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# PRODUCTIVE LANDSCAPES (PROLAND)

## NATIONAL LAND-USE PLANNING TO PREVENT DEFORESTATION AT THE AGRICULTURAL FRONTIER: A SYNTHESIS OF THE EVIDENCE AND A CASE STUDY FROM CAMEROON



PHOTO CREDIT: MOKHAMAD EDLIADI (LEFT); ATABONG ARMSTRONG (CENTER); RYAN BROWN (RIGHT)

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*For this paper, we reviewed the evidence for the effectiveness of national land-use planning to prevent agricultural expansion into forests. We found that this approach can work, but there have been only a few cases where it has been proven to work, largely because few developing countries have established the conditions for national-level land-use planning to be successful. We synthesize the research and development literature to describe five important conditions for land-use planning success. Through examination of the experience in Cameroon we then illustrate how governments can use land-use planning to prevent agricultural expansion and slow deforestation. Cameroon provides an example of several steps that governments should take when implementing this approach. It also highlights common challenges that practitioners are likely to encounter and that donors should anticipate.*

*Since the 1990s, international development practitioners have come to regard land-use planning as an essential strategy to achieve sustainable development goals. People engage in land-use planning to satisfy multiple, often competing, demands for limited land resources related to production and conservation. Through this approach, practitioners systematically assess land resources to identify the best uses for the land available. They then forge and implement agreements—land-use plans—that govern how people may access and use the land. Land-use planning can help people in developing countries achieve agreement on land use, but implementation is often fraught with challenges, many of which stem from weak governance. Governments need the capacity and motivation to act efficiently and equitably, and achieving sustainable land-use goals requires long-term financial support.*

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## **LAND-USE PLANNING IS A WIDELY USED STRATEGY TO PROMOTE SUSTAINABLE DEVELOPMENT**

Global sustainability initiatives have a land problem. Agriculture has long been a primary driver of deforestation and biodiversity loss. If projected increases in demand for food<sup>1</sup> and agricultural land (FAO, 2017) in developing countries hold true, agricultural expansion into forests and other natural habitats will further undermine ecosystem services and make it even more difficult to avoid extreme climate disruption. Forest loss also will continue to push species to extinction. Researchers studying these issues warn of an impending “food security-biodiversity-climate crisis” over competing demands for land use (Rudel & Meyfroidt, 2014), a “looming land scarcity” (Lambin & Meyfroidt, 2011), and a “perfect storm” in which global environmental goals collide with efforts to produce more food (Sayer et al., 2013).

Since the 1992 United Nations Conference on Environment and Development (UNCED), also known as the Rio Earth Summit, land-use planning has become a key tool for development organizations that aim to help governments, private industry, rural land-users, and other stakeholders conserve and sustainably manage land resources (FAO, 1993; GIZ, 2012; Rudel & Meyfroidt, 2014; Barber et al., 2015; Metternicht, 2017). In 2016, the United Nations Food and Agriculture Organization (FAO) listed land-use planning as an essential strategy to increase agricultural production while protecting and restoring forests (FAO, 2016). International development organizations had begun promoting land-use planning widely in the 1980s and 1990s to achieve sustainable development goals (UNCED, 1992).

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<sup>1</sup> Estimates suggest global demand for food will increase between 59 percent and 98 percent by 2050 (Valin et al., 2014). This range of projections was produced by 10 participants in the Agricultural Model Intercomparison and Improvement Project (AgMIP), a major international effort linking the climate, crop, and economic modeling communities with cutting-edge information technology to produce improved crop and economic models and the next generation of climate impact projections for the agriculture sector. For more on AgMIP, see <http://www.agmip.org>

Land-use planning creates a governance framework for people to resolve conflicts over land use, such as the “collision” between agricultural expansion and natural ecosystems. Through the planning process, stakeholders jointly analyze the suitability of land parcels for different uses and negotiate the tradeoffs inherent in exploiting land for different purposes. Planners aim to put available land to its best use and meet the diverse needs of multiple stakeholders.

### Land-use planning in five steps

Leading practitioner organizations such as the United Nations FAO (FAO, 1993), the German development agency (GIZ) (GIZ, 2012), and USAID (Barber et al., 2015) all recommend a similar process for designing and implementing land-use plans, which can be summarized in five steps:

1. Define objectives for land use based on present and future needs of land-users and other stakeholders;
2. Assess the suitability of land available to meet stakeholders’ needs; develop alternative scenarios for land use; make trade-offs and uncertainties explicit;
3. Identify and attempt to resolve conflicts among stakeholders over competing land uses;
4. Choose the preferred alternative(s); design and implement the plan; and
5. Monitor implementation to assess how well it achieves stakeholder-determined goals; revise and adapt the plan as needed.

**Practitioner Guidelines** from the United Nations FAO, GIZ, and USAID provide useful recommendations, examples from developing countries around the world, and additional references for land-use planning:

FAO. (1993). *Guidelines for Land Use Planning*

GIZ. (2012). *Land Use Planning: Concepts, Tools, and Applications*

USAID LEAF Program. (Barber et al., 2015). *Guidelines on Low Emission Land Use Planning*

Land-use planning may involve actors working at different scales, through national, regional, and/or local governments. Planners working at each scale may pursue their objectives independently, but ideally they will work together to integrate planning across scales (FAO, 1993; GIZ, 2012; Barber et al., 2015). National-level planners typically focus on setting national strategies and policies, including laws, regulations, and macro-level zoning, as well as funding and coordinating efforts through government agencies. Regional planners focus more on specific landscapes, watersheds, ecoregions, protected areas, and transportation or other infrastructure networks. They work with provincial or district governments, may develop regional zoning regulations, and can help link national land-use priorities to local implementation. Local land-use planning usually involves a village or group of villages, where councils and planning committees work with landowners and users to define rules of access and allocation and implement land-use plans. Although cooperation and integration across scales is desirable, it can be difficult in practice. Land-use planning in developing countries often is more like an “organized anarchy” in which stakeholders form strategic alliances to pursue their own objectives, and resolving conflicts can take many years (Rudel & Meyfroidt, 2014).

