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Integrating Forest Resources, Community Livelihoods and Local Governance for Sustainable Community Forest Management: Evidence from the Woteva Community Forest, Southwest-Cameroon

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ABSTRACT: While community forestry has been widely promoted across the tropics as a means of reconciling conservation with rural livelihoods, how resource allocation, livelihood benefits, and local governance interact within individual community forests remains poorly understood, with evidence scattered across disparate studies. This study addresses that gap through a case analysis of the Woteva Community Forest (WCF), a 1,845-hectare, tripartite-zoned forest on the eastern slope of Mount Cameroon, established in 1997 under Cameroon's 1994 Forestry Law. Drawing on structured and open-ended household questionnaires administered through rapid random sampling, key-informant interviews, and documentary review, the study examined the WCF's sectoral resource base, its livelihood contributions from timber, non-timber forest products (NTFPs), apiculture, and eco-tourism, and its customary–statutory governance arrangements. Results show that the WCF comprises a 1,204-hectare forest/NTFP sector, a 462-hectare grassland sector supporting apiculture and Prunus africana enrichment planting, and a 180-hectare volcanic sector for eco-tourism, managed under a 25-year rotational plan. Formal timber exploitation is currently non-operational: thirty-seven felled logs remain unextracted, as the forest's rugged, high-slope terrain renders transport prohibitively costly, a finding consistent with global evidence linking harvesting costs to slope and accessibility. Prunus africana bark remains the principal commercial NTFP. Governance is anchored in a matrilineal chieftaincy, a Traditional Council, and statutory committees, an arrangement associated with markedly lower reported inequity (4%) than in two neighboring forests (38–54%), although environmental awareness remains low (19%). These findings are interpreted against Cameroonian, African, and global tropical literature on elite capture, terrain-constrained logging economics, and cross-regional governance comparisons. The study concludes that zoning, livelihood diversification, and the integration of customary authority into governance structures constitute a transferable model for community forest management in terrain-constrained tropical settings.

KEYWORDS: Community forestry, forest governance; livelihood, non-timber forest products, terrain-constrained logging, sustainable forest management.

1. INTRODUCTION

Community forestry emerged from the recognition that centralized, state-controlled forest management in the tropics had largely failed to curb deforestation, generate rural income, or secure the customary rights of forest-adjacent populations (Alemagi *et al*., 2022). Developing management rights to local communities was expected to align conservation incentives with livelihood needs, on the premise that communities with secure, long-term resource rights and functioning local institutions have stronger incentives to manage forests sustainably than distant state agencies (Ostrom, 1990). In Cameroon, this logic was codified in the 1994 Forestry Law and its 1995 implementing decree, which allow a community to manage up to 5,000 hectares of the non-permanent forest estate under a renewable 25-year agreement, subject to a state-approved Simple Management Plan (Piabuo *et al*., 2018).

Three decades on, close to 430 community forests have been attributed in Cameroon, covering approximately 1.7 million hectares, yet fewer than a quarter are in active management, and national reviews report that the overwhelming majority fail to meet basic standards of accountability and equity, largely because of elite capture of forest revenue, weak downward accountability, and high transaction costs of establishing and operating

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a CF (Alemagi *et al*., 2022; Essougong *et al*., 2019,Piabuo *et al*., 2018). At the same time when forests continue to underpin rural livelihoods across the country: non-timber forest products (NTFPs) supply food, medicine, fodder, and non-farm income, and community forest use has been shown to be strongly predicted by household location, gender, occupation, and CF membership (Fru, 2018).

Much of the existing literature treats resource characteristics, livelihood outcomes, and governance quality as separate objects of analysis, even though they are functionally interdependent: the physical and biophysical characteristics of a forest (terrain, accessibility, species composition) shape which livelihood activities are commercially viable while livelihood viability shapes the incentives that community members and leaders have to invest in good governance, and governance quality in turn determines how reliably resource-derived income reaches households (Alemagi *et al*., 2022; Beauchamp & Ingram, 2011). This study addresses that gap by integrating all three dimensions (ecological stability, improvement in livelihood quality and devolution of management rights) in a single case: the Woteva Community Forest (WCF) in Fako Division, South West Region, established in 1997 on the eastern flank of Mount Cameroon. Woteva is a particularly instructive case because prior independent comparative research identified it as an unusually well-governed community forest relative to two neighboring CFs more strongly associated with elite capture (Ngang, 2015; Piabuo *et al*., 2018), while its rugged volcanic terrain has simultaneously rendered formal timber exploitation commercially non-viable, forcing the community to rely on a livelihood portfolio built around NTFPs, apiculture, and eco-tourism rather than timber revenue.

This study had four specific objectives: (i) to document the sectoral resource base and land-use allocation of WCF; (ii) to establish why formal timber exploitation is not currently operational and to situate this within the wider literature on terrain-constrained tropical logging economics; (iii) to characterize the customary and statutory governance institutions through which forest-derived livelihoods are organized; and (iv) to compare WCF's resource-use, livelihood, and governance outcomes against evidence from other community forests in Cameroon, across Africa, and in the wider tropics, in order to draw generalizable implications for sustainable community forest management.

