (7% of total forest area). Today there are well over 600 community forests in the country.

Despite high hopes for CF in the mid-1990 and some successes, most researchers and development professionals agree that CF has not produced the desired outcomes of improved wellbeing and improved forest management in Cameroon (CED et al 2017). While some cases of community social and livelihoods benefits have been recorded, evidence of real economic benefits is scarce. In the Ngoume community, for instance, the community members used money from timber sales to build bore holes and start a kindergarten.

Much research, however, shows that for most forest communities there has been little or no change in their livelihoods (Oyono et al. 2007). Ezzine de Blas et al. (2009) argues that, "(while communities seem to be benefiting financially from the forest, their capacity to do so is limited by their inability to capture value added in the market chain. This is due to a lack of technical skills, excessive distance to markets, competition from industrial loggers who access the newly opened logging areas, and the intensity of external help they receive. The result is a sub-optimal contribution of community forests to local development."

Similarly, while a few cases of increased forest cover in community forests have been noted (Rainforest Alliance 2016), far more negative environmental outcomes have been recorded. For example, there have been reports of illegal logging and deforestation in community forests (Auzel et al 2001). Forest communities closer to major cities, such as Nkimineki and Awae, have been particularly affected negatively (Piabuo et al 2019; Auzel et al 2001). In some cases, CF has not had any effects on forest cover. Bruggeman et al. (2015), for example, found that there is no major difference in the rate of deforestation between CF areas and other land-use zones.

Researchers have identified a range of factors that have contributed to poor forest outcomes, including:

1. Limited size of community forests - 5000 ha has been shown to be too small for viable enterprises of many forest products, including the extraction of many timber species;
2. Institutional formats that are problematic for enterprise development, including a lack of clarity on tax matters and other issues;
3. Lack of finance, especially of start-up capital, and lack of business development and management skills (resulting in communities partnering with NGOs, logging companies, and other external entities to help navigate and complete the procedure to formally acquire a community forest); and
4. Various governance challenges, including weak accountability mechanisms, elite capture, and power struggles between CF managers, traditional authorities, and local government officials.

This study examined 682 community forests for which spatial data were available, covering 2.1 M ha (averaging about 3,100 ha per community forest) or 6.8% of Cameroon's total area (Figure 16). From

2001 to 2019, community forests lost a total of 118,187 ha of forests equivalent to 5.6% of its baseline forest cover. This translates to an average annual deforestation rate of 0.29% (Table 5).

Total forest cover lost by community forest as a percent varied widely -- between 0.00% and 65.56%, with community forests experiencing 5.6% loss on average. Community forests with below average, average, and above average cumulative forest loss are located across Cameroon's forest areas in the south (Figure 16).

These community forest figures compare with a cumulative forest loss in the 18-year study period of about 0.6% of all protected areas (with an average annual deforestation rate of 0.03%), and 4.7% of Cameroon nationally (with an average annual deforestation rate of 0.24%) (Table 5).

Over the study time period, forest loss in Cameroon's community forests followed similar trends to forest loss at the national level, with forest loss increasing beginning in 2011 (Figure 16). There was a divergence in 2017 when forest loss in community forests spiked higher than the national level. Forest loss in Cameroon's protected areas was consistently low in the 18-year study period and much lower than in community forests and at the national level.

Cameroon's community forest data provides robust information, including thorough temporal attributes not provided in the data sources of the other four research countries. Of the 682 community forests in the dataset, 499 have a date of establishment within the window of the period of study. The number of formal community forests established per year varied in the 18-year study period (Figure 17).

To compare the rate of tree cover loss in community forests before and after the year of establishment, the community forests were aggregated by establishment year and the average annual forest loss for the "pre establishment" period (*i.e*., the time period before the community forest was established) was compared with the average annual forest loss for the "post establishment" period. For example, for community forests established in 2008, the "pre establishment" time period of 2001-2007 was compared with the "post establishment" time period of 2008-2019. The average annual forest loss was then calculated over each respective period.

The analysis shows that the "post establishment" rates of forest loss in community forests were consistently higher than "pre establishment" forest loss rates (Figure 18). This is perhaps expected as communities with formal community forests and approved SMPs have approval from government to extract timber and other forest products from their forests. Communities without formal community forests are not allowed to log their forests for commercial purposes.

Figure 16 | Percent Tree Cover Loss in 682 Community Forests in Cameroon (2001-2019)