## WHAT HAVE WE LEARNED ABOUT THE EFFECTIVENESS OF LAND-USE PLANNING? CAN IT PREVENT AGRICULTURAL EXPANSION INTO FORESTS?

Researchers and development practitioners have published numerous studies and reports in the last 30 years that evaluate the effectiveness of land-use planning and provide recommendations for future work. We reviewed this literature, first with a broad focus on publications that describe land-use planning to achieve diverse sustainable development goals, and then with a narrower focus on efforts to prevent agricultural expansion into forests. The overarching lesson of our literature review is that land-use

planning can succeed in meeting diverse development goals, including avoided deforestation, but planners frequently fall short of their goals because success depends on several conditions—for both planning and implementation—that rarely occur at the same time in the same place in developing countries. Land-use planning efforts often lack the necessary policy frameworks, enforcement structures, geographic information, technical and managerial capacity, and financial resources. And they often fail to sufficiently engage stakeholders. Table I provides detail on these conditions that researchers and practitioners highlight as important.

<b>CONDITIONS FOR SUCCESSFUL LAND-USE PLANNING IN DEVELOPING COUNTRIES</b>
<p>Land-use planning should be authorized by laws or regulations with mechanisms to enforce compliance</p> <ul style="list-style-type: none"> <li>• Rights to use the land and allocate land resources should be clear and secure.</li> <li>• Plans should be legally binding to facilitate enforcement.</li> </ul>
<p>Land-use planning should be based on information that permits a thorough assessment of land resources in the planning area</p> <ul style="list-style-type: none"> <li>• Essential information may include biophysical features such as soil and water availability and quality, agricultural potential, biodiversity, and climate conditions; environmental and social impact assessments; economic analyses; and analyses of infrastructure, land tenure, and the wider legal context for planning.</li> </ul>
<p>Participants should have relevant technical and managerial capacity</p> <ul style="list-style-type: none"> <li>• Participants need technical capacity to develop and interpret assessments of land resources, and managerial capacity to coordinate actors and oversee implementation.</li> </ul>
<p>Resources for planning and implementation are essential</p> <ul style="list-style-type: none"> <li>• A land-use plan should have a strategy to support the costs of implementation.</li> </ul>
<p>Land-use planning should include broad participation of multiple stakeholders</p> <ul style="list-style-type: none"> <li>• Land-use planning should combine national and regional priorities with local needs and interests.</li> <li>• Information should come from multiple sectors so that the process of assessing land and its potential will include diverse participants' knowledge and viewpoints.</li> <li>• Broad participation will increase transparency, allow participants to negotiate trade-offs and avoid future conflicts, and help participants trust the process and share its potential benefits.</li> </ul>

*Table I is based on a literature review that produced (i) academic research papers that evaluate the effectiveness of land-use planning to achieve diverse sustainable development goals; (ii) reports and practitioner guidelines from leading development organizations with decades of experience supporting land-use planning initiatives; and (iii) research papers focused specifically on evaluating the effectiveness of land-use planning to prevent agricultural expansion and reduce deforestation at national, regional, and local scales.<sup>2</sup> See Annex I for titles and links to key documents.*

It is also worth noting that the literature contains numerous studies—mostly theoretical—showing that land-use planning has *potential* to help governments and development partners optimize the use of land parcels and achieve diverse objectives for more sustainable land use. Many of these studies present tools that researchers developed to inform the process, including datasets, geographic information system (GIS) techniques, and computer-modeling software that stakeholders can use to define objectives, assess the suitability of land parcels for different purposes, develop alternative scenarios, rank alternatives, and

<sup>2</sup> The literature review consisted of an extensive search of peer-reviewed and practitioner literature using the search engines Google Scholar and Web of Science. References in the papers that the search uncovered were also followed. Research also included review of studies recommended by two academic researchers contacted by email.

clarify tradeoffs and uncertainties associated with different options (Bryan et al., 2011; Bourgoin et al., 2013; Adams et al., 2014; Adams et al., 2016; Montanarella et al., 2018).

However, the practical guidance presented in Table I and the promise of researchers' tools to inform the process should not obscure the steep challenges associated with land-use planning to prevent agricultural expansion into forests. The research literature contains few examples in which rigorous application of empirical methods demonstrates that land-use planning was successful at preventing, or at least slowing, agricultural expansion into forests. Some studies do show positive results at national, regional, and local scales (See Annex I for examples). But successful land-use planning fundamentally depends on governments that often have low capacity to design land-use plans or assure adherence to the rule of law and transparent and equitable implementation. The process might require decades of investment supported by donors, reveal broad weaknesses in governance, and bring to light divergent objectives between donors and the governments they support.

The Cameroon case study presented below illustrates these challenges and how successful land-use planning depends on the conditions described in Table I. Since the early 1990s, the government of Cameroon and its development partners have made progress establishing the conditions for success, as well as designing and implementing a national plan to protect and manage rainforest areas where agricultural expansion is the principal threat. They also have struggled with numerous challenges commonly associated with land-use planning in developing countries.