2. CONCEPTUAL FRAMEWORK: LINKING RESOURCES, LIVELIHOODS AND GOVERNANCE

This study is informed by the common-pool resource governance tradition, which holds that sustainable outcomes in that community-managed natural resource systems depend on the interaction of resource characteristics, user-group attributes, and institutional design (Ostrom, 1990). Building on this tradition, we adopt a simple integrative framework in which (a) the biophysical resource base (species composition, terrain, accessibility) determines the feasible set of livelihood activities; (b) livelihood outcomes depend on which of those feasible activities the community can commercialize, given market access, labour, and capital constraints (Beauchamp & Ingram, 2011); and (c) governance arrangements — encompassing accountability, equity, participation, representation, direction, and performance (Piabuo *et al*., 2018) — determine how reliably resource- and livelihood-derived benefits are captured, distributed, and reinvested by the community. Critically, these three dimensions are treated here as interacting rather than independent: a resource base that forecloses high-value timber extraction (as in Woteva) forces livelihood diversification, which in turn changes the distribution of who controls valuable forest income and can therefore alter the community's exposure to elite capture (Persha & Andersson, 2014).

3. MATERIALS AND METHODS

3.1 Study Area

The study was conducted in Woteva village and its associated community forest (MINFOF Registration No. 344), located on the eastern slope of Mount Cameroon in Fako Division, South West Region of Cameroon, near 4.15°N, 9.18°E, and partly falling within the buffer zone bordering Mount Cameroon National Park (MCNP). Spanning approximately 1,845 hectares, the WCF has been under community management since 1997 (Kabelong et al., 2018; WECONS, 2026). Its position within the Cameroon Highlands, a region already noted for exceptional plant endemism, adds further weight to the conservation importance of forest patches such as this one (Cheek et al., 2000). The area exhibits a pronounced altitudinal vegetation gradient, transitioning from lowland evergreen forest through submontane and montane forest to open grassland and recent volcanic (lava) formations associated with the 1958–1959 eruption of Mount Fako, and is characterized by steep, uneven, and in certain places inaccessible topography.

Climatically, the area experiences two distinct seasons rather than four: an extended wet period from roughly April to November and a shorter, still relatively humid stretch between December and March (Tabue Mbobda et al., 2018). Rainfall is exceptionally heavy — between 2,000 and 5,000 mm a year, among the highest anywhere on the African continent, a consequence of the mountain forcing moist air upward (Tabue Mbobda et al., 2018). Warm temperatures persist throughout the year, typically ranging from 25°C to 35°C at lower elevations, with little seasonal fluctuation. One counterintuitive feature of the Woteva landscape is the complete absence of permanent lakes or springs, despite abundant rainfall; this is a predictable outcome of the volcanic soil's high permeability, which allows water to drain away quickly rather than pool at the surface.

The terrain itself is far from uniform: much of the WCF is steep and uneven, with parts of the forest difficult or impossible to reach on foot, a legacy of the volcanic processes that shaped the land. This is reflected in the vegetation, which follows a pronounced gradient from low to high elevation. Moving upslope, the forest transitions from lowland evergreen forest through submontane and montane zones before opening into grassland, alongside patches of relatively young lava terrain formed during Mount Cameroon's 1958–1959 eruption. Lower slopes are characterized by species like *Polyscias fulva*, *Strombosia grandifolia*, *Macaranga occidentalis*, and *Cylicomorpha solmsii*, whereas the cooler, moisture-laden upper elevations give way to species such as *Drypetes staudtii*, *Staudtia stipitata*, *Prunus africana,* and multiple Cola species (Tabue Mbobda et al., 2018). This elevational turnover is not unique to Woteva — it reflects a broader zonation pattern already well documented across the wider Mount Cameroon region (Cheek et al., 2000). Economically valuable timber species found within the forest include African mahogany (*Entandrophragma angolense*), ironwood (*Lophira alata*), country onion (*Afrostyrax lepidophyllus*), pygeum (*Prunus africana),* and tiger wood (*Microberlinia bisulcata*). The latter is of particular conservation concern: it is currently classified as Critically Endangered, having suffered population losses from both agricultural expansion and unsustainable logging tied to international demand for decorative wood (van der Burgt &

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Cheek, 2022). *Prunus africana* faces a comparable threat, its medicinal bark having been overharvested across much of its African range such that international trade in the species is now restricted under CITES Appendix II (Cunningham et al., 2002). In response to these pressures, conservation actors have carried out active reforestation in and around the WCF: over 14,000 seedlings of threatened species were planted across the forest and adjacent farmland during a 2014–2015 initiative run jointly by the Global Trees Campaign and the Environment and Rural Development Foundation (ERuDeF, 2015).

aunal diversity within the forest is similarly notable. The Nigeria–Cameroon chimpanzee (*Pan troglodytes ellioti*) — the rarest and most range-restricted of the four recognized chimpanzee subspecies — inhabits the WCF and is listed as Endangered (Oates et al., 2016). The drill (Mandrillus leucophaeus), a primate confined to a small portion of the Gulf of Guinea region, is also present and shares this Endangered status, its decline driven by habitat fragmentation and hunting (Gadsby et al., 2020). Beyond these two flagship primates, the forest hosts an assortment of other species: hornbills, several monkeys, bush pigs, porcupines, giant rats, pangolins, vipers, galagos, tortoises, and a wide array of birds (Tabue Mbobda *et al*., 2018). Taken together, this faunal richness is consistent with what would be expected from the broader Mount Cameroon ecosystem, long recognized for its unusually high vertebrate diversity (Cheek *et al*., 2000). The location map of the Woteva community forest and its environs is presented in Figure 1.