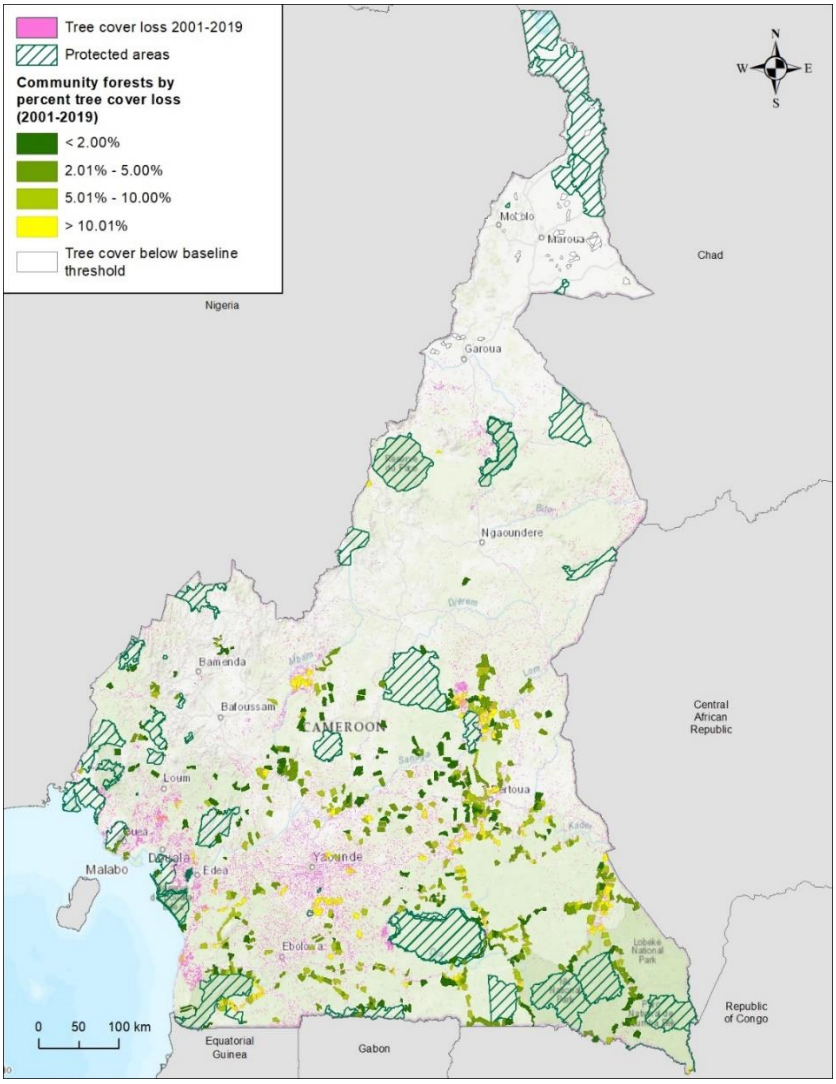


Table 5 | Forest Cover and Cumulative Forest Loss in 682 Community Forests in Cameroon (2001-2019)

Area	Number of Units	Forest Cover in 2000 (ha)	Cumulative Forest Loss 2001-2019 (ha)	Percent Cumulative Forest Loss 2001-2019	Average Annual Forest Loss
Community Forests	**682**	**2,126,919**	**118,187**	**5.6%**	**0.29%**
Convention définitive	*323*	*998,682*	*59,232*	*5.9%*	*0.31%*
Convention provisoire	*269*	*875,456*	*45,895*	*5.2%*	*0.28%*
Unknown	*90*	*252,782*	*13,060*	*5.2%*	*0.27%*

Protected Areas	**48**	**3,460,642**	**22,025**	**0.6%**	**0.03%**
Designated	*37*	*3,040,211*	*19,541*	*0.6%*	*0.03%*
Inscribed	*2*	*5,649*	*154*	*2.7%*	*0.14%*
Proposed	*9*	*414,782*	*2,330*	*0.6%*	*0.03%*
National	**N/A**	**31,277,278**	**1,455,235**	**4.7%**	**0.24%**

Figure 16 | Average Percent Forest Loss Per Year in 682 Community Forests in Cameroon

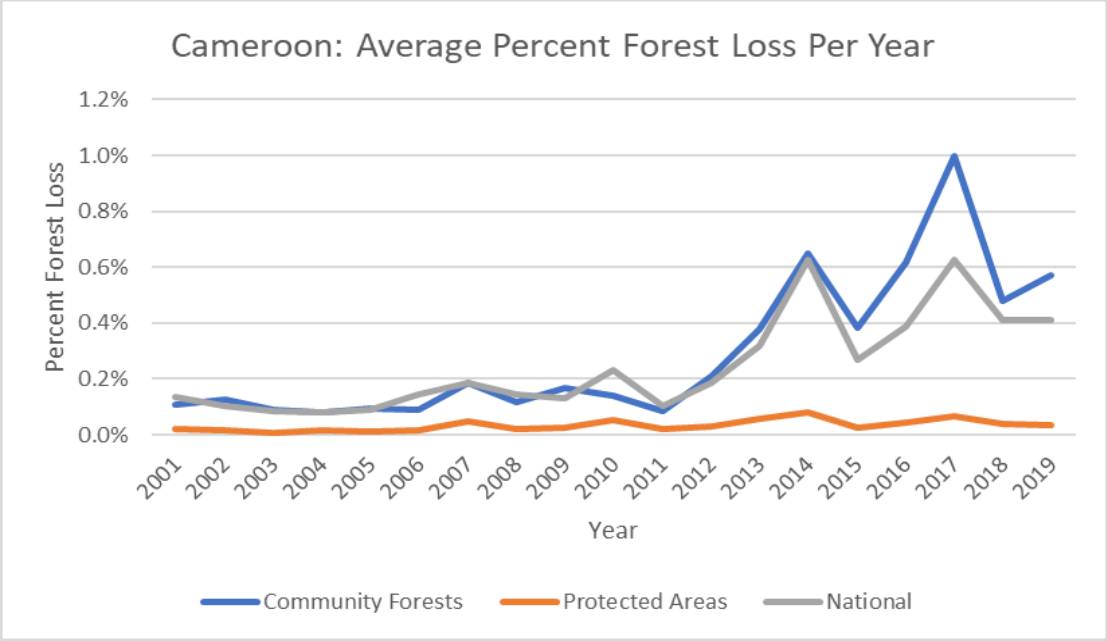


Figure 17 | Number of community forests by year of establishment date in Cameroon

