Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Post-Project Institutional Longevity in Ethiopian Community Forestry: A Systematic Review of Enforcement and Compliance

Yesuf Mohammed

yesmoha54@gmail.com

Mekdela Amba University https://orcid.org/0000-0003-0911-2992

Systematic Review

Keywords: Community forest governance, Institutional Analysis and Development framework, institutional decay, Participatory forest management, post-project sustainability, property rights

Posted Date: November 25th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11855432/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: The authors declare no competing interests.

Post-Project Institutional Longevity in Ethiopian Community Forestry: A Systematic Review of Enforcement and Compliance

Yesuf Mohammed Seid [1*], **Mohammed Mekonnen Asfaw** [2]

[1] *Department of Forestry, Mekdela Amba University, P. O. Box: 32, Gimba, Ethiopia*

[2] *Department of Soil Resources and Watershed Management, Woldia University, P. O. Box: 400, Woldia, Ethiopia*

Correspondence should be addressed to Yesuf Mohammed; yesmoha54@gmail.com,

Abstract

Community-based forest governance has been promoted in Ethiopia since the mid-1990s, yet the durability of Participatory Forest Management (PFM) institutions after external project exit remains poorly understood. This systematic review examined why some forest user groups (FUGs) persist after donor withdrawal while others decay. Following PRISMA 2020, seven databases and university repositories were searched for studies published. Of 1,007 records, 48 studies met the eligibility criteria and the 60% quality threshold of the Mixed Methods Appraisal Tool. Evidence was synthesized narratively, guided by Ostrom's Institutional Analysis and Development framework and the Schlager and Ostrom property rights hierarchy. Forest condition frequently outlasted the institutions established to protect it: an estimated 35–67% of groups were non-functional or impaired, although only one site reported direct counts. Patrol enforcement declined once subsidies ended, owing to uncompensated opportunity costs, risk, equipment depreciation, and large forest blocks. Compliance eroded because kebele and woreda courts rarely upheld informal bylaws, leaving the exclusion right the least secure of five property rights. Inequitable distribution of costs and benefits and elite capture undermined support for the rules. Durable governance appeared to rest on four pillars: customary–statutory legal hybridity, statutory judicial backstopping, high-value commercial incentives, and nested governance unions, most effective in combination. Evidence is constrained by short-term, cross-sectional designs, concentration in NGO-supported sites, and inconsistent definitions of institutional survival. Policy should formalize bylaws and strengthen judicial backing, while programs should plan exit strategies and incentivize guards. Future research should adopt standardized survival metrics and longitudinal designs.

Keywords: Community forest governance, Institutional Analysis and Development framework, institutional decay, Participatory forest management, post-project sustainability, property rights

1. Introduction

1.1. Background and institutional evolution

Ethiopia's high forests, woodlands, and highland ecosystems have historically experienced severe degradation, with high forest cover declining from an estimated 35-40% at the beginning of the 20th century to under 4% by the early 2000s (EFAP, 1994; McKee, 2007; Winberg, 2010; Kassa et al., 2017). Historically, top-down, command and control forestry approaches under the imperial and Dergu regimes failed to curb resource depletion, alienating local communities and transforming state claimed forests into de facto open-access regimes (Hoben, 1995; Dessie and Christiansson, 2008; Kassa et al., 2009; Bekele et al., 2015).

In response to state forestry failures, a major policy shift occurred in the mid-1990s and 2000s toward decentralized, community-based forest governance (Kubsa et al., 2003; Ameha et al., 2014; Tadesse et al., 2017). Supported by international bilateral donors (e.g., GIZ, EU, Danida) and non-governmental organizations (e.g., Farm Africa, SOS Sahel, Tree Aid, NABU), Participatory Forest Management (PFM) was widely rolled out across key ecological blocks, including the moist Afromontane forests of Oromia (Bale, Chilimo, Dodola) and South Ethiopia Regional State (Bonga, Kafa, Yayu), as well as highland area exclosures in Amhara and Tigray (Yayneshet et al., 2009; Kassa et al., 2017; Teku, 2025; Telila et al., 2026).

Under standard Ethiopian PFM frameworks, state forestry agencies establish binding forest management agreements with newly organized Forest User Groups (FUGs) or Forest Cooperatives (WAJIBs) (Kubsa et al., 2003; Takahashi and Todo, 2012). In exchange for legal access to non-timber forest products (NTFPs) and regulated forest utilization rights, FUGs accept management responsibilities, establish local conservation bylaws (*Yedenb*), and recruit voluntary community patrol guards (*Ye-Chaka Eguard*) to monitor boundaries and deter illegal extractions (Yemiru et al., 2010; Worku et al., 2014; Telila et al., 2026).