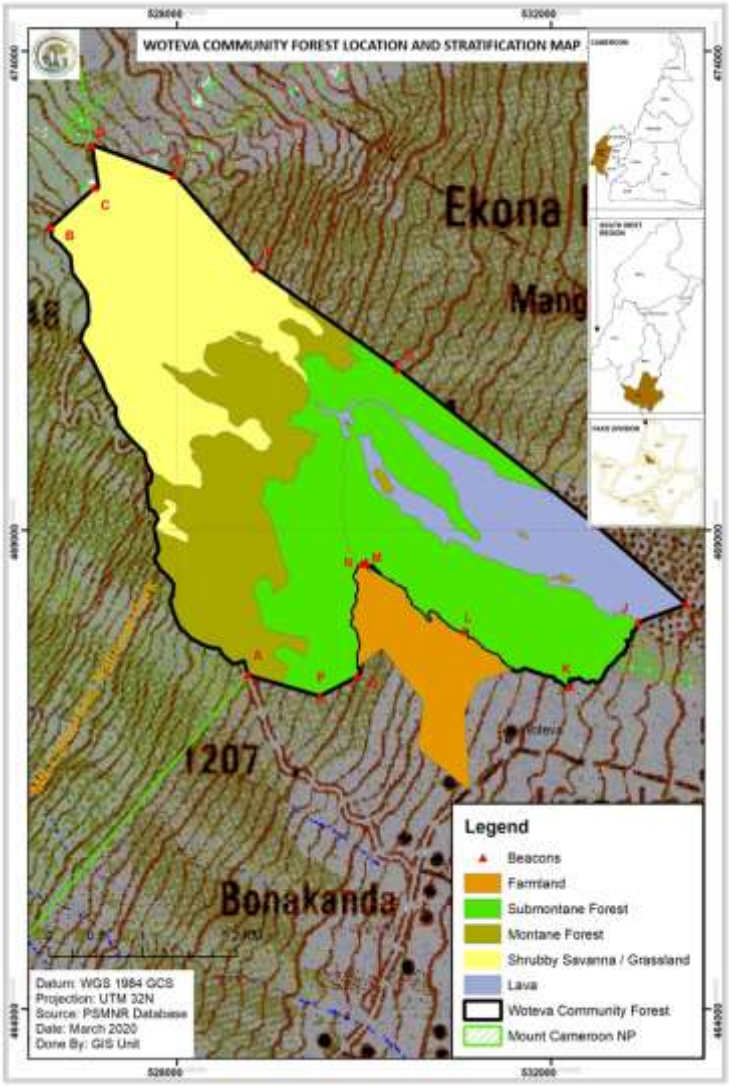


Figure 1: Location Map of the Woteva Community Forest

3.2 Research Design and Data Collection

A cross-sectional, mixed-methods survey design was used, combining structured closed-ended questionnaire items with open-ended interview questions, consistent with standard approaches in Cameroonian community forestry livelihood and governance research (Fru, 2018; Ngang, 2015). Data collection followed a Participatory Rural Appraisal (PRA) approach with three complementary components: (i) documentary review of the WCF Simple Management Plan, prior inventories, correspondence with the Ministry of Forestry and Wildlife (MINFOF), and village development records; (Bowen, 2009), (ii) a rapid random household sampling survey using a structured and open-ended questionnaire covering household composition, land tenure, forest product use, income sources, and perceptions of forest governance; (Bernard, 2017) and (iii) key-informant interviews and group discussions with the Village Forest Management Committee (FMC), the Eco-Tourism Management Committee, the Forest Management Officer, and the Chairperson and executive members of the Traditional Council (Chambers, 1994). Fieldwork was organized into

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two five-day sessions: the first with the FMC and Eco-Tourism Committee, and the second with the Forest Management Officer, the Traditional Council, and the village Chief (Chambers, 1994).

The questionnaire combined closed items (e.g., household size, land tenure category, forest product categories used, awareness of governance and environmental protection measures) with open-ended items allowing respondents to describe, in their own words, forest-derived income sources, perceived changes in benefit-sharing, and constraints on sustainable exploitation, including terrain and access-related constraints on timber harvesting (Bernard, 2017; Chambers, 1994). Approximately 85% of approached households and stakeholders responded to the survey, with non-response attributed mainly to seasonal absence linked to rural out-migration.

3.3 Sampling

Although the community forest is exploited by neighboring villages Woteva, Ekona Lelu, Bonakanda and Bonjia, sampling and data collection was limited to the Woteva village, due to the fact that it is the principal and key exploiting community that controls the management of the community forest, and is home to the forest management committee and other indigenous and traditional governing bodies which influence forest resource exploitation. Given the small size of Woteva village (36 households, approximately 125 residents), a rapid random household sampling approach was applied across the village's residential clusters, supplemented by purposive sampling of institutional key informants (Chief, Traditional Council executives, FMC and Eco-Tourism Committee members, Forest Management Officer) to ensure that all levels of the forest's governance structure were represented in the qualitative data (cite). A total of 103 participants partook in the survey.