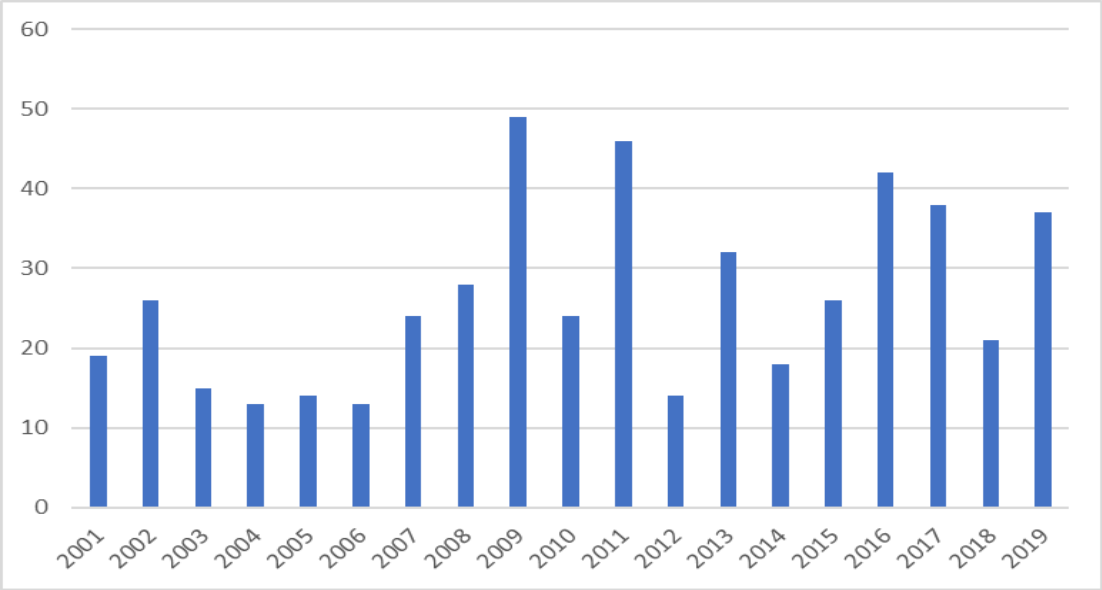
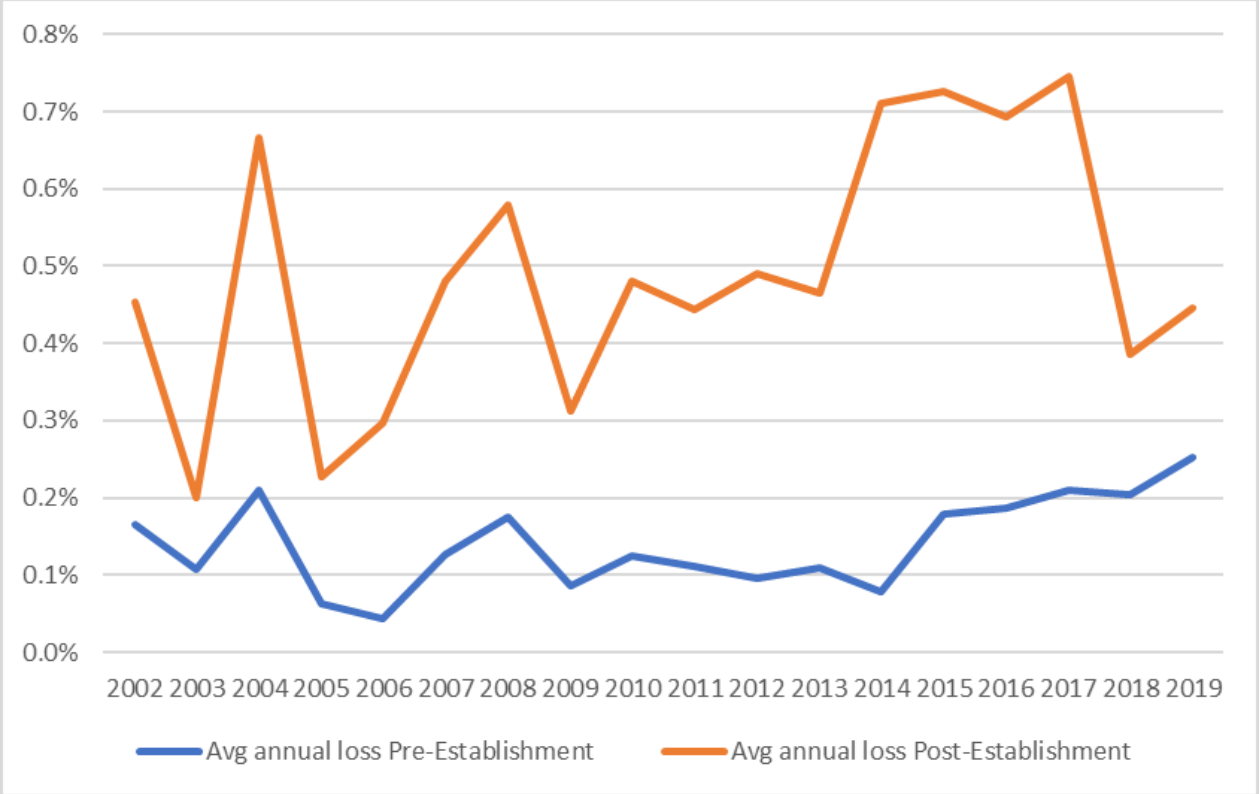