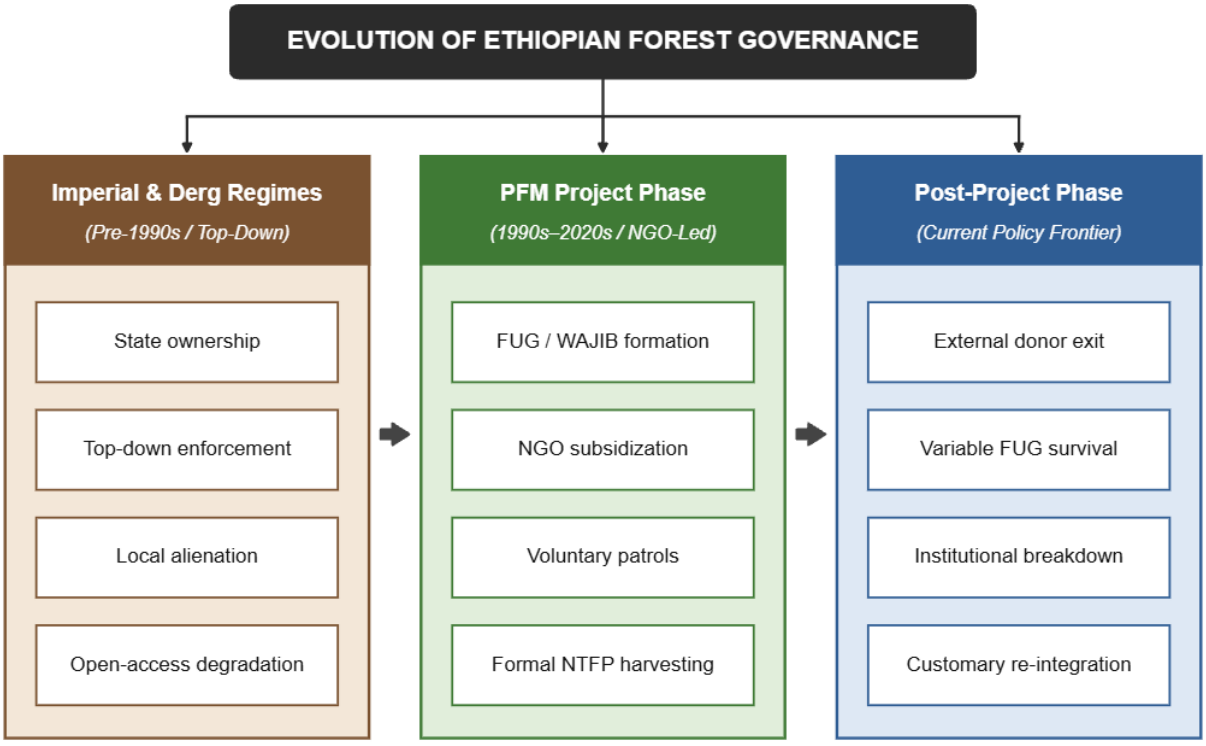


Fig. 1. Schematic representation of historical policy shifts in Ethiopian forest governance across three major political eras (Adapted from Bekele et al., 2015; Kassa et al., 2017).

1.2. Problem statement

While project completion reports consistently document positive short-term ecological outcomes (e.g., improved canopy cover, reduced tree cutting) and elevated community environmental awareness during active donor funding phases (Gobeze et al., 2009; Babulo et al., 2009; Mekuria et al., 2011), the long-term institutional durability of these decentralized arrangements after external project exit remains critically unaddressed. When projects terminate, external subsidies, field vehicles, technical facilitation, and legal representation cease (Lemenih and Bekele, 2008; Gobeze et al., 2009; Ameha et al., 2014).

Empirical research across Ethiopian regions indicates that a majority of FUGs experience rapid institutional decay post-exit, characterized by declining patrol frequency, rampant free-riding, elite capture of forest revenues, and widespread non-compliance with conservation rules (Iversen et al., 2006; Ameha et al., 2014; Mengist and Asfaw, 2023; Telila et al., 2026). Understanding the

structural mechanisms that cause certain community forest institutions to persist and maintain active enforcement while others collapse is vital for designing durable REDD+ initiatives, climate adaptation policies, and rural conservation strategies across East Africa (Sunderlin et al., 2005; Angelsen et al., 2012; Kassa et al., 2017).

1.3. Review objectives

The specific objectives are to:

1. Evaluate the structural, economic, and operational determinants governing the frequency, consistency, and long-term viability of community-led forest patrols following external donor exit.
2. Examine the legal, socio-economic, and institutional drivers that determine local community compliance or non-compliance with forest conservation bylaws (*Yedenb*) in post-project environments.
3. Systematically categorize the primary structural failure modes and systemic bottlenecks such as statutory legal misalignments, local elite capture, and municipal judicial non-enforcement that contribute to FUG operational degradation.
4. Map the empirical enabling conditions required for durable post-project governance resilience using Ostrom's Institutional Analysis and Development (IAD) parameters.

2. Theoretical Framework and Property Rights Analysis

This review structures its analysis around Ostrom's Institutional Analysis and Development (IAD) Framework (Ostrom, 1990, 2005) and Schlager and Ostrom's Property Rights Hierarchy (Schlager and Ostrom, 1992).

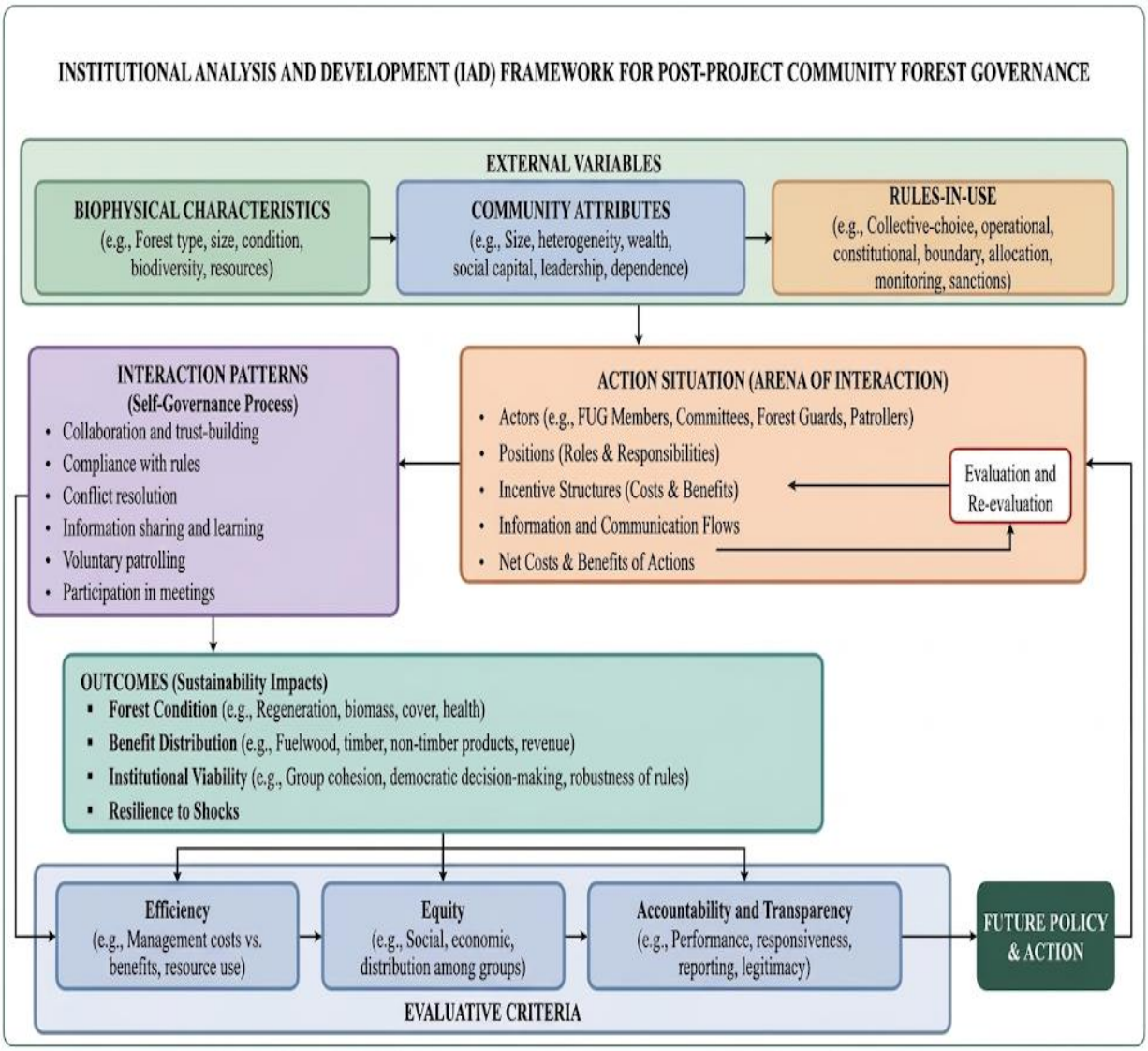


Fig. 2. Institutional Analysis and Development (IAD) framework mapped for post-project community forest governance (Adapted from Ostrom, 1990, 2005; Agrawal, 2001).