3.4 Data Analysis

Quantitative data (population and household counts, sectoral land areas, harvested volumes, and reported income figures) were summarised descriptively. Qualitative data from open-ended questionnaire items and key-informant interviews were analyzed thematically to characterize governance structures, cultural institutions, and livelihood strategies, following the directed content-analysis approach used in comparable Cameroonian community forestry governance research (Piabuo *et al*., 2018). Findings were triangulated against, and compared with, previously published assessments of community forest governance and livelihoods in Cameroon — including an independent comparative study that assessed Woteva alongside two neighboring community forests (Ngang, 2015; synthesised in Piabuo *et al*., 2018) — and against the wider African and tropical community forestry literature, to contextualize WCF's performance.

4. RESULTS AND DISCUSSION

4.1 Socio-Demographic and Land Tenure Context

Woteva village has an estimated population of 125 persons across 36 households, a small population that community informants attributed to sustained rural exodus of the economically active population (18–50 years) in search of employment and social amenities such as schools, potable water, and health facilities. Approximately 98% of residents identified as indigenous Bakweri, with Pidgin English, and English as the dominant languages. Land is held predominantly through family inheritance rather than formal titling where land passes from father to children, including daughters, through family heads or the Traditional Council, and outright sale of community land is prohibited. This inheritance-based tenure system mirrors the wider Bakweri pattern in which land and forest access remain embedded in kinship and chieftaincy structures rather than statutory titling (Monono *et al*., 2016). The out-migration of working-age residents documented here is consistent with a broader pattern increasingly reported in community forestry contexts elsewhere, where labour outmigration reshapes household forest dependence, collective action capacity, and forest transition dynamics in rural, mountainous settings (Cite).

4.2 Sectoral Allocation and Management of Forest Resources

The WCF Simple Management Plan divides the forest into three functional sectors based on vegetative composition and community consultative resolutions. Sector 1, the forest sector, covers 1,204 hectares and is designated for small-scale, subsistence-oriented exploitation of major timber species and NTFPs under a 25-year rotational cycle, with one twenty-fifth of the area exploitable annually under MINFOF authorization and mandatory post-harvest natural or artificial regeneration. Sector 2, the grassland sector, covers 462 hectares and supports honey production and eco-tourism activities such as camping, with artificial enrichment planting of *Prunus africana* and other adaptable species at a rate of one twenty-fifth of the sector area per year. Sector 3, comprising volcanic (lava) formations from the 1958–1959 Mount Fako eruption, covers 180 hectares and is reserved for eco-tourism, featuring lava craters, caves, historic German graves, and lava-flow trails.

This tripartite, rotation-based zoning reflects a deliberate multiple-use planning logic consistent with sustainable-yield principles applied elsewhere on Mount Cameroon, notably in the long-running rotational management of *Prunus africana* harvesting (Ewusi & Acworth, 2001), and with the broader emphasis in Cameroonian community forestry on aligning the 25-year statutory CF agreement period with an internally consistent harvesting rotation (Piabuo *et al*., 2018).

4.3 Terrain as a Binding Constraint on Timber Exploitation

A central finding of this study is that WCF currently undergoes no formal, active timber exploitation, despite Sector 1 being nominally designated for timber harvesting under the management plan. This is a direct consequence of the forest's rugged, uneven, high-slope terrain rather than of resource scarcity, regulatory restriction, or lack of community interest. Historical evidence corroborates this constraint: thirty-seven previously felled logs (predominantly Sapelli and Tiama), abandoned before the WCF Simple Management Plan was signed, remained un-extracted years after MINFOF's Regional Delegation formally issued a non-objection authorization for their recovery, because interested economic operators ultimately declined to proceed once they assessed the site. The principal barriers cited were the prohibitive cost of head-load transportation of sawn timber from the felling sites to the nearest motorable point, and the high cost of labor and logistics required to work the terrain.

This outcome is consistent with a substantial body of forest-economics literature showing that timber harvesting costs rise sharply, and non-linearly, with slope and with distance from road or haul access, because steep terrain both increases the physical effort required to fell, extract, and transport logs and constrains the use of cost-efficient mechanized extraction methods (Duguma *et al*., 2018; Alemagi *et al*., 2022). Alemagi *et al*., (2022) explicitly identify "size and biophysical potential" — which includes terrain and accessibility — as one of the structural "form" deficits

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limiting the operational viability of Cameroonian community forests, alongside legal and rights-based deficits. Comparative cost-benefit modelling of Cameroonian community forests has similarly shown that profitability is highly sensitive to extraction and transport costs, with many CFs registering only marginal net benefit relative to a no-CF counterfactual once these costs are fully accounted for (Beauchamp & Ingram, 2011). Global reviews comparing conventional, certified, and community timber management in the tropics likewise emphasize that community operations, which typically rely on artisanal, non-mechanized extraction methods, are disproportionately vulnerable to terrain and distance-related cost escalation relative to industrial concessionaires with access to mechanized skidding and haulage (Burivalova *et al*., 2017).

Woteva's experience therefore illustrates, at the scale of a single community forest, a structural constraint that is likely widespread but under-documented in the Cameroonian CF literature, where terrain is rarely disaggregated from other "biophysical" constraints in governance assessments. Rather than representing a governance failure, WCF's absence of active timber exploitation should be read as a rational, terrain-driven adaptation: the community's Simple Management Plan explicitly anticipates future exploitation "with better finance potential" using mobile sawmills such as the Lucas Mill, which could substantially reduce transport costs by allowing on-site conversion of logs into transportable sawn dimensions. Until such capital investment is secured, however, WCF's livelihood strategy has, by necessity, shifted toward NTFPs, apiculture, and eco-tourism.