## **LAND-USE PLANNING IN CAMEROON'S RAINFOREST**

Spanning over 200 million hectares and six countries in Central Africa, the rainforest of the Congo Basin is the second largest in the world. It is rich with biodiversity and a massive global carbon sink. In aboveground living biomass alone, the Congo Basin stores 22.45 gigatons of carbon (Spawn et al., 2020). Although the Congo Basin has been spared the rampant deforestation seen in other tropical areas, threats are increasing, including rapid human population growth, infrastructure development, smallholder agriculture, mining, and logging (Koenig, 2008; USAID 2017).

Approximately 18.5 million hectares of this forest are located in southern Cameroon (de Wasseige et al., 2012). Cameroon is the most densely populated country in the region and has had one of the highest rates of deforestation, losing 4.2 percent of its tree cover between 2001 and 2019 (Global Forest Watch). Agricultural expansion has been the main cause, for subsistence shifting agriculture as well as cash crops, especially cocoa and palm oil for international markets (Cerutti et al., 2009; Topa et al., 2009; Robiglio et al., 2010; de Wasseige et al., 2012; Ordway et al., 2019). Logging also has been a factor, although logging in Cameroon is usually selective and thereby contributes more to forest degradation than deforestation (Laporte et al., 2007; de Wasseige et al., 2012).

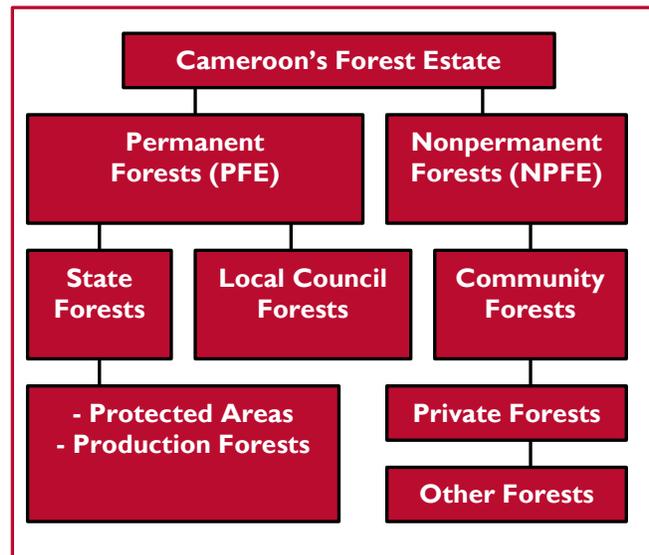
During the 1990s, Cameroon's national government and its donor partners set out to reform the forestry sector, control agricultural expansion and deforestation, establish protected areas, and manage logging activities to increase government revenue (Bruggeman et al., 2015). The main vehicles for reform were a Forest Law approved by Cameroon's National Assembly in 1994 (Republic of Cameroon, 1994) and a related zoning plan that allocates forest areas according to two levels of protection: permanent (PFE) and non-permanent (NPFE) forest estate. Numerous donors played a role initiating these reforms and have continued to leverage financial support to influence their implementation (Topa et al., 2009; Bruggeman et al., 2015; Karsenty, 2017). The World Bank provided much of the leadership and financial leverage and also coordinated efforts of the Global Environment Facility (GEF) and the governments of Canada, France, Germany, the Netherlands, and the United Kingdom.

Cameroon's PFE is meant to guarantee the sustainable management of the country's most valuable forest resources. The 1994 Forest Law mandates that the PFE must cover at least 30 percent of the

national territory, be representative of Cameroon’s biodiversity, and be managed according to government-approved management plans.<sup>3</sup> In practice, PFE forests are mostly large tracts of rainforest remote from human settlements. They are divided into state forests, which the national government owns, and local council forests, owned by municipalities. The state forests comprise most of the PFE and include 1) protected areas such as national parks and forest reserves set aside for conservation, and 2) forest operation areas set aside for logging on a selective, rotational basis. Local council forests are of the second type, production forests zoned for selective logging. Prior to exploitation, zoned land must be gazetted. Gazetting entails consultation with stakeholders and legally ratifies zoning classifications (Topa et al., 2009; Bruggeman et al., 2015).

NPFE forests are allocated for more intensive exploitation. They are divided into community forests, private forests, and “other” forests. Frequently located close to roads and around villages, NPFE forests are generally more fragmented than PFE forests, and they may be cleared and converted to other uses such as agriculture. In fact, much of the NPFE is meant to provide agricultural land for local people (Hoare, 2006; Topa et al., 2009; Bruggeman et al., 2015).

Thus, Cameroon’s forest-zoning plan is not designed to completely eliminate agricultural expansion into forests but to protect high-value forest areas, especially rainforest, and contain deforestation in lower-value forests. Although Cameroon’s National Assembly approved the Forest Law in 1994, the government did not begin implementing the forest-zoning plan for several years, after a series of negotiations and agreements with the World Bank (Topa et al., 2009). In the early 2000s, Cameroon’s government began officially gazettement areas in the southern rainforest according to the zoning restrictions, opening the way for exploitation (Topa et al., 2009; Bruggeman et al., 2015). Zoning undertaken in the 1990s created the framework for establishing forest management units, concessions, protected areas, community forests, and forest reserves. From 2004 to 2015, the area with approved forest management plans increased from 1.5 million hectares to 5.6 million hectares on a total PFE of around 12.8 million hectares, including protected areas (Fomete, 2018; Neeff et al., 2020).