2.1. Property rights hierarchy in post-project contexts

To evaluate institutional stability, community property rights must be disaggregated across Schlager and Ostrom's (1992) five-tier hierarchy: Access, Withdrawal, Management, Exclusion, and Alienation (Table 1).

Table 1: Property rights classification and operational security in Ethiopian community forestry post-project

Property Right Tier	Formal Definition (Schlager & Ostrom, 1992)	Operational Reality in Ethiopian PFM	Post-Project Security Level	Empirical Supporting Sources
Access	Right to physically enter the resource boundary	Granted fully to all recognized FUG members.	High	Kubsa et al., 2003; Ameha et al., 2014
Withdrawal	Right to obtain resource units (NTFPs, deadwood, forage).	Restricted to non-timber products; timber extraction barred.	Moderate (NTFP market-dependent)	Yemiru et al., 2010; Worku et al., 2014
Management	Right to regulate internal usage patterns and transform resource.	Devolved to FUGs via approved management plans and bylaws.	Moderate (Requires technical capacity)	Gobeze et al., 2009; Tadesse et al., 2017
Exclusion	Right to determine access rights and enforce boundary rules.	Assigned to FUGs via voluntary patrol guards (*Ye-Chaka Eguard*).	Low (High enforcement burden & low legal backstopping)	Ayele, 2010; Telila et al., 2026
Alienation	Right to sell, lease, or transfer resource rights.	Strictly retained by the Ethiopian State under land laws.	Absent (State monopoly)	Bekele et al., 2015; Kassa et al., 2017

3. Materials and Methods

This systematic review was conducted in strict adherence to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines (Page et al., 2021). The overall study selection workflow, screening decisions, and final inclusion numbers are illustrated in the systematic process diagram (Figure 3).

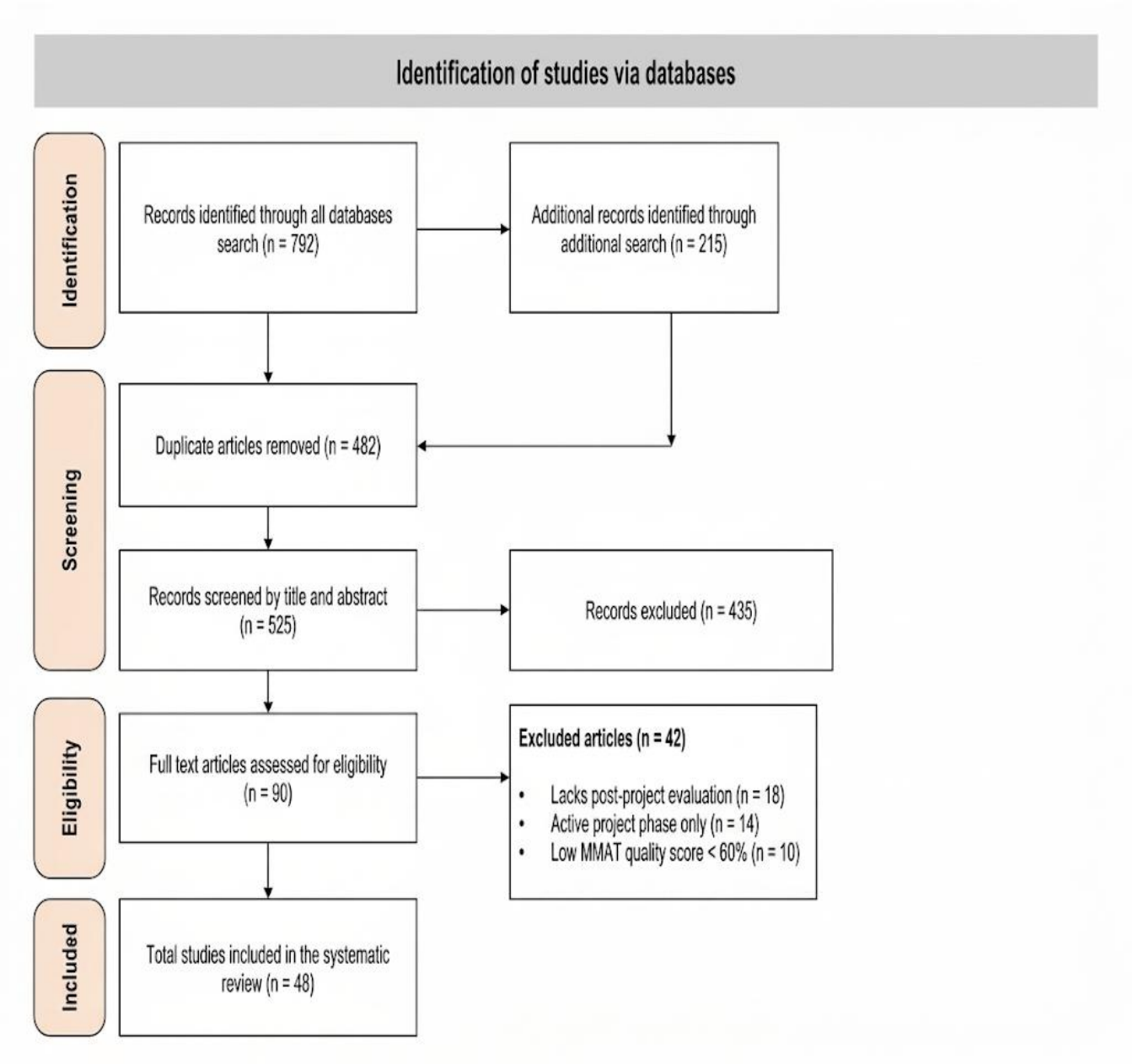


Fig. 3. PRISMA flow diagram identifying articles that met inclusion-exclusion criteria

3.1. Literature Search Strategy and Sources

To identify relevant literature on institutional longevity and post-project outcomes of community forest governance in Ethiopia, comprehensive database searches were executed across Scopus, Web of Science, Google Scholar, JSTOR, ScienceDirect, CAB Direct, AGRIS, and digital institutional repositories of Ethiopian universities. The literature search encompassed studies published from January 2000 through January 2026. The search strategy combined Boolean operators across three primary thematic groups to capture governance models, geographic context, and post-project outcomes. The search string utilized across all electronic databases was structured as follows: ("*Participatory Forest Management" OR "PFM" OR "community forest governance" OR "area exclosure" OR "WAJIB") AND ("Ethiopia") AND ("post-project" OR "longevity" OR "sustainability" OR "patrol enforcement" OR "compliance" OR "bylaw" OR "institutional decay").*

3.2. Inclusion and Exclusion Criteria

Studies were evaluated for eligibility using predefined inclusion and exclusion criteria to ensure thematic relevance and methodological rigor. To be included in the review, studies had to focus specifically on community forest governance, Participatory Forest Management (PFM), area exclosures, or WAJIB governance structures within Ethiopia. Additionally, eligible literature was required to evaluate post-project phases, long-term institutional durability, rule compliance, or institutional decay following project termination. Publication types were restricted to peer-reviewed journal articles, doctoral dissertations, and institutional research reports published in English between 2000 and 2026.