Figure 18 | Average annual rate of forest loss inside community forests during the "pre establishment" time period (before the community forest was established, according to date) vs. during the "post-establishment" time period in Cameroon

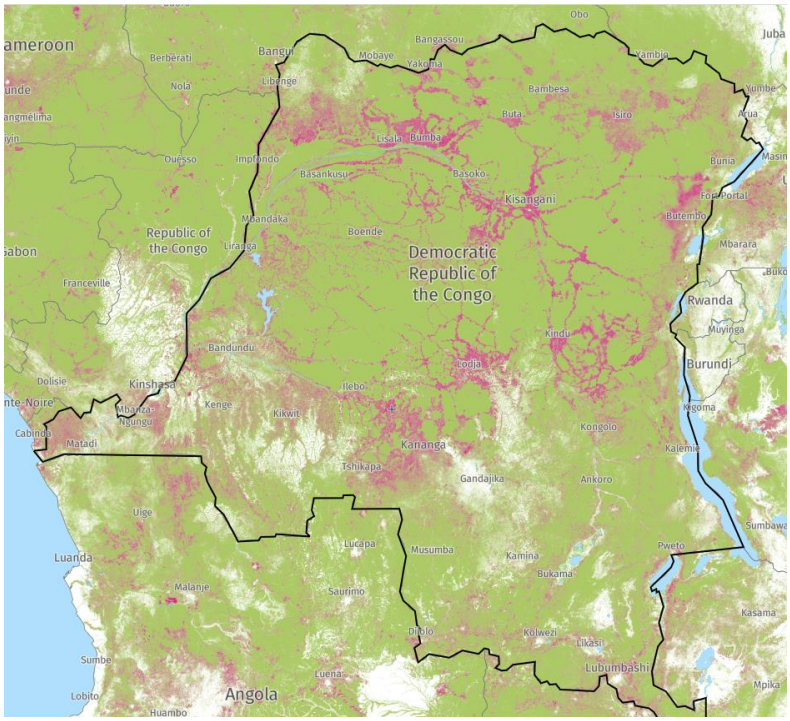


4.5 DEMOCRATIC REPUBLIC OF THE CONGO

4.4.1. Overview (source: GFW 2020)

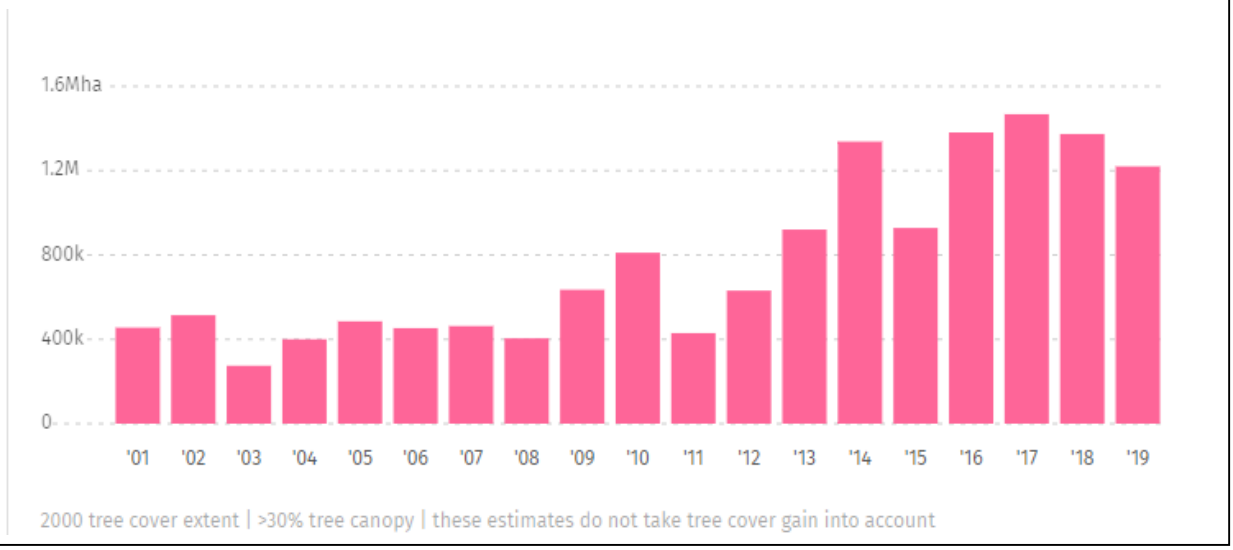
1. In 2000, Democratic Republic of the Congo (DRC) (Figure 19) had 199 Mha of natural forest, extending over 85% of its land area. In 2019, it lost 1.22Mha of natural forest, equivalent to 512Mt of CO_2 of emissions.
2. From 2001 to 2019, DRC lost 14.6Mha of tree cover, equivalent to a 7.3% decrease in tree cover since 2000 (Figure 20).
3. From 2002 to 2019, DRC lost 4.83Mha of humid primary forest, making up 34% of its total tree cover loss in the same time period. Total area of humid primary forest in Democratic Republic of the Congo decreased by 4.6% in this time period.
4. DRC has a total carbon store of 42.3Gt, with most of the carbon stored in biomass.