### Cameroon is at the Forefront of Land-Use Planning in the Congo Basin

Cameroon was the first Congo Basin country to pass national legislation that required land-use planning to implement forestry sector reforms, and since the 1990s other Congo Basin countries have followed suit, including the Central African Republic, Democratic Republic of the Congo (DRC), Gabon, and the Republic of the Congo. Sponsored by a number of international development organizations, led by the World Bank, these countries’ land-use planning initiatives all followed a similar model of macro-level forest zoning to create a PFE that consists primarily of protected areas and production forests and a NPFE that is largely for subsistence agriculture.

<sup>3</sup> For a discussion of the 1994 law and a link to the law itself, see this page of the WRI-managed Forest Legality Initiative: <https://forestlegality.org/risk-tool/country/cameroon-0#tab-laws>

Researchers studying the impact of Cameroon’s forest-zoning plan found that the zoning restrictions significantly reduced deforestation in the PFE compared to the NPFE in a 2.4-million-hectare area in southern Cameroon. In the study area, forest cover actually increased by .08 percent annually over eight years (Bruggeman et al., 2015). The researchers conducted the study between 2002 and 2010 to coincide with the initial implementation of the plan, and centered on the gazetted forest surrounding a rapidly growing town in an otherwise sparsely populated region. They assessed trends in deforestation by analyzing satellite images of forest areas that were zoned differently—either as PFE or NPFE—but were similar with respect to other variables that might have contributed to deforestation (e.g., proximity to roads, villages, and larger towns) and to the areas’ suitability for agriculture. Using this experimental technique, the researchers were able to evaluate specific impacts of the forest-zoning plan on deforestation across the study area. They also tested for leakage—for example, whether zoning forests as PFE might have prevented deforestation in the PFE but resulted in people simply clearing forest elsewhere. In short, the researchers detected some deforestation in both the PFE and NPFE, but there was significantly less deforestation in the PFE and no evidence of leakage. To help validate the analyses, they interviewed villagers living in the study area who reported that, in their view, PFE forests did have increased protection following implementation of the forest-zoning plan.

Broader analyses also suggest that the forest-zoning plan has slowed deforestation in Cameroon’s rainforest. Between 2001 and 2010, gross deforestation across the rainforest averaged ~0.08 percent per year, while gross deforestation in the PFE portion of the rainforest averaged ~0.05 percent per year (Hansen et al., 2013; WRI, 2013). Between 2011 and 2018, gross deforestation across the rainforest increased sharply, averaging ~0.28 percent per year, while gross deforestation in the PFE portion of the rainforest also increased, but less so, averaging ~0.10 percent per year (Hansen et al., 2013; WRI, 2013). Although these trends by themselves do not establish that lower deforestation rates in the PFE resulted from forest-zoning protections, the trends are consistent with this conclusion, and they correlate with implementation of the forest-zoning plan.

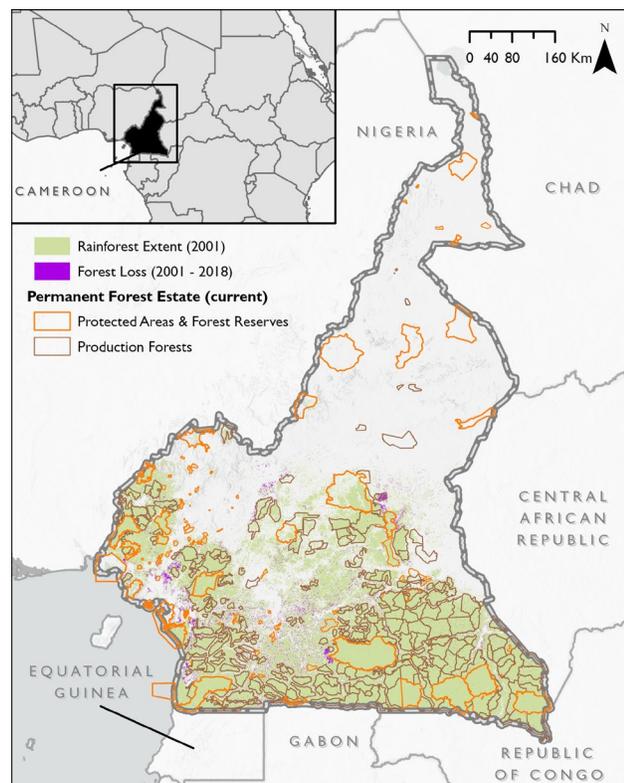


Figure 1. Between 2001 and 2018, most deforestation in Cameroon’s rainforest occurred outside the PFE. (Hansen et al., 2013)

## **PROGRESS ESTABLISHING CONDITIONS FOR SUCCESSFUL LAND-USE PLANNING CONTRIBUTED TO POSITIVE RESULTS IN CAMEROON**

**Land-use planning should be authorized by laws or regulations with mechanisms to enforce compliance:** Cameroon's 1994 Forest Law establishes a nationally ratified policy framework that confers legitimacy on the forest-zoning plan. Clear and secure land tenure is essential for regulating land use, but rights to access and use land, especially forestland, are often unclear and insecure in developing countries (GIZ, 2012; Rudel & Meyfroidt, 2014; FAO, 2016; Rudel & Hernandez, 2014; Briassoulis, 2019). In Cameroon, the process of zoning and gazetting forest areas in the PFE and NPFE replaces traditional, insecure tenure claims with legally established rights of ownership (Topa et al., 2009; Bruggeman et al., 2015). By 2019, Cameroon's government had zoned more than half of its rainforest as PFE, formally declaring those areas off-limits for agricultural conversion (WRI, 2013).