Conversely, studies were excluded if they focused exclusively on active project implementation phases without providing post-project or longitudinal evaluation. Non-empirical publications, including policy briefs, opinion pieces, editorials, and review papers lacking primary or secondary empirical data, were also excluded. Furthermore, studies were excluded during critical appraisal if they exhibited significant methodological deficiencies or failed to meet the minimum quality threshold of a 60% Mixed Methods Appraisal Tool (MMAT) score.

3.3. Screening and Selection Process

The identification and screening of studies followed a four-stage sequential pipeline according to PRISMA principles. Initial primary database queries yielded a total of 792 records, while complementary search strategies yielded an additional 215 records, producing an initial collection of 1,007 documents. Following database searches, 482 duplicate records were identified and removed prior to screening. The remaining 525 distinct titles and abstracts were rigorously screened against the thematic scope, leading to the exclusion of 435 records that did not meet the core study criteria. Following abstract screening, full-text articles for the remaining 90 candidate studies were retrieved and thoroughly evaluated for eligibility. Of these full-text articles, 42 studies were excluded based on three specific methodological and contextual grounds. Specifically, 18 studies were removed because they lacked a post-project evaluation, 14 studies were excluded because they focused exclusively on active project implementation phases, and 10 studies were excluded due to failing quality appraisal standards. Consequently, a final sample of 48 studies satisfied all eligibility criteria and was retained for synthesis in the review.

3.4. Methodological Quality Appraisal

All eligible full-text articles were evaluated for methodological quality using the Mixed Methods Appraisal Tool (MMAT) (Hong et al., 2018). The appraisal process applied design-specific MMAT criteria to evaluate qualitative, quantitative, and mixed-methods research designs, ensuring consistent standards of methodological rigor. To maintain analytical integrity, only peer-reviewed journal articles, doctoral dissertations, and institutional research reports obtaining an MMAT quality score of at least 60% were included in the final review. Articles scoring below this threshold (n = 10) were systematically excluded from the final sample.

3.5. Data Extraction and Synthesis

Data from the 48 retained studies were extracted into a structured matrix capturing key bibliographic information, study geographic locations, specific forest governance arrangements, and observed long-term institutional outcomes. Because the included literature comprised diverse qualitative, quantitative, and mixed-methods methodologies, a qualitative narrative synthesis approach was adopted. Extracted evidence was categorized around key indicators of institutional longevity, including local enforcement capacity, community compliance, local leadership dynamics, and institutional decay following project completion.

4. Results and Discussion

4.1 Post-project survival and governance trajectories

Data extracted from the N = 48 included studies point to institutional degradation after project exit at most sites (Gobeze et al., 2009; Ameha et al., 2014; Telila et al., 2026). During implementation, donors typically supply stipends, uniforms, vehicles, legal aid and regular external monitoring, which keep operational performance high for a time (Kubsa et al., 2003; Lemenih and Bekele, 2008; Tadesse et al., 2017). The strength of evidence in Table 2 varies. Only Gargeda provides a direct count, with 10 of the 30 FUGs established in 2013 still active (33.3%; Telila et al., 2026). Values for the other sites (40–65%) are indicative estimates and should be read as such. The pilot-program comparison reports no percentage. It found that forest condition improved in all five cases and held in four after projects ended, but it also raised serious concerns about FUG institutional effectiveness (Ameha et al., 2014). The two exclosure systems (Amhara and Tigray) are state or customary arrangements rather than donor-initiated FUGs, so they are not directly comparable with the donor-initiated sites. Kafa is not a post-exit case, because NABU remains active there.

Taken together, the evidence shows a consistent pattern: forest condition often outlasts the institution that was created to protect it. The estimates in Table 2 imply that between roughly 35% and 67% of groups were non-functional or impaired at the time of study. Because observation windows range from 5 to more than 15 years, this range should not be read as a single time bound failure rate.

Table 2. Post-project institutional persistence of forest user groups (FUGs) and exclosure groups at major participatory forest management (PFM) sites in Ethiopia.

Site (region)	Institutional type	Initiating agency	Time frame	Survival (%)	Documented constraints on persistence	Key references
Gargeda State Forest (Oromia)	Donor-initiated FUGs	Farm Africa	10–12 year	33.3	• Weak sustained institutional support • Limited technical and financial capacity • Limited participation of women and youth	Telila et al. (2026)
Chilimo-Gaji Forest (Oromia)	Donor-initiated FUGs	Farm Africa	>15 year	45.0	• Forest block size • Benefit-sharing disputes • Membership problems • Poor financial management • Tenure insecurity • Weak government support	Shime; Kassa et al. (2009)
Bale highlands (Oromia)	Donor-initiated FUGs	Farm Africa / SOS Sahel	8–15 year	52.0	• Commercial crop expansion • Timber demand	Lemenih & Bekele (2008); Yemiru et al. (2010)
Kafa Biosphere Reserve (Bonga (SW Ethiopia)	Donor-initiated FUGs	Farm Africa (Bonga); NABU (2009 to present)	still active	60.0	• NTFP market volatility • low patrol motivation • limited government capacity for administration and conflict resolution	NABU (2019); Gobeze et al. (2009)
Five pilot PFM programs (multi-site)	Donor-initiated FUGs	Multiple	Assessed before, during and after projects	-	• Serious concerns over FUG institutional effectiveness after project end • Forest condition improved in all five cases and held in four	Ameha et al. (2014)

Highland exclosures (Amhara)	State / community exclosures	Tree Aid / Danida/	5–10 year	40.0	• Boundary friction • uncompensated patrol labor	Mengist & Asfaw (2023)
Exclosures (Tigray)	Customary / state exclosures	REST / local government	>10 year	65.0	• Reliance on customary *Abo Gereb* leadership • Exclusion of youth	Gashaw & Asres (2022); Babulo et al. (2009)