Figure 19 | Tree Cover in 2000 (green) and Tree Cover Loss from 2001-2019 (pink) in DRC



5. In DRC, the land-use change and forestry sector is a net source of CO_2, emitting an average of 170tCO_2e per year from 1990 to 2017. This represents 78% of DRC's total greenhouse gas emissions over the same period.
6. Between 2001 and 2019, a total of 6.00Gt of CO_2 was released into the atmosphere as a result of tree cover loss in DRC. This is equivalent to 316Mt per year.

Figure 20 | Tree Cover Loss (2001-2019) in DRC



The Democratic Republic of the Congo (DRC) has the second largest and most intact area of contiguous rainforest in the world, accounting for more than half of the total remaining rainforests in the Congo Basin region. Some 40 million people, out of a total DRC population of 80 million, depend on forests for their livelihood. About 26.3% of DRC's forest is in public protected areas and another 14.7% is in logging concessions.

The concept of CF was recognized in DRC's 2002 Forestry Code. The Forest Code grants communities the right to acquire Local Community Forestry Concessions (*Concession Forestière des Communautés Locales*, CFCL), although it lacks the necessary implementing regulations, including rules to govern the allocation and management of CFCLs. In 2014, however, the presidential Community Forestry Decree was signed by the prime minister which specifies the process for local communities and indigenous people to apply for community forests (Moïse 2019).

Since then, a number of challenges and obstacles to the successful development of CF in DRC have become identified. For example, the law places much of the decision-making powers over the granting and oversight of CFCLs at the local and provincial level but these often have weak administrative capacity. Moreover, the risks of rent-seeking, elite capture and abuse of the new system by loggers have been problematic (RFUK 2018).

To address these and other challenges, the government passed new laws and guidelines to help regulate the creation and development of CFCLs (RFUK 2018). In February 2016, Ministerial Decree No. 025 - Concessions Forestières des Communautés Locales (CFCL) - was signed into law by DRC's Environment Minister. The Decree provides that community forest concessions are formally granted by provincial governors and allows for "multi-use" CFCLs to be held in perpetuity for up to 50,000 hectares of land (124,000 acres) – ten times more than the maximum amount authorized in other countries in the region (RFUK 2018).

Decree No. 025 also provides the rules governing CFCL management by communities (RFUK 2018). Under this Decree, when a CFCL is established and documented, it grants the community significant

rights in perpetuity to both trees/forests and land. The community may use the concession land for timber extraction (with restrictions on level of mechanization - only lighter tools, such as chainsaws, are permitted), non-timber forest products, ecotourism, wood energy, and/or for other purposes subject to a simple management plan approved by the local administration.

In addition to Decree No. 025, the Ministry of Environment and Sustainable Development established a sub-department devoted to community forestry, and in June 2018, the *National Strategy for Community Forestry* which sets out the future guiding principles was finalized and published (RFUK 2018).

To establish a CFCL, a community, with support from local government, must demarcate the concession area through participatory mapping and obtain the approval of neighboring villages to avoid any land disputes. The community must also carry out biodiversity and socioeconomic studies, develop a simple forest management, and prepare a land use plan that outlines proposed economic activities and how they will be conducted in sustainable manners. Once a CFCL is granted, the community must establish a local development committee to address land management decisions or any conflicts that arise.

Establishing a CFCL may be the best option for communities interested in securing land. DRC's 2006 Constitution calls for addressing customary land rights but there are no legal provisions for such rights or collective ownership of land (*e.g.,* IPLC land). The National Land Reform Commission was established in 2013 but has not delivered any significant policy document to address IPLC land or customary rights. As a result, the 1970s land laws still apply which do not recognize any land as belonging to IPLCs. Specifically, the 1973 General Property Law, provides that all land in the country belongs to the government. In November 2020, a bill which recognizes and confirms indigenous land rights was passed by the DRC's National Assembly and will go to the country's senate in 2021. The bill also provides indigenous peoples free education and healthcare (Yeung 2021).

In February 2017, the first CFCL in DRC was granted to the people of Bolima, in the northwest Équateur Province. By June 2018, 34 CFCLs had been allocated in three provinces, covering 253,211 hectares, and in 2019, 57 CFCLs had been granted. Today, 70 CFCLs are in place and another 30 are in the process of being granted. These 100 CFCLs cover a total area of 2,003,982 hectares (7,700 square miles) (MEDD 2021). The CFCLs are located around the country, from the Salonga National Park to North Kivu. The Rainforest Foundation-United Kingdom (RFUK) estimates that up to 75 million hectares (290,000 sq miles) in DRC are potentially available for communities under the scheme (Yeung 2021).

Since the CFCLs have only just been established in DRC, little research has been conducted on the livelihood and forest management outcomes. Recently published research by CIFOR on two community forests in northeast DRC found that they have not yet produced an increase in people's real income. In both sites, there was a negative financial turnover over five years. All productive activities analyzed - logging, hunting and firewood collection - either resulted in losses or low profit. Moreover, CIFOR found that community elites are most likely to participate in and reap the rewards from such activities. Another study of 35 CFCLs by Actions for the Protection and Promotion of Endangered Peoples and Species (APEM), a local nonprofit organization, found that nearly half of them engaged in only one productive activity (Yeung 2021; Lescuyer et al 2019).