Cameroon's government also has established useful mechanisms to facilitate enforcement of the forest-zoning plan. For example, with funding from USAID and other donors, Cameroon has partnered with the Global Forest Watch (GFW) program to monitor activities in forests across the country. GFW has produced the Interactive Forest Atlas of Cameroon, an online cartographic and statistical database built from regularly updated land-cover images taken from satellites (WRI, 2013). This atlas, first launched in 2005, provides forest managers and other stakeholders with extensive information about the PFE and other forests across the country, including gains and losses in tree cover and weekly updates and alerts about likely deforestation events. In addition, Cameroon's government has partnered with other nongovernmental organizations (NGOs) to conduct independent assessments of forest management operations, including collaborating with local informants to investigate illegal activities (Topa et al., 2009). As part of its European Union Forest Law Enforcement, Governance and Trade Voluntary Partnership Agreement (FLEGT-VPA), Cameroon's government established a FLEG Independent Observer (OI-FLEG) in 2000, initially in partnership Global Witness, Resource Extraction Monitoring, and the Belgian research institute AGRECO-CEW (Cameroon Environmental Watch). More recently, it has collaborated with Cameroonian NGOs FODER (Forests and Rural development), FLAG (Field Legality Advisory Group), and CED (Centre for Environment and Development) (Cameroon and the EU, 2013, 2019).

**Land-use planning should be based on information that permits a thorough assessment of land resources in the planning area:** In the early 1990s, officials from Cameroon's Department of Forests and a team of international consultants used GIS, satellite images, and aerial photos to develop the forest-zoning plan. Although the planners failed to consider information about local peoples' needs for traditional land uses, which we discuss below, they did rely on accurate information about forest resources and land-use potential. They considered several factors when assessing forests and setting boundaries, including the extent of human occupation, infrastructure, and agricultural cultivation; soil characteristics and agricultural potential; and the amount of timber resources available (Penelon et al., 1998; Hoare, 2006). GFW's Interactive Forest Atlas also provides an extraordinary amount of information to Cameroon's government and other stakeholders working to conserve and manage forests.

**Participants should have relevant technical and managerial capacity:** Numerous international development organizations and environmental NGOs have helped Cameroon's government build capacity to design and implement the forest-zoning plan. For example, the World Bank's Forest and Environment Sector Program (FESP) improved the effectiveness of the government agencies responsible for managing Cameroon's forests. Launched in 2004, the FESP focused largely on reducing corruption and building institutional capacity to manage forests more sustainably, with provisions for updating

management systems for personnel, inventory, and finances; procuring equipment; rehabilitating agency infrastructure; and hiring and training technical staff (Topa et al., 2009). Under the FESP, Cameroon's government hired more than 1,500 new employees. It also joined forces with national educational institutions and international research organizations such as the Center for International Forestry Research (CIFOR) to provide academic and professional training (Cerutti et al., 2009).

In addition to these activities, the International Union for Conservation of Nature (IUCN) and World Wildlife Fund (WWF) helped Cameroon's government create policies and plans for managing forests in protected areas, and the Wildlife Conservation Society (WCS) provided technical assistance to protect biodiversity in national parks and curb poaching (Topa et al., 2009). These NGOs and several others worked with Cameroon's government to write its first National Biodiversity Strategy and Action Plan (MINEF, 1999; NBSAP 1999), a key document to inform compliance with the Convention on Biological Diversity as well as the 1994 Forest Law mandate that the PFE should be representative of Cameroon's biodiversity.

**Resources for planning and implementation are essential:** Of the many international collaborations that provided funding for Cameroon's forest-zoning plan, the World Bank's FESP was probably the most significant. It not only provided US\$185 million worth of assistance for implementation but also enabled Cameroon's government to develop new taxation policies that have increased revenue from forestry operations, mainly in the PFE (Cerutti et al., 2009; Topa et al., 2009). Between 1994 and 2014, the country's tax revenue from timber companies, forest-product exports, and other forestry operations increased more than fivefold, from approximately US\$14 million to approximately US\$78 million (Cerutti et al., 2016). Because of these taxes, Cameroon's rainforest is now much more valuable to the national government, and this strengthens the case for managing forests sustainably in accordance with the forest-zoning plan (Topa et al., 2009; Cerutti et al., 2016; Nkongho, 2018).

## **CAMEROON AND ITS PARTNERS STILL HAVE WORK TO DO TO IMPROVE CONDITIONS FOR IMPLEMENTING THE FOREST-ZONING PLAN AND OVERCOME CHALLENGES<sup>4</sup>**

**Land-use planning should be authorized by laws or regulations with mechanisms to enforce compliance:** Although Cameroon has zoned more than half of its rainforest as PFE, the zoning process only *identifies* which areas belong to the PFE and NPFE; it is the gazettement process that *legally ratifies* those classifications. Gazetting forest areas in Cameroon requires consulting neighboring communities, considering traditional tenure claims, and possibly modifying the proposed zoning boundaries to account for traditional claims. These requirements, coupled with the considerable economic and political stakes involved in the allocation of large tracts of primary rainforest for either timber production or conservation, have led

**Common challenges:** Although land-use planning can help clarify and secure land-use rights, government officials might be reluctant to approve and implement clear land-use laws and regulations. For example, zoning restrictions might be unpopular with some constituent communities, and officials might benefit politically when there is a lack of transparency in rules governing land access and allocation.