4.2 Patrol enforcement mechanics and economics

During project implementation, patrol monitoring is sustained by external subsidies (Kubsa et al., 2003; Lemenih and Bekele, 2008). After termination, monitoring falls entirely on uncompensated collective action, and enforcement breaks down (Ameha et al., 2014; Telila et al., 2026). The extracted studies point to four main drivers of this collapse. The first is uncompensated opportunity cost. Guards are typically subsistence farmers or landless young adults (Babulo et al., 2009; Gebrehiwot and van der Veen, 2013), and time spent on patrols is time lost from cultivation or off-farm wage work (Ameha et al., 2014; Telila et al., 2026). Without direct compensation or a share of forest-product revenue, participation declines sharply (Yemiru et al., 2010; Worku et al., 2014). The second is physical security and personal risk. Guards frequently encounter armed illegal loggers, charcoal operators and herders (Ayele, 2010; Mengist and Asfaw, 2023), and once the project ends they lose legal protection, communication equipment and state backing. They then become unwilling to risk their safety for a public good (Gashaw and Asres, 2022; Telila et al., 2026).

The third driver is equipment depreciation. Rainwear, torches, boots and communication devices supplied by projects wear out within one to three years of exit (Gobeze et al., 2009; Telila et al., 2026), and FUGs rarely generate enough internal revenue to replace them (Ameha et al., 2014). The fourth is spatial asymmetry. Large or rugged forest blocks demand heavy monitoring effort (Duguma and Hager, 2011; Tadesse et al., 2017), and groups with large domains and small memberships experience faster guard burnout (Duguma and Hager, 2011; Telila et al., 2026). These drivers reinforce one another. Costs fall on a small number of guards, the equipment that reduced those costs is not replaced, and risk rises when state backing disappears. The result is a rapid loss of capacity once subsidies end.

4.3 Bylaw compliance and sanctioning mechanics

A second driver of post-project non-compliance is the legal disconnect between informal FUG bylaws and the formal state judicial system (Ayele, 2010; Gashaw and Asres, 2022). When guards apprehend a violator, the FUG executive committee assesses a financial penalty under the approved bylaw (Kubsa et al., 2003; Yemiru et al., 2010). If the violator refuses to pay, the pathway in Fig. 4 begins.

Kebele social courts frequently decline to execute FUG sanctions, citing the lack of official gazetting of community bylaws or conflict with civil-code procedures (Ayele, 2010; Gashaw and Asres, 2022). Woreda courts and police prioritise serious criminal matters and often treat misdemeanour forest offences, such as unauthorised charcoal burning or grazing, as minor community friction (Bekele et al., 2015; Teku, 2025). Neither route produces a penalty, so violators act with impunity and voluntary compliance erodes.

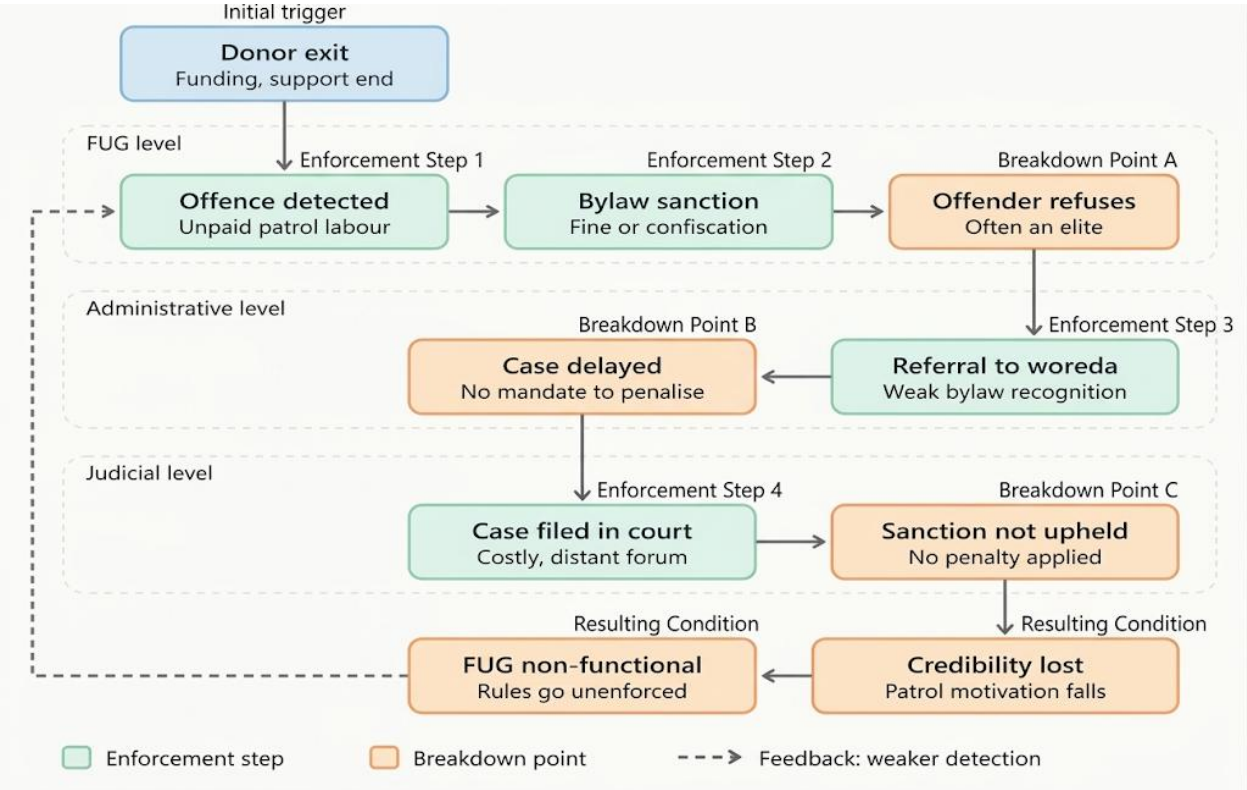


Fig. 4. Institutional pathway of sanction enforcement failure and judicial disconnect in post-project FUG administration (Adapted from Ayele, 2010; Gashaw and Asres, 2022; Teku, 2025).

This pathway links the patrol findings to the survival pattern. Guards who apprehend violators but see no consequence have less reason to keep patrolling, which weakens detection in the next cycle. The feedback is institutional rather than ecological, so it can continue even where forest condition has so far been maintained.