One principal barrier for all communities is the high cost of setting up a CFCL. Communities are not charged application fees, but in the two CIFOR sites, USD $109,000 to $153,000 was needed to comply with the law. These fees covered required coordination meetings and committees, the establishment of boundaries and maps, baseline studies, and other mandatory steps. In addition, there are costs of

establishing local economic activities including payments of authorizations, taxes and permits that are required to conduct hunting, logging, or gathering of non-timber forest products (NTFPs). As in other countries, communities need guidance and support from external actors, such as NGOs (Yeung 2021; Lescuyer et al 2019). To save costs, APEM found that some communities skipped required steps, such as consulting with neighboring communities when drawing maps. In one APEM site, the CFCL was logged using semi-industrial tools rather than the required lighter tools (*e.g.*, chainsaws).

While there remain challenges to achieving positive development outcomes, CF has already led to improved forest management in some CFCLs. Recent analysis by RFUK, one of several NGOs facilitating the implementation of the DRC's CFCLs, found the rate of deforestation in 57 CFCLs from 2001 to 2019 was 23% lower than the national average and 46% lower than in large-scale logging concessions (Yeung 2021).

This study examined 22 CFCLs in DRC for which spatial data were available, covering 373,155 ha (0.19% of the country's total area) (Figure 21). These CFCLs experienced a cumulative forest loss of 16,394 ha from 2001 to 2019 or a loss of 4.4% of the baseline forest area. This cumulative forest loss translates to an average annual deforestation rate of 0.23%. Total forest loss in the 18-year study period in CFCLs as a percent varied significantly between 0.01% and 26.4%. Many CFCLs in or adjacent to protected areas had low total forest loss while those far from protected areas showed higher forest loss.

In contrast, protected areas experienced a total forest loss of 4.0% from 2001 to 2019 with an annual average deforestation rate of 0.22% and forest loss at the national level was 7.5% over the 18-year study period which translates into an average annual deforestation rate of 0.40% (Table 6). Across all three forest governance types, a similar trend occurs, with forest loss increasing over time including a small increase in 2010 followed by an immediate decrease in forest loss and then fairly consistent forest loss through the remainder of the study period (Figure 22).

Our data show that the rate of deforestation in CFCLs from 2001 to 2019 (4.4%) is just slightly higher than the rate in DRC's protected areas (4.0%) but significantly lower than the national average (7.5%) (Table 6). RFUK's study of 57 CFCLs over the same period (2001 to 2019) found that the deforestation rate in the CFCLs was 23% lower than the national average, suggesting that some CFCLs (including those in our study) show an even better performance compared to the national average. Our finding that deforestation rates in CFCLs and protected areas are similar is noteworthy given that CFCLs are multiple use areas whereas DRC's protected areas are fully protected with extraction of forest products and significant land use changes prohibited.

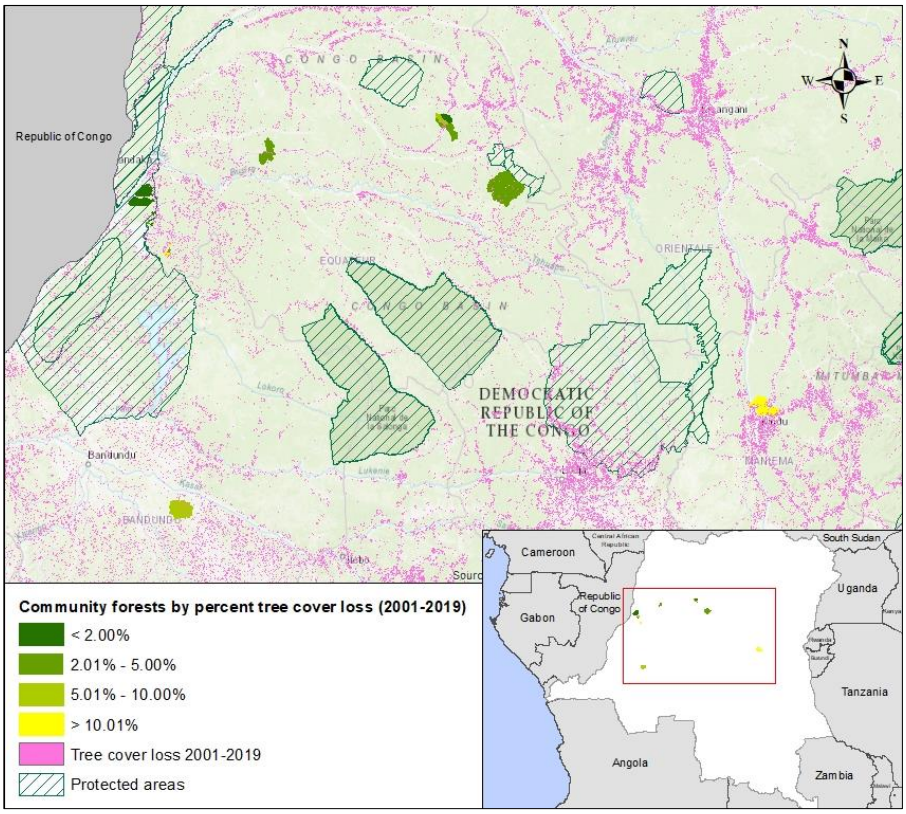
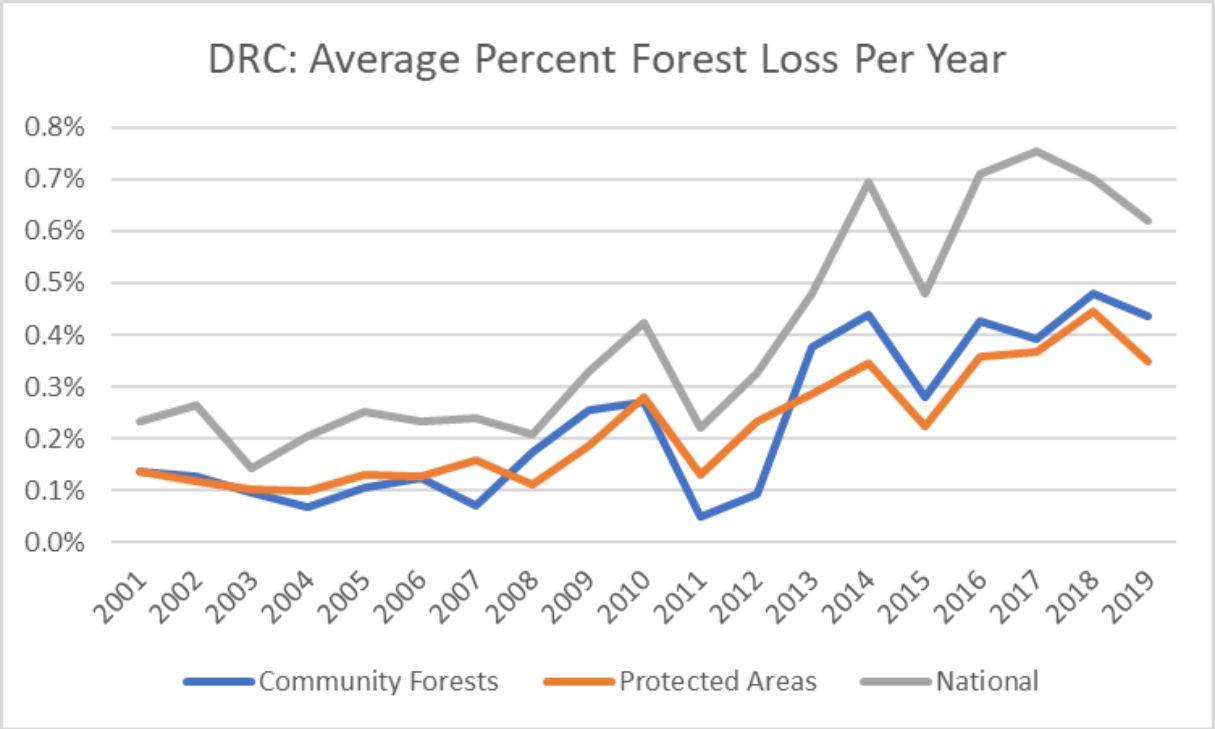