Law enforcement officials might fail to enforce land-use plans because the officials have insufficient resources; because some officials might be dependent on revenues from resource exploitation that would be prohibited by the land-use plans; or worse, because corrupt officials might aim to profit from prohibited resource exploitation.

<sup>4</sup> Common challenges in this section were generated through the same literature review that produced the conditions for successful land-use planning in developing countries presented in Table 1.

some wary government officials to delay the gazetting process (Bruggeman et al., 2015; Karsenty, 2017). By 2017, government officials still had not gazetted about 7 million hectares zoned as PFE (Karsenty, 2017). By 2020 the situation had improved, but approximately one-sixth of the areas zoned as PFE still were not gazetted (WRI, 2013). Unclear and insecure land tenure is correlated with higher levels of deforestation in tropical countries (Robinson et al., 2014). In Cameroon, the zoning and gazetting process has clarified rights of ownership and use for much of the forest estate, but gazetting delays have made it impossible for some rural and forest-dependent communities to assert and negotiate ownership rights (Topa et al., 2009; Bruggeman et al., 2015).

The 1994 Forest Law and associated regulations also include clear provisions for enforcing the forest-zoning plan, but the government's approach to enforcement may limit its effectiveness. Perhaps the most important enforcement mechanism is the requirement, noted above, that PFE forests must be managed according to government-approved management plans, which are subject to review and revision every five years. Through the forest-zoning plan, Cameroon's government has allocated approximately three-quarters of the PFE for industrial logging<sup>5</sup>—on a selective, rotational basis designed to prevent net deforestation—and the remaining PFE is allocated primarily for conservation (WRI, 2013). However, lack of resources prompted the government to cede responsibility to the logging companies for developing and enforcing management plans in the areas allocated for logging, even though logging companies are not incentivized to stop communities from exploiting PFE forests if those activities do not threaten timber species that the logging companies wish to harvest (Bruggeman et al., 2015). In addition, despite Cameroon's partnership with Global Forest Watch to monitor forests, and its work with other NGOs to investigate illegal activities, researchers have pointed out that government officials might be reluctant to enforce forest management plans, or require their revision to adapt to realities on the ground, because the government depends on logging companies for tax revenue (Cerutti et al., 2008). Widespread revenue seeking by government officials also undermines enforcement (Morrison et al., 2009; Cerutti et al., 2010; Cerutti et al., 2016; Nkongho, 2018). In 2011, only 27 percent of timber found circulating in Cameroon was legal (Cerutti & Lescuyer, 2011). In the early 2000s, numerous PFE forests were exploited without management plans (Bruggeman et al., 2015).

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### **Leveraging World Bank Resources to Enforce Compliance**

*Among the many reforms that the World Bank promoted in Cameroon's forestry sector were new regimes for timber concessions. These reforms were designed, in part, to break down the patronage systems governing the allocation of forest permits. Government officials in Cameroon sometimes resisted gazetting forest boundaries because doing so raised the risk that community claims could change concession boundaries, but the Bank eventually leveraged instruments such as the HIPC (Highly Indebted Poor Countries) negotiations in 2010–2011 to pressure Cameroon officials to sign overdue gazetting decrees (Karsenty, 2017).*

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<sup>5</sup> Between 2001 and 2019, the portion of PFE zoned for logging grew from ~2/3 to ~3/4 as Cameroon's government allocated more land to the PFE.

**Land-use planning should be based on information that permits a thorough assessment of land resources in the planning area:**

The planners who designed Cameroon’s forest-zoning plan were selective in the information they used to create forest boundaries because they were primarily interested in promoting timber production and forest conservation in the PFE and agriculture in the NPFE. Several researchers have pointed out that the information the planners considered was inadequate to account for local peoples’ needs for other land uses—the planners conducted almost no consultations with local communities, field inventories, or assessments of traditional tenure arrangements and land-use practices (Topa et al., 2009; Samndong & Vatn, 2012), and they included in the PFE many areas that local communities used for shifting agriculture, agroforestry, hunting, and harvesting other non-timber forest products (NTFPs). According to the zoning restrictions, cultivation, including agroforestry, is completely prohibited in the PFE, while hunting and access to NTFPs are severely restricted. Cameroon’s government does need to control shifting agriculture to prevent deforestation, but by failing to address forest-dependent communities’ land-use needs, the forest-zoning plan has created widespread conflicts between those communities and government officials and logging companies over forest boundaries and access rights (Hoare, 2006; Samndong & Vatn, 2012; Hirai & Yasouoka, 2020).

**Common challenges:** Land-use planners might take shortcuts when gathering information and rely primarily on desk analyses (e.g., GIS datasets or satellite images and aerial photos of landscapes) without considering other information about landowners’ and users’ needs for land resources.

Such a narrow technical approach might create conflict among land-users.

**Participants should have relevant technical and managerial capacity:**

Development organizations and environmental NGOs have helped transform Cameroon’s forestry sector by improving forest management; aligning the country’s legal framework with international conventions and agreements applicable to the forestry sector; institutionalizing education, research, and training programs; and increasing the oversight of forestry operations as well as the tax revenue generated. However, three studies conducted in the last several years indicate that Cameroon’s educational and research institutions and government agencies still have low capacity to implement the forest-zoning plan (Cerutti et al., 2009; Djiegni et al., 2016; Cerutti et al., 2016). One study notes that “national educational institutions lack capacity and resources for research and training. The results of their research are poorly valorized, and research programs are insufficiently tailored to the priorities of the [forestry] sector” (Cerutti et al., 2009). Moreover, government agencies overseeing the forestry sector are still heavily dependent on outside assistance; there is poor coordination among agencies responsible for managing forests; and the government is constrained in its ability to produce and manage environmental data for decision-making, largely because agencies have little funding to do so (Cerutti et al., 2009; Cerutti et al., 2016; Djiegni et al., 2016). At this point, Cameroon is far from self-reliant in managing its forestry sector in accordance with the forest-zoning plan.