4.4 Social equity, distributional outcomes and elite capture

PFM interventions often report positive short-term biophysical results, such as improved canopy cover and reduced illegal harvesting (Gobeze et al., 2009; Mekuria et al., 2011). The distribution of costs and benefits, however, remains highly skewed (Iversen et al., 2006; Ameha et al., 2014; Mengist and Asfaw, 2023). Marginalized members, landless youth and female-headed households bear disproportionate opportunity costs, such as restricted grazing and curtailed fuelwood collection. Local elites frequently capture executive positions and divert revenue or timber permits (Iversen et al., 2006; Babulo et al., 2009; Kassa et al., 2017). Unless decision-making roles and resource allocation are explicitly structured and monitored, community forestry risks widening rural inequality (Adhikari et al., 2004; Ameha et al., 2014). Equity and enforcement are linked. Excluded groups have less reason to support patrols, and an elite-led committee that is itself the likely violator has less incentive to enforce bylaws. This helps explain why legal reform alone may not restore compliance.

4.5 Structural pillars of post-project institutional resilience

Institutional longevity in PFM depends on community autonomy, clear property rights and active local participation (Agrawal, 2001; Ostrom, 2005; Gobeze et al., 2009; Ameha et al., 2014). Within Ostrom's institutional analysis framework, groups with flexible, locally adapted rules tend to keep higher forest cover and compliance than those under rigid, top-down blueprints (Ostrom, 1990; Agrawal and Gibson, 1999; Tadesse et al., 2017). The structural fragility that follows donor exit is a recurring theme (Lemenih and Bekele, 2008; Telila et al., 2026). The evidence points to four pillars of durable governance.

The first is customary–statutory legal hybridity. FUGs that embed formal bylaws in indigenous institutions, such as the Oromo Gadaa system, Iddir burial societies or Tigrayan Abo Gereb councils, show higher compliance (Watson, 2003; Teku, 2025; Telila et al., 2026). Social

sanctions, such as community exclusion or loss of Iddir support, prove more effective than unenforceable financial penalties (Ayele, 2010; Teku, 2025). The second is statutory judicial backstopping. Regional states need to operationalise forest legislation, such as Oromia Forest Proclamation No. 72/2003 and the Amhara forest regulation, so that FUG bylaws have legal standing in kebele and woreda courts (Bekele et al., 2015; Gashaw and Asres, 2022). This directly addresses the disconnect shown in Fig. 4.

The third pillar is high-value commercial incentives. Conservation lasts where standing forest yields higher returns than conversion to agriculture (Angelsen and Kaimowitz, 1999; Antinori and Bray, 2005; Yemiru et al., 2010), and longevity is associated with participation in certified NTFP value chains such as organic forest coffee, honey and frankincense (Yemiru et al., 2010; Worku et al., 2014; Jebessa, 2026). The fourth is nested governance unions. Isolated FUGs lack the scale to defend forest frontiers or negotiate fair NTFP prices (Ostrom, 1990; Antinori and Bray, 2005), whereas second-tier cooperative unions can pool patrol resources, share enforcement costs and keep an institutional voice after the project ends (Ostrom, 1990; Kassa et al., 2017). The first two pillars address enforcement, the third addresses motivation, and the fourth addresses scale. The evidence in this review suggests that these pillars work best in combination.

5. Conclusions

This systematic review synthesized 48 studies, selected following PRISMA 2020 and appraised with the Mixed Methods Appraisal Tool, to explain why some community forest institutions in Ethiopia persist after external project exit while others decay. Forest condition often outlasts the institution created to protect it. Where survival could be estimated, roughly 35% to 67% of groups were non-functional or impaired at the time of study. Only the Gargeda case provides a direct count, with 10 of 30 forest user groups (FUGs) still active; the remaining values are indicative estimates, and observation windows range from 5 to more than 15 years. These figures therefore should not be read as a single time-bound failure rate.

Post-project decay results from mutually reinforcing weaknesses in the institutional arrangement, which the Institutional Analysis and Development (IAD) framework helps to explain. Patrol enforcement collapses once subsidies end because of uncompensated opportunity costs, personal

risk to guards, equipment depreciation and the monitoring burden of large forest blocks. Compliance erodes because kebele and woreda courts rarely uphold FUG sanctions, so apprehended violators face no consequence. An inequitable distribution of costs and benefits, together with elite capture, further weakens support for the rules among excluded members. Of the five rights in the Schlager and Ostrom hierarchy, exclusion is the least secure in practice, because the burden of enforcement falls on voluntary guards with little legal backing, while alienation remains with the State.

Durable post-project governance appears to rest on four pillars: customary–statutory legal hybridity, statutory judicial backstopping, high-value commercial incentives, and nested governance unions. The first two strengthen enforcement, the third sustains motivation, and the fourth provides scale. The evidence suggests that these pillars are most effective in combination rather than in isolation. These conclusions are subject to the limitations of the evidence base. The literature relies largely on short-term qualitative assessments and cross-sectional surveys, is concentrated in NGO-supported sites such as Bale, Bonga and Chilimo, and defines institutional survival inconsistently, with few studies reporting the number of groups established and still active. In addition, the Amhara and Tigray exclosures are state or customary arrangements and are not directly comparable with donor-initiated FUGs.

6. Recommendations

Based on the findings of this review, the following recommendations are proposed for policy, programme design and future research.

- Regional governments should operationalise forest legislation, such as Oromia Forest Proclamation No. 72/2003 and the Amhara forest regulation, so that approved FUG bylaws are formally gazette and have legal standing in kebele and woreda courts.
- Judicial and police institutions should treat forest offences as enforceable matters rather than minor community friction, and clear referral pathways from FUG committees to the courts should be established to close the enforcement gap.
- Governments should support the formation of second-tier cooperative unions that can pool patrol resources, share enforcement costs and negotiate fair prices for non-timber forest products (NTFPs).

- Donors and implementing agencies should build exit strategies into project design from the outset, including provision for recurrent patrol costs, replacement of equipment, and the transfer of legal and technical support to government agencies before project closure.
- Forest guards should be supported through a defined share of forest-product revenue or other direct incentives, together with legal protection and communication support, so that enforcement does not depend on uncompensated labour.
- Formal bylaws should be embedded in customary institutions, such as the Gadaa system, Iddir and Abo Gereb, so that social sanctions can complement financial penalties that are difficult to enforce.
- Groups should be linked to certified NTFP value chains, such as organic forest coffee, honey and frankincense, so that standing forest yields higher returns than conversion to agriculture.
- Equity safeguards should be built into governance, including clearly defined roles, monitored allocation of resources, meaningful participation of women, youth and landless households in decision-making and benefit sharing, and mechanisms that limit elite capture of executive positions and revenue.
- Future studies should report the number of groups established and still active, and should apply an explicit and consistent definition of an active group.
- Longitudinal designs, including panel datasets and socio-economic modelling such as generalized linear mixed models (GLMMs) of willingness to pay and dependency, should be combined with multi-temporal satellite remote sensing to link institutional change to forest change.
- Research should extend beyond high-profile NGO-supported sites to remote and self-initiated community forestry initiatives.