Figure 21 | Percent Tree Cover Loss in 22 Community Forests in DRC (2001-2019)

Table 6 | Forest Cover and Cumulative Forest Loss in 22 Community Forests in DRC (2001-2019)

Area	Number of Units	Forest Cover in 2000 (ha)	Cumulative Forest Loss 2001-2019 (ha)	Percent Cumulative Forest Loss 2001-2019	Average Annual Forest Loss
Community Forests	**22**	**373,155**	**16,394**	**4.4%**	**0.23%**
Protected Areas	**49**	**62,168,367**	**2,515,229**	**4.0%**	**0.22%**
Designated	*43*	*55,669,009*	*2,342,605*	*4.2%*	*0.24%*
Inscribed	*5*	*5,917,312*	*146,150*	*2.5%*	*0.13%*
Proposed	*1*	*582,045*	*26,474*	*4.5%*	*0.25%*
National	**N/A**	**31,277,278**	**1,455,235**	**4.7%**	**0.24%**

Figure 22 | Average Percent Forest Loss Per Year in 22 Community Forests in DRC



4. CONCLUSIONS AND RECOMMENDATIONS

While the country-level findings are important on their own, a comparison of the results across the five research countries of Liberia, Equatorial Guinea, Gabon, Cameroon and DRC provides further insights into the effectiveness and value of CF and the enabling conditions for success, including improved forest management and improved local wellbeing.

The rate of forest loss in community forests in the five research countries from 2001 to 2019 varied from a high of 10.2% in Liberia (with an average annual deforestation rate of 0.54%) to a low of 4.2% in Gabon (with an average annual deforestation rate of 0.22%) (Table 7). The different rates of forest loss in community forests across the five countries may be linked to the type and amount of forest products that are harvested. This, in turn, may be related to the type and quality of the forest in the community forest. The rates of forest loss may also be linked to the capacity of the community to manage their community forest and their ability to protect against illegal logging or other uses by outsider actors or community members. The literature makes clear that many communities face governance challenges and need help managing the forest in sustainable ways (see above).

Table 7 | Forest Loss in Community Forests, Protected Areas and the Country

	Commulative forest loss (2001-2019)	Average Annual Deforestation Rate	Commulative forest loss (2001-2019)	Average Annual Deforestation Rate	Commulative forest loss (2001-2019)	Average Annual Deforestation Rate
COUNTRY	**Community Forests**		**Protected Areas**		**National**	
Liberia	10.2%	0.54%	4.3%	0.23%	18.0%	0.96%
Equatorial Guinea	6.2%	0.33%	1.5%	0.08%	4.5%	0.24%
Gabon	4.2%	0.22%	1.3%	0.07%	1.8%	0.10%
Cameroon	5.6%	0.29%	0.6%	0.03%	4.7%	0.24%
DRC	4.4%	0.23%	4.0%	0.22%	7.5%	0.40%

* Green numbers indicate deforestation rates lower than community forest deforestation rates
Red numbers indicate deforestation rates higher than community forest deforestation rates

The different forest loss rates may also be linked to unique CF enabling conditions. CF experts argue that DRC's scheme – where forest loss rates are among the lowest - is an improvement on similar initiatives tested in neighboring countries such as Cameroon, Gabon, and the Central African Republic. As noted, in

the DRC, CFCLs are granted to communities in perpetuity while in Cameroon, forest rights are granted for five-year periods. DRC conditions provide a better platform for building a business plan for long-term sustainability, given that the laws allow for 10 times the amount of land for community forests than other countries and the focus is not only on timber but other income streams. DRC's CFCLs are also in primary forest, not degraded forest as is often the case in Cameroon and elsewhere.