**Common challenges:** Technical and managerial capacity to design and implement land-use plans might be low. Educational and research institutions and systems might not be training enough people, or training them adequately, to gather, interpret, and apply information about land resources.

Government institutions might be understaffed and lack the resources to coordinate actors responsible for implementing land-use plans and manage land-resource information.

**Funding for planning and implementation is essential:** Ever since its National Assembly approved the Forest Law in 1994, Cameroon has depended on international development partners to help fund the design and implementation of the forest-zoning plan. In addition, although the country’s forestry sector tax reforms have provided a major boost to tax revenue, the distribution of the money to

government agencies responsible for overseeing the forestry sector has long been inadequate to support sustainable forest management (Cerutti et al., 2016). Powerful political interests control much of the tax revenue, and it is often subject to mismanagement, including widespread embezzlement of funds (Morrison et al., 2009; Cerutti et al., 2010; Cerutti et al., 2016; Nkongho, 2018).

To manage its forestry sector in accordance with the forest-zoning plan, Cameroon will need continued international donor support (World Bank, 2017), and it should redouble efforts to stem corruption and increase internal funding for the forestry sector (Cerutti et al., 2016). One option for additional donor support, although it will not necessarily address corruption, is for Cameroon to take advantage of REDD+ programs<sup>6</sup> to conserve forests and enhance forest carbon stocks to mitigate climate change (Dkamela et al., 2014; Spratt et al., 2018; Bernard & Minang, 2019). This could help raise funds to implement the forest-zoning plan and ensure that PFE portions of the rainforest are more valuable intact than they are cleared and converted to agriculture or other land uses incompatible with forest conservation and sustainable management.

Further, Cameroon's government could help reduce conflicts with rural and forest-dependent communities by instituting new policies to more broadly share benefits of the forest-zoning plan that currently accrue to the national government (Hoare, 2006; Samndong & Vatn, 2012; Cerutti et al., 2016; Fomete et al., 2018; Nkongho, 2018). In particular, forestry sector tax revenues distributed effectively to local communities could help pay for community programs to improve livelihoods and increase access to education, electricity, and clean water; this could increase support among local communities for forest-zoning plan restrictions in the PFE and provide incentives for them to fight against illegal deforestation (Cerutti et al., 2016; Nkongho, 2018).

**Land-use planning should include broad participation of multiple stakeholders:** Neither the design nor implementation of the forest-zoning plan in Cameroon included broad participation by affected stakeholders. As noted previously, rural and forest-dependent communities have been largely excluded, especially from decisions regarding land use in the PFE. For more than 25 years, the design and implementation of the plan has been a top-down process dominated by international development organizations, timber companies, and national government officials. With some exceptions, these actors have prioritized conservation of the rainforest, timber production, and cash flows to Cameroon's national government above the needs of rural and forest-dependent communities.

Although the forest-zoning plan has succeeded at controlling agricultural expansion and preventing deforestation in at least some areas of the PFE, Cameroon's government and its development partners should increase participation of rural and forest-dependent communities in the ongoing implementation

**Common challenges:** Funding might be a significant constraint. Land-use planning and implementation to protect large forest areas in developing countries requires substantial financial investment.

At the same time, many developing countries with extensive forest resources are relatively poor and plagued with corruption and financial mismanagement.

**Common challenges:** Powerful actors such as government officials, wealthy landowners, and donor organizations might dominate land-use planning and implementation.

Participants might be unwilling to consider alternatives for land access and allocation that are inconsistent with their own priorities.

Less powerful actors, especially poor communities, might not have the financial resources and technical capacity needed to meaningfully participate in land-use planning and management.

<sup>6</sup> For more information about REDD+ funding programs for developing countries, see: <https://www.forestcarbonpartnership.org/>

of the plan. For reasons of fairness and justice, this would be good in its own right, and it also could improve outcomes for the rainforest. For example, in 2011 Cameroon's National Assembly approved a new Land Use Planning law (Republic of Cameroon, 2011), which aims to reconcile national planning, including the forest-zoning plan, with local planning and sustainable development (Fomete et al., 2018). This law, combined with the provision that PFE forest management plans are subject to review every five years, provides an opportunity to address rural and forest-dependent communities' land-use needs and further clarify and secure their land-use rights (Fomete et al., 2018). In addition, Cameroon and its development partners could provide more help for rural and forest-dependent communities to establish and benefit from community forests, which are officially part of the NPFE.

According to the 1994 Forest Law, community forests are supposed to provide rural and forest-dependent communities opportunities to harvest timber, extract NTFPs, and develop agriculture. Since 1994, communities in Cameroon have established approximately 400 community forests (Bernard & Minang, 2019), but the costs and technical requirements of establishing community forests in accordance with the Forest Law are out of reach for most communities, and they have frequently relied on timber companies for assistance. This leaves the communities indebted to the timber companies, undercuts their autonomy over the land, and permits unsustainable exploitation of their forests (Bernard & Minang, 2019).