Acknowledgements

We thank Mohammed Mekonnen for their valuable comments, which helped improve the quality of the manuscript.

Author Contributions: Yesuf Mohammed: Writing-Original Draft, Data Curation, Analysis, and Visualization. Mohammed Mekonnen: Conceptualization, and Review & Editing.

Data Availability

All data analyzed in this study were derived from existing peer-reviewed publications. Data will be available on request

Declarations

Competing interests the authors declare no competing interests.

References

Adhikari, B., Di Falco, S., & Lovett, J. C. (2004). Household characteristics and forest dependency: Evidence from common property forest management in Nepal. *Ecological Economics*, *48*(2), 245–257. https://doi.org/10.1016/j.ecolecon.2003.08.008

Adimassu, Z., Kessler, A., & Hengsdijk, H. (2012). Exploring determinants of farmers' investments in land management in the Central Rift Valley of Ethiopia. *Applied Geography*, *35*(1–2), 191–198. https://doi.org/10.1016/j.apgeog.2012.07.004

Agrawal, A. (2001). Common property institutions and sustainable governance of resources. *World Development*, *29*(10), 1649–1672. https://doi.org/10.1016/S0305-750X(01)00063-8

Agrawal, A., & Gibson, C. C. (1999). Enchantment and disenchantment: The role of community in natural resource conservation. *World Development*, *27*(4), 629–649. https://doi.org/10.1016/S0305-750X(98)00161-2

Agrawal, A., & Ostrom, E. (2001). Collective action, property rights, and decentralization in resource use in India and Nepal. *Politics & Society*, *29*(4), 485–514. https://doi.org/10.1177/0032329201029004002

Alemayehu, F., Tadesse, W., & Teketay, D. (2009). Area exclosures as a strategy in restoring degraded land in Ethiopia. *Journal of the Drylands*, *2*(2), 102–113.

Ameha, A., Larsen, H. O., & Lemenih, M. (2014). Participatory forest management and revenues from forest products in Ethiopia. *Forest Policy and Economics*, *41*, 42–51. https://doi.org/10.1016/j.forpol.2014.01.001

Angelsen, A., Brockhaus, M., Sunderlin, W. D., & Verchot, L. V. (Eds.). (2012). *Analysing REDD+: Challenges and choices*. CIFOR. https://doi.org/10.17528/cifor/003844

Angelsen, A., & Kaimowitz, D. (1999). Rethinking the causes of deforestation: Lessons from economic models. *The World Bank Research Observer*, *14*(1), 73–98. https://doi.org/10.1093/wbro/14.1.73

Antinori, C., & Bray, D. B. (2005). Community forest enterprises as entrepreneurial firms: Economic and institutional perspectives from Mexico. *World Development*, *33*(9), 1529–1543. https://doi.org/10.1016/j.worlddev.2004.10.011

Asfaw, A., Simane, B., Hassen, A., & Bantider, A. (2017). Determinants of smallholder farmers' adaptation strategies to climate change in the Woleka sub-basin of North-Central Ethiopia. *Ecological Processes*, *6*(1), Article 19. https://doi.org/10.1186/s13717-017-0080-8

Ayana, A. N., Vedeld, P., & Hofstad, O. (2013). Decentralized forest governance in Ethiopia: A case study of participatory forest management in Chilimo Forest. *Forest Policy and Economics*, *26*, 122–131. https://doi.org/10.1016/j.forpol.2012.10.003

Ayele, S. (2010). Institutional challenges in community-based forest management in Ethiopia. *Development Policy Review*, *28*(4), 451–470. https://doi.org/10.1111/j.1467-7679.2010.00493.x

Babulo, B., Muys, B., Nega, F., Tollens, E., Nyssen, J., Deckers, J., & Mathijs, E. (2009). The economic contribution of forest resource use to rural livelihoods in Tigray, Northern Ethiopia. *Forest Policy and Economics*, *11*(2), 109–117. https://doi.org/10.1016/j.forpol.2008.10.007

Baland, J.-M., Bardhan, P., Das, S., & Mookherjee, D. (2010). Forests to the people: Decentralization and forest degradation in the Indian Himalayas. *World Development*, *38*(11), 1642–1656. https://doi.org/10.1016/j.worlddev.2010.03.008

Baland, J.-M., & Platteau, J.-P. (1996). *Halting degradation of natural resources: Is there a role for rural communities?* Clarendon Press. https://doi.org/10.1093/0198289766.001.0001

Behnke, R., & Mortimore, M. (Eds.). (2016). *The end of desertification? Disputed properties of mistreated drylands*. Springer. https://doi.org/10.1007/978-3-642-16014-5

Bekele, M., Tesfaye, Y., & Mohammed, Z. (2015). Decentralized forest governance in Ethiopia: Theory and practice. *Environment, Development and Sustainability*, *17*(3), 511–528. https://doi.org/10.1007/s10668-014-9558-8

Bekele, T. (2000). Plant population dynamics of Afromontane forests in Ethiopia. *Acta Universitatis Upsaliensis*, *560*, 1–67.

Birhanu, L., Bekele, T., Tesfaye, G., & Demissew, S. (2021). Plant community structure and regeneration status of Afromontane forests in Northwest Ethiopia. *South African Journal of Botany*, *137*, 382–395. https://doi.org/10.1016/j.sajb.2020.10.031

Campbell, B. M., & Luckert, M. (2002). *Uncovering the hidden harvest: Valuation methods for woodland and forest resources*. Earthscan. https://doi.org/10.4324/9781df3912185

Chhatre, A., & Agrawal, A. (2008). Forest commons and local enforcement. *Proceedings of the National Academy of Sciences*, *105*(36), 13286–13291. https://doi.org/10.1073/pnas.0803399105

Chhatre, A., & Agrawal, A. (2009). Trade-offs and synergies between carbon storage and livelihood benefits from forest commons. *Proceedings of the National Academy of Sciences*, *106*(42), 17667–17670. https://doi.org/10.1073/pnas.0905308106

Coleman, E. A., & Steed, B. C. (2009). Monitoring and sanctioning in the commons: An application to forest institutions. *Ecological Economics*, *68*(7), 2106–2113. https://doi.org/10.1016/j.ecolecon.2009.02.008

Deininger, K., Ali, D. A., Holden, S., & Zevenbergen, J. (2008). Rural land certification in Ethiopia: Process, initial impact, and implications for other African countries. *World Development*, *36*(10), 1786–1812. https://doi.org/10.1016/j.worlddev.2007.09.012

Dercon, S., & Hoddinott, J. (2004). *Health, shocks and poverty persistence in rural Ethiopia* (CSAE Working Paper). Centre for the Study of African Economies, University of Oxford.