4.4 Livelihood Contributions of Forest Resources

In the absence of active timber revenue, WCF's livelihood contribution is dominated by NTFPs, apiculture, and nascent eco-tourism. Community members reported subsistence use of construction materials, fuelwood, medicinal plants, and wild foods, harvested primarily for household and cultural use rather than commercial sale, a pattern broadly consistent with survey evidence from three other Fako Division community forests, where fuelwood collection (89.4% of respondents), NTFP harvesting (41.3%), subsistence farming (40%), and small-scale timber exploitation (25.7%) were the dominant recorded uses (Fru, 2018).

The ethnobotanical assessment and survey conducted in the Woteva Community Forest demonstrates that the forest supports a diverse assemblage of non-timber forest products (NTFPs) that contribute substantially to household subsistence, traditional healthcare, food security, and livelihood resilience. Beyond the commercially exploited *Prunus africana*, the inventory documented numerous edible, medicinal, construction and culturally important species including *Ricinodendron heudelotii* (njansang), *Piper guineense* (bush pepper), *Cola acuminata* (cola nut), *Dacryodes edulis* (African plum), *Tetrapleura tetraptera*, *Heinsia crinita*, *Kigelia africana*, *Tetracarpidium conophorum*, *Cola lepidota*, several mushroom species, and marantaceous leaves used for wrapping food. Most of these resources were harvested primarily for household consumption, traditional medicine and local markets rather than commercial export, illustrating the multifunctional role of NTFPs in supporting rural livelihoods while reducing dependence on timber extraction. NTFPs currently represent the most accessible biological resources for local communities. Among these, *Prunus africana* remains the only species officially commercialized under an approved management arrangement, while products such as bush pepper, njansang, bush mango relatives, medicinal plants, wrapping leaves and fruits continue to be traded mainly through informal local markets. This contrast illustrates that actual livelihood value is determined not only by biological abundance or market price but also by accessibility, harvesting regulations, transport costs, and market organization.

These findings are consistent with studies conducted in other community forests of Cameroon, where NTFPs have been shown to constitute a major component of rural livelihood strategies. Fru (2018), working in community forests of Fako Division, similarly reported that fuelwood, medicinal plants, wild foods, and various NTFPs were among the most frequently utilized forest resources by local households, often contributing more directly to daily welfare than timber resources. Likewise, Ingram et al. (2012) observed that households across the Congo Basin rely heavily on NTFPs for both subsistence and cash income, with products such as njansang, bush pepper, eru (*Gnetum africanum*), and medicinal plants forming important components of local and regional markets. Similar patterns have been documented elsewhere in Africa. For example, Sunderland et al. (2003) reported that NTFPs provide critical livelihood support throughout Central Africa by diversifying household income sources and reducing vulnerability to agricultural and economic shocks. The dependence on multiple NTFPs observed in Woteva therefore reflects a broader regional pattern in which forest-dependent communities derive greater livelihood security through the combined use of numerous forest products rather than relying on a single commodity.

Among commercially exploited NTFPs, *Prunus africana* bark has generated the most significant direct income for Woteva. Between 2013 and 2015, harvesting was carried out under agreement with the Mount Cameroon Prunus Management Company (MOCAP). Bark was purchased at 600 FCFA per kilogram, generating reported gross sales of approximately 2,363,750 FCFA, of which 1,884,750 FCFA had been received by the community, with a balance of 1,424,500 FCFA still owed by the buyer at the time of reporting. This pattern of partial or delayed payment is consistent with the wider history of *Prunus africana* exploitation on Mount Cameroon, where community-based management since the 1990s has raised the farm-gate bark price roughly four- to fivefold relative to pre-management levels, while buyer opportunism, payment delays, and CITES-linked export-quota volatility have continued to constrain the reliability of household income from the species (Ewusi & Acworth, 2001).

Wildlife use has historically included subsistence hunting of duikers (*Cephalophus* spp.), civets, primates, and chimpanzees (*Pan troglodytes*), though community informants reported a decline in hunting pressure in recent years, attributed to collaborative sensitization efforts by the Mount Cameroon National Park and to a shift by former hunters toward farming. Eco-tourism, though still nascent, generated a modest but symbolically significant direct benefit: a payment of 50,000 FCFA received from a television documentary crew filming the Ekona lava-flow trail was applied toward construction of the village community hall.

This diversified, NTFP- and tourism-centered livelihood portfolio, forced in part by the terrain constraint, mirrors global evidence that community forests unable to commercialize timber at scale often derive greater net livelihood benefit from a small number of high-value NTFPs than from marginal or uncompetitive timber operations (Beauchamp & Ingram, 2011). Comparable patterns of NTFP-centered livelihood diversification have been documented in Sri Lanka's intermediate zone community forests, where NTFP-based income significantly improved household livelihood indicators even in the absence of large-scale timber revenue (Ekanayake *et al*., 2022), and at Mount Oku in Cameroon's North West

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Region, where community forest management centered on NTFPs and honey production has been documented as a viable strategy for combining forest rehabilitation, conservation, and livelihood sustainability in similarly steep Cameroonian highland terrain (Foncha & Ewule, 2020).