The rate of forest loss rate in the protected areas was lower than the rate in the community forests in all five research countries. The difference in rates, however, varied significantly. In DRC, the forest loss rate in community forests was just slightly higher than in protected areas (4.0% vs. 4.4%, respectively) while in Cameroon, the rate of forest loss in community forests was significantly higher than in the protected areas (5.6% vs. 0.6%, respectively). These findings are consistent with the various rules and regulations that regulate land and forest use in protected areas and community forests. While land use changes and the extraction of forest products are prohibited in most protected areas, communities with formal community forests have the authority to harvest timber and other forest products for commercial purposes (*i.e.,* they manage the forest for use).

In contrast, the forest loss rate at the national level was lower than the rate in the community forests in Equatorial Guinea, Gabon and Cameroon (from 16% to 57% lower), but higher than the rate in community forests in Liberia and DRC (almost twice as high in both countries). There are several possible explanations for these mixed results. Overall, forests in Liberia and DRC may be under greater pressure and/or less protection than the forests in Equatorial Guinea, Gabon, and Cameroon. This suggestion is supported by the finding that forest loss in the protected areas in Liberia and DRC are also significantly higher than forest loss in the protected areas in Equatorial Guinea, Gabon, and Cameroon. Forest loss in Liberia's community forests is also significantly higher than in the other four research countries. Alternatively, the forests in Equatorial Guinea, Gabon, and Cameroon may be less threatened and/or better protected than the forests in Liberia and DRC accounting for the mixed findings.

This study also examined forest loss before and after the formal establishment of community forests in Cameroon. The analysis found that forest loss rates in formal community forests were 2 to 7 times higher than the forest loss rates in the same forests prior to being established as a community forest. This finding is perhaps expected given than communities with a formal community forest have the legal authority to harvest timber and other forest products for commercial purposes while those without a formal community forests are prohibited from doing so.

As the global demand for forestland, timber, and other forest products rises and prices soar, governments must put in places safeguards and other measures to ensure forests are managed in sustainably and contribute in meaningful ways to climate mitigation. The findings from this research on CF in Liberia, Equatorial Guinea, Gabon, DRC, and Cameroon suggest that CF can lead to improved forest management and local development if the appropriate enabling conditions and incentive packages are in place to encourage sound management, and if communities have the capacity or are supported in their efforts to sustainably manage their forests. Effective CF can also help government meet the emission reduction commitments made in their National Determined Contributions (NDCs) under the climate change Paris Agreement.

There is mounting evidence that CF is a valuable forest management modality that has the potential to contribute to sustainable forest management and improved livelihoods. Many researchers and development professionals, however, have concluded that the full potential of CF has yet to be realized

in most countries with many hurdles in the way of effective implementation. CF experts in countries around the world have documented various factors of success to achieving CF objectives of forest management and local development. Many experts have highlighted key conducive conditions for CF interventions, which can inform CF design to ensure positive forest and livelihood outcomes. While the specific contexts vary across IPLCs and geographies, CF proponents, many working directly with IPLCs, consistently point to several factors that must be in place for CF to achieve positive outcomes.

Governments, development assistance agencies, logging companies and other forest-product businesses, NGOs, and other civil society organizations can help ensure these factors are in place. Among these factors, five are commonly noted by researchers and development professionals:

1. Supportive legislation and enabling regulations that provide IPLCs with sufficiently strong and secure property rights to incentivize them to make investments in their lands and forests;
2. Economic and other incentives that encourage IPLCs to sustainably manage their lands and forests for long-term benefit flows (*e.g*., use of forests for commercial purposes, REDD+ or other Payment for Ecosystem Service (PES) schemes);
3. Sufficient local capacity (*e.g.*, knowledge, technical skills and infrastructure) for IPLCs to protect their lands and forests from unwelcomed intruders/exploiters;
4. Support from government, NGOs, and other actors to help IPLCs meet specific technical, financial, and other requirements for acquiring forest rights, including the rights to use forest products for commercial purposes (*e.g*., mapping of lands and development of management plans for regulated forest utilization): and
5. An enabling environment to facilitate the marketing of timber and other forest products from community forests, including access to domestic/international markets, information on market values of forest products, and infrastructure to transport and ship products to market.

Finally, while this paper focuses on IPLC management of closed canopy, primary forests, these five factors of success likely also have implications for community forests involving other types of forests, such as woodlands and mangrove forests. More generally, they may also apply to community management of other ecosystems (*e.g*., wetlands) and natural resources (*e.g.,* wildlife). Like CF of primary forests, the literature shows that community-based natural resource management can lead to sustainable ecosystem management and improved local wellbeing under the right conditions.

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