## **THE BALANCE OF THE EVIDENCE: NATIONAL LAND-USE PLANNING TO PREVENT AGRICULTURAL EXPANSION INTO FORESTS OFTEN REQUIRES COMPREHENSIVE PROGRESS IN GOVERNANCE**

The Cameroon experience illustrates the potential of national land-use planning as well as the challenges. Rigorous empirical analysis demonstrates that Cameroon's forest-zoning plan reduced deforestation at the agricultural frontier in one region over eight years, and broader correlational analysis also indicates that the forest-zoning plan has helped reduce deforestation across much of Cameroon's rainforest. In addition to this success, Cameroon established the overall map and formal process for land management at subnational levels, a framework that set the stage for defining rights to land through gazetting, a public process for negotiating and settling rights in forest land. The country did this largely by working with partners to establish conditions for success, including clarifying and securing land-use rights; instituting legal mechanisms to enforce agricultural and forestry land-use requirements; creating and sharing accurate information about land resources; building technical and managerial capacity in the forestry sector; attracting substantial donor funding; and increasing government revenue, thereby increasing incentives to protect the rainforest.

### **Land-use planning in Cameroon has faced multiple hurdles**

On the other hand, the process Cameroon has undertaken since the early 1990s has been fraught with challenges common among land-use planning initiatives in developing countries. These challenges include a lack of political will to implement the plan, weak law enforcement, and corruption; overly narrow technical approaches to assessing and allocating land resources, which can create conflict among land-users; low capacity to design and implement the plan; inadequate funding and poor financial management; and the real potential for powerful actors to hijack the process, capture the benefits of land-resource exploitation, and exclude less powerful communities.

These challenges largely stem from weak governance. Good governance is essential to adjudicating how people will use land and forest resources to address the "collision" between food security, biodiversity conservation, and climate change adaptation and mitigation. Donors and practitioners considering

supporting land-use planning, whether at the national or subnational level, must assess the difficulty of establishing conditions for the process to be successful, transparent, and equitably implemented. They should assess:

- How far is the country from a clear process of clarifying and securing land-use rights?
- What are the legal mechanisms to enforce agricultural and forestry land-use requirements?
- What is the current capacity for creating and sharing accurate information about land resources?
- What is the state of technical and managerial capacity in the forestry sector?
- Can the country attract substantial donor funding and increase government revenue to support land management according to land-use plans?
- Will the partners in a land-use planning initiative support democratizing the process, with broad participation of stakeholders who have interests in how the land will be allocated and managed?

### **Final recommendations when providing support to land-use planning**

If land-use planning proponents are satisfied with the answers to these questions, they also will need to build the following elements into the process itself:

- Design support for both planning and implementation at national, regional, and local scales. National-level planning is only one part of the work that needs to be done. A good plan that is not implemented serves little; one that is poorly implemented may be exploited to formalize inequitable decisions.
- Plan for a long and costly process. Governments might need help establishing transparent, sustainable revenue streams to support implementation for many years.
- Assess and design for reducing the power of entrenched interests and support the government in anti-corruption efforts. Recognize the influence that logging companies, agricultural firms, and other market enterprises, including payments for ecosystem services, might have over government decision-making; work with government to ensure broad participation and design mechanisms for the implementation phase to safeguard rights of communities to forests and their resources.

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## ANNEX I: KEY REFERENCES

- 1) Academic research papers that evaluate the effectiveness of land-use planning to achieve diverse sustainable development goals
  - [Land use planning: A key to sustainable agriculture \(De Wraichen, 2003\)](#)
  - [Organizing anarchy: The food security–biodiversity–climate crisis and the genesis of rural land use planning in the developing world \(Rudel & Meyfroidt, 2014\)](#)
  - [Combating land degradation and desertification: The land-use planning quandary \(Briassoulis, 2019\)](#)
- 2) Reports and practitioner guidelines from leading development organizations with decades of experience supporting land-use planning initiatives
  - [Guidelines for land use planning \(FAO, 1993\)](#)
  - [State of the world’s forests 2016. Forests and agriculture: Land-use challenges and opportunities \(FAO, 2016\)](#)
  - [GIZ Land use planning: Concepts, tools, and applications \(GIZ, 2012\)](#)
  - [USAID Guidelines on low emission land use planning \(Barber et al., 2015\)](#)
- 3) Research papers focused specifically on evaluating the effectiveness of land-use planning to prevent agricultural expansion and reduce deforestation that show positive results at different scales:

### National

- [Production forests as a conservation tool: Effectiveness of Cameroon’s land use zoning policy \(Bruggeman et al., 2015\)](#)
- [Why forests? Why now? The science, economics and politics of tropical forests and climate change \(Seymour & Busch, 2016\)](#)

### Regional

- [The institutional drivers of sustainable landscapes: A case study of the ‘Mayan Zone’ in Quintana Roo, Mexico \(Bray et al., 2004\)](#)
- [Is community-based forest management more effective than protected areas? A comparison of land use/land cover change in two neighboring study areas of the Central Yucatan Peninsula, Mexico \(Ellis & Porter-Bolland, 2008\)](#)
- [Decentralized land use zoning reduces large-scale deforestation in a major agricultural frontier \(Nolte et al., 2017\)](#)

### Local Scales

- [Integrated analyses of local land-use regulations, cultural perceptions, and land-use/land cover data for assessing the success of community-based conservation \(Dalle et al. 2006\)](#)
- [New directions for participatory land use planning: Can bottom-up approaches achieve a win-win for sustainable development and forest conservation? \(Ingalls et al., 2020\)](#)

- Formalizing land rights can reduce forest loss: Experimental evidence from Benin (Wren-Lewis et al., 2020)