4.5 Cultural and Customary Institutions Shaping Forest Use

Forest use and management in Woteva are embedded within a dense framework of Bakweri religious and rite-based cultural institutions. Community informants described night-time cultural rituals such as *mingna* and *ngagna*, associated with totemic societies believed to draw power from elephant totems and displayed ceremonially during traditional wrestling contests (the "Palapala fight"), and described mortuary practices involving libation, grave rituals, and communal reconciliatory rites such as the three-day "sasa" ceremony intended to pacify the deceased and honor the ancestors (Monono *et al*., 2016; Tanjong, 2014). Ancestor veneration functions as a mediating institution between the living and a pantheon of deities associated with the mountain and its natural features, including guardian deities linked to the volcanic peak of Mount Fako, such as the demi-god Ifasà Moto, said to protect the Bakweri people from volcanic eruption (Nana & Tchamadeu, 2014; Monono *et al*., 2016).

These customary belief systems are not incidental to forest governance. Comparative research on Bakweri traditional beliefs around the Mount Cameroon National Park (MCNP) has shown that such norms have historically reinforced forest conservation by regulating access to specific sites and resources, even though they remain largely unrecognized within the Park's statutory management plan (Monono *et al*., 2016; Nkemnyi *et al*., 2016). Recent institutional research across Cameroon's Western Highlands similarly finds that forest landscape restoration and natural-resource governance interventions achieve markedly higher community compliance when they are designed to accommodate, rather than bypass, endogenous cultural institutions and ancestral belief systems, since rural communities' strong reverence for their culture generates a reservoir of trust and legitimacy that exogenous, purely regulatory interventions cannot easily replicate (Kimengsi & Giessen, 2024; Kimengsi & Silberberger, 2023). This pattern is consistent with a wider continental and global literature on the role of sacred sites, totemic taboos, and traditional ecological knowledge in sustaining informal forest conservation outcomes, from sacred-forest custodianship in South Africa's Limpopo Province, where ritual sanction and fear of ancestral consequence have been shown to deter fuelwood harvesting and hunting within protected sites (Sinthumule & Mashau, 2020), to broader syntheses concluding that spiritual and cultural attachment to land is frequently a stronger predictor of community conservation commitment than formal regulation alone. In Woteva, the persistence of matrilineal succession rules, secrecy in chieftaincy succession, and family-based land inheritance reflects this broader Bakweri pattern in which customary institutions retain substantial authority over land and natural resource access alongside the statutory community forestry framework (Monono *et al*., 2016).

4.6 Institutional Governance Structure

Formal governance of WCF operates through a hybrid customary-statutory structure. The village Chief serves as head of village administration and principal contact for external development partners and technical services; he is supported by the Quarter Head, who acts in his absence, and by the Traditional Council, which convenes even when both the Chief and Quarter Head are unavailable. The Village Development Committee (VDC) functions as the village's planning body, overseeing implementation of the Village Development Plan and reporting to the Traditional Council, while the Forest Management Committee (FMC) and the Eco-Tourism Management Committee hold operational responsibility for day-to-day forest and tourism activities; notably, the Chief himself currently also holds the position of Forest Management Officer, directly linking customary and statutory forest authority. Succession to the chieftaincy follows a matrilineal principle among five founding families (Wondumbe, Wonjonge, Wonyameoja, Wonyikomi, and Wonajonjo); the reigning Chief privately designates a successor from among his sons in consultation with elders, and the successor's identity is kept secret until the Chief's death.

This layered structure — combining a hereditary chieftaincy, a Traditional Council, and specialized statutory committees (FMC, VDC, Eco-Tourism Committee), with the Chief concurrently serving as Forest Management Officer — corresponds closely to governance configurations identified elsewhere in Cameroon as more likely to produce positive community forestry outcomes, particularly where customary authority is directly integrated into the management committee rather than existing in parallel or in tension with it (Piabuo *et al*., 2018; Brown & Lassoie, 2010). Comparative research on within-community governance in Cameroon finds that community forests whose management committees combine elected representatives with legitimate customary authorities, and where the chief plays an active, supportive role, tend to display stronger "positive elite" dynamics that channel resources toward community development rather than private capture (Piabuo *et al*., 2018).

4.7 Comparative Governance and Livelihood Performance

Woteva has previously been included, alongside the neighboring Bakingili and Bimbia-Bonadikombo community forests, in an independent household-level assessment of community forestry outcomes across Fako Division (Ngang, 2015), subsequently synthesized in a national review of community forest governance in Cameroon (Piabuo *et al*., 2018). This comparative evidence offers a valuable external benchmark for the present findings.

On equity in benefit-sharing, only 4% of Woteva respondents reported no improvement in the benefit-sharing system, compared with 38% in Bakingili and 54% in Bimbia-Bonadikombo, where poor outcomes were attributed principally to corruption, embezzlement, and elite capture of forest revenue (Piabuo *et al*., 2018). This is consistent with the present study's finding of an actively functioning, multi-tiered governance structure in which the Chief, Traditional Council, and FMC operate with overlapping accountability, reducing scope for the kind of unilateral, unaccounted decision-making documented in poorly governed Cameroonian CFs, where management committees have been found to withhold financial statements from the community for years at a time (Piabuo *et al*., 2018; Oyono, 2004). On participation, 64% of respondents across the three Fako CFs, Woteva included, reported that community forestry had improved their participation in forest resource management (Piabuo *et al*., 2018), consistent with the active, committee-based interview process observed in this study's field sessions with the FMC and Eco-Tourism Committee.

Not all indicators point toward uniformly strong performance, however. Awareness of environmental protection measures introduced through community forestry was reported as comparatively low in Woteva (19%) relative to Bakingili (43%) and Bimbia-Bonadikombo (38%) (Piabuo *et al*., 2018), suggesting that while Woteva's benefit-sharing and internal accountability mechanisms function comparatively well, community-level environmental education and sensitization lag behind neighbouring forests. This is a plausible outcome given Woteva's smaller and more dispersed population, itself partly a product of rural out-migration, and its correspondingly lower exposure to NGO- and civil-society-led training

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programmes that have driven awareness gains elsewhere in the South West Region (Piabuo *et al*., 2018). It also underscores a broader finding in the Cameroonian community forestry literature: positive outcomes on one governance principle (such as equity or accountability) do not necessarily co-occur with positive outcomes on others (such as direction or environmental awareness), so governance quality should be assessed multidimensionally rather than through any single indicator (Piabuo *et al*., 2018; Duguma *et al*., 2018).

Woteva's comparatively favorable equity outcomes contrast sharply with the dominant pattern documented across Cameroon, where elite capture is repeatedly identified as the primary obstacle to community forestry success. National reviews find that the large majority of Cameroonian CF case studies fail to meet basic standards for accountability and equity, with local elites frequently capturing revenue through self-appointment to management committees and the manipulation of financial records, often with the tacit complicity of local administrative officials (Piabuo *et al*., 2018; Oyono, 2004; Brown & Lassoie, 2010; Kenfack Essougong *et al*., 2019). A recent power-dynamics analysis of community forests in the Mount Cameroon National Park buffer zone similarly found that communities typically receive less than 10% of the revenue intended for them once dominant state, donor, and elite actors have shaped benefit distribution (Sufo Kankeu & Ayuk, 2026). Elite capture in decentralized forest governance is theorized to arise when local elites exploit asymmetric information, weak downward accountability, and inequitable benefit-sharing agreements to secure disproportionate shares of resource rents (Persha & Andersson, 2014). Against this backdrop, Woteva's low reported rate of benefit-sharing dissatisfaction is a notable, if partial, positive outlier, plausibly explained by the direct integration of the Chief and Traditional Council into forest governance, sustained technical support from the indigenous Ngo Wewuley Consultancy, comparatively transparent, externally verifiable *Prunus africana* transaction records, and the very absence of a large, terrain-enabled timber rent that might otherwise have attracted more intensive elite competition for control.

4.8 Comparison with African and Global Tropical Community Forestry

Beyond Cameroon, WCF's experience resonates with wider African and global tropical patterns in three respects. First, its reliance on customary and spiritual institutions to reinforce sustainable resource use parallels findings from sacred-forest and totemic-taboo systems documented across the continent, from South Africa's Thathe Vondo sacred forest (Sinthumule & Mashau, 2020) to broader continental syntheses of African traditional ecological knowledge, and is reinforced by recent Cameroonian institutional research showing that natural-resource governance interventions succeed more reliably when they accommodate rather than override endogenous cultural institutions (Kimengsi & Giessen, 2024).

Second, WCF's terrain-constrained timber economics echo a wider tropical pattern in which biophysical accessibility, not merely institutional design, determines which forest products a community can viably commercialize. Comparative assessments of conventional, certified, and community timber management across the tropics find that community operations are systematically more exposed to terrain- and distance-related cost escalation than industrial concessionaires (Burivalova *et al*., 2017), while cost-benefit modelling of Cameroonian CFs shows that profitability is highly sensitive to exactly these extraction and transport costs (Beauchamp & Ingram, 2011). Mount Oku's experience in Cameroon's North West Region, where community forest management has similarly pivoted toward NTFP- and honey-centered livelihoods on steep highland terrain, offers a domestic parallel to Woteva's adaptation (Foncha & Ewule, 2020), while Sri Lanka's intermediate-zone community forests illustrate that NTFP-centred livelihood strategies can deliver measurable household livelihood improvement even where large-scale timber commercialization is not the primary revenue source (Ekanayake *et al*., 2022).

Third, WCF's governance challenges and comparative strengths echo a global pattern in community-based natural resource management whereby devolution of formal rights does not automatically translate into equitable outcomes unless accompanied by robust downward accountability, technical capacity, and reliable market linkages for high-value forest products. Nepal's community forestry programme, long regarded internationally as a relatively successful model, illustrates both the promise and the limits of this logic: three decades of experience show that positive livelihood outcomes depend heavily on the strength of downward accountability to Community Forest User Groups and on formal rules mandating that a substantial share of revenue be reinvested in community development, yet recent assessments report that once-active Nepalese forest user groups have become increasingly passive as socio-economic conditions, including labour outmigration, have changed. Cameroon's community forests, including Woteva, lack an equivalent statutory revenue-allocation rule, leaving benefit distribution more dependent on the quality of local leadership than on binding national policy (Piabuo *et al*., 2018). Woteva's comparatively favorable outcomes therefore appear to derive substantially from locally embedded good governance practice rather than from any national policy safeguard, a pattern that mirrors findings from Latin American and Southeast Asian community forestry more broadly, where the presence of legitimate, accountable local institutions and "positive elites" has repeatedly been identified as decisive in determining whether devolved forest rights translate into genuine community benefit (Piabuo *et al*., 2018). At the global scale, this case also underscores the stakes involved: forests are estimated to be worth over USD 150 trillion worldwide and to directly support the livelihoods of approximately 1.6 billion people, or roughly a quarter of the global population (United Nations, 2023), making the granular, community-level governance and resource-use dynamics documented here relevant well beyond Woteva itself.

4.9 Implications for Sustainable Forest Management

Several implications follow from these integrated findings. First, WCF's sectoral zoning and 25-year rotational cycle provide a practical, replicable template for aligning statutory community forest agreement periods with an internally consistent sustainable-yield harvesting schedule, but the persistent non-operation of the timber sector shows that such planning is necessary but not sufficient: without capital investment in appropriate low-impact extraction technology (e.g., mobile sawmilling) suited to steep terrain, the nominal timber sector will remain economically dormant regardless of how well it is zoned on paper (WECONS, 2026; Burivalova *et al*., 2017).

Second, the persistence of unpaid balances from *Prunus africana* transactions highlights the continued vulnerability of community forest revenue to buyer opportunism and weak contract enforcement, a long-standing feature of the Mount Cameroon *Prunus* trade (Ewusi & Acworth, 2001). Strengthening formal sales contracts, exploring direct market linkages, and diversifying NTFP commercialization would reduce this exposure and stabilize household income, complementing the livelihood diversification already evident in Woteva's honey and eco-tourism activities.

Third, Woteva's comparatively strong equity and participation outcomes, set against its comparatively weak environmental-awareness outcomes, indicate that governance support to Cameroonian community forests should not assume that strengths in one governance dimension automatically

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generalize to others. Targeted investment in environmental education, delivered through the same NGO and civil-society channels credited with awareness gains elsewhere in the South West Region, could usefully complement Woteva's already-functional accountability mechanisms (Piabuo *et al*., 2018).

Fourth, the integration of customary institutions — chieftaincy, matrilineal succession, ancestor-linked cosmology, and the Chief's dual role as Forest Management Officer — into the forest's day-to-day governance appears to function as a stabilizing, legitimacy-conferring mechanism that merits explicit recognition, rather than marginalization, within Cameroon's statutory community forestry framework, consistent with recommendations emerging from research on Bakweri traditional beliefs (Monono *et al*., 2016; Nkemnyi *et al*., 2016) and on endogenous institutional compliance in Cameroon's Western Highlands (Kimengsi & Giessen, 2024).

Finally, WCF illustrates that resource characteristics, livelihood strategy, and governance quality should be assessed as an integrated system rather than as separate policy domains. Terrain-constrained timber economics forced livelihood diversification in Woteva; that diversification, combined with a hybrid customary-statutory governance structure, appears in turn to have reduced (though not eliminated) the community's exposure to the elite capture that afflicts many other Cameroonian community forests. This integrated reading suggests that national community forestry policy and donor support programmes would benefit from routinely assessing biophysical accessibility alongside institutional design when diagnosing why individual community forests over- or under-perform national averages.

5. CONCLUSION AND RECOMMENDATIONS

This study integrated resource, livelihood, and governance dimensions in a single analysis of the Woteva Community Forest in Cameroon's South West Region, drawing on household survey and open-ended questionnaire data collected through rapid random sampling and participatory rural appraisal. WCF supports a small, predominantly indigenous Bakweri community through a diversified livelihood portfolio built around NTFPs, apiculture, and nascent eco-tourism, organised across three functional sectors under a 25-year rotational management plan. Formal timber exploitation remains non-operational because of the forest's rugged, high-slope terrain, a constraint corroborated by global evidence on terrain-driven logging cost escalation, and this constraint has, in turn, shaped both the community's livelihood strategy and, plausibly, its comparatively favourable governance outcomes by limiting the scale of rent available for elite capture. Governance combines a hereditary, matrilineally succeeded chieftaincy and Traditional Council with statutory Forest Management, Village Development, and Eco-Tourism committees, and comparative evidence situates Woteva among the better-performing community forests in Fako Division on measures of equity and participation, although environmental awareness remains comparatively underdeveloped.

We recommend that: (i) MINFOF and technical partners assess the feasibility of subsidized, appropriately scaled mobile sawmilling to activate Sector 1 without triggering the cost and elite-capture risks associated with conventional mechanized logging; (ii) WCF and its partners formalise *Prunus africana* and other NTFP sales contracts to reduce payment-default risk; (iii) civil-society and government sensitization programs prioritize Woteva for environmental-awareness training to close the gap identified relative to neighboring CFs; and (iv) Cameroon's statutory community forestry framework explicitly recognize, rather than sideline, functioning customary governance structures of the kind documented in Woteva, consistent with converging evidence from Bakweri traditional-belief research and Western Highlands institutional-compliance research. More broadly, the study suggests that sustainable community forest management outcomes are best understood, diagnosed, and supported as the product of interacting resource, livelihood, and governance systems rather than as three separate policy problems, a conclusion with relevance well beyond Woteva to terrain-constrained community forests across Cameroon, Africa, and the wider tropics.

DECLARATIONS

Conflict of Interest: The authors declare no conflict of interest.

Authors' Contributions

This work was carried out in collaboration among all authors. Authors PEN, LSN, KPB and NES were responsible for conceptual contributions and research design. Authors PEN and NES were responsible for field survey. Author PEN is the principal researcher and wrote the manuscript. All authors read and approved the final manuscript.

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