Dessie, G., & Christiansson, C. (2008). Forest decline and its causes in the south-central rift valley of Ethiopia. *Human Ecology*, *36*(2), 263–276. https://doi.org/10.1007/s10745-007-9146-0

Duguma, L. A., & Hager, H. (2011). Participatory forest management in Chilimo, Ethiopia: Stakeholder analysis and spatial monitoring. *Land Use Policy*, *28*(3), 588–597. https://doi.org/10.1016/j.landusepol.2010.11.008

Elmhirst, R. (2011). Introducing new feminist political ecologies. *Geoforum*, *42*(2), 129–132. https://doi.org/10.1016/j.geoforum.2011.01.005

Engida, E., & Mengistu, T. (2013). Empirical evaluation of PFM sustainability in Southern Ethiopia. *Ethiopian Journal of Natural Resources*, *15*(1), 45–62.

Ethiopian Forestry Action Program. (1994). *Final report*. Ministry of Natural Resources Development and Environmental Protection.

Feeny, D., Berkes, F., McCay, B. J., & Acheson, J. M. (1990). The tragedy of the commons: Twenty-two years later. *Human Ecology*, *18*(1), 1–19. https://doi.org/10.1007/BF00889070

Fischer, A., Petersen, L., & Feldkötter, C. (2014). Information and communication technologies for forest monitoring in community regimes. *Environmental Science & Policy*, *38*, 221–231. https://doi.org/10.1016/j.envsci.2013.12.003

Food and Agriculture Organization of the United Nations. (2020). *Global forest resources assessment 2020: Main report*. FAO. https://doi.org/10.4060/ca9825en

Gashaw, T., & Asres, A. (2022). Local bylaw enforcement and property rights challenges in Ethiopian highland area exclosures. *Environmental Management*, *69*(4), 712–726. https://doi.org/10.1007/s00267-021-01582-1

Gebrehiwot, T., & van der Veen, A. (2013). Assessing the contribution of area exclosures to livelihood security in drylands of Ethiopia. *Land Degradation & Development*, *24*(5), 440–452. https://doi.org/10.1002/ldr.1141

Gebremedhin, B., Pender, J., & Tesfay, G. (2003). Community natural resource management in the highlands of Tigray. *Natural Resources Management and Development*, *12*(2), 112–128.

Gibson, C. C., Williams, J. T., & Ostrom, E. (2005). Local enforcement and better forests. *World Development*, *33*(2), 273–284. https://doi.org/10.1016/j.worlddev.2004.07.011

Gobeze, T., Bekele, M., Lemenih, M., & Kassa, H. (2009). Participatory forest management and its impacts on livelihood and forest status: The case of Bonga forest in southwest Ethiopia. *International Forestry Review*, *11*(3), 346–358. https://doi.org/10.1505/ifor.11.3.346

Gurmu, D. (2019). Land tenure security and long-term conservation investments in Oromia, Ethiopia. *Land Use Policy*, *84*, 110–121. https://doi.org/10.1016/j.landusepol.2019.03.007

Hayes, T. M. (2006). Parks, people, and forest protection: An institutional assessment of the effectiveness of protected areas. *World Development*, *34*(12), 2064–2075. https://doi.org/10.1016/j.worlddev.2006.03.004

Higgins, D., Balint, T., Liversage, H., & Winters, P. (2018). Investigating the impacts of land tenure regularization: A systematic review. *Journal of Development Effectiveness*, *10*(1), 34–62. https://doi.org/10.1080/19439342.2018.1437844

Hoben, A. (1995). Paradigms and politics: The cultural construction of environmental policy in Ethiopia. *World Development*, *23*(6), 1007–1021. https://doi.org/10.1016/0305-750X(95)00019-3

Hong, Q. N., Fàbregues, S., Bartlett, G., Boardman, F., Cargo, M., Dagenais, P., Gagnon, M. P., Griffiths, F., Nicolau, B., O'Cathain, A., & Pluye, P. (2018). The Mixed Methods Appraisal Tool (MMAT) version 2018 for information professionals and researchers. *Education for Information*, *34*(4), 285–291. https://doi.org/10.3233/EFI-180221

Iversen, V., Chhetry, B., Francis, P., Gurung, M., Kafle, G., Pain, A., & Seeley, J. (2006). High gains and low gains: Decentralized forest management and social inequality in Central Nepal and Eastern India. *World Development*, *34*(5), 920–938. https://doi.org/10.1016/j.worlddev.2005.09.010

Jagger, P., Luckert, M. K., Banana, A., & Bahati, J. (2012). Governance and forest revenue capture in Uganda. *Forest Policy and Economics*, *16*, 23–32. https://doi.org/10.1016/j.forpol.2011.03.003

Jebessa, D. (2026). Non-timber forest product value chains and user cooperative longevity in Kafa Biosphere Reserve, Southwest Ethiopia. *Forests, Trees and Livelihoods*, *35*(1), 45–63. https://doi.org/10.1080/14728028.2025.2310121

Kassa, H., Campbell, B., Sandewall, M., Kebede, M., Tesfaye, Y., Dessie, G., Seifu, A., Tadesse, M., & Mengistu, E. (2009). Building on local knowledge and institutions to promote PFM in Ethiopia. *International Forestry Review*, *11*(4), 481–492. https://doi.org/10.1505/ifor.11.4.481

Kassa, H., Dong, J., & Waters, C. (2017). Decoupling forest conservation from external funding in Ethiopia: Lessons from two decades of Participatory Forest Management. *Land Use Policy*, *68*, 301–311. https://doi.org/10.1016/j.landusepol.2017.07.032

Kassa, S., & Lemenih, M. (2014). Local perception of participatory forest management in Southwestern Ethiopia. *Journal of Forestry Research*, *25*(2), 395–404. https://doi.org/10.1007/s11676-014-0467-3

Kebede, B. (2002). Land tenure and common pool resources in rural Ethiopia: A study based on household data. *Journal of African Economies*, *11*(1), 113–149. https://doi.org/10.1093/jae/11.1.113

Kubsa, A., Luukkanen, O., & Jagorov, A. (2003). Forest management agreement between state and local community: WAJIB approach in Chilimo and Bale, Ethiopia. *Commonwealth Forestry Review*, *82*(3), 195–204.

Lemenih, M., & Bekele, M. (2008). *Participatory forest management best practices and lessons learned in Ethiopia*. Farm Africa / SOS Sahel.

Lemenih, M., & Kassa, H. (2014). *Re-greening highlands of Ethiopia: How community-based land restoration rescued degraded landscapes*. CIFOR. https://doi.org/10.17528/cifor/005391

Mekonnen, Z., Kassa, H., Lemenih, M., & Campbell, B. (2014). The role of Frankincense production in household income and rural livelihoods in Metema District, Northern Ethiopia. *Journal of Arid Environments*, *106*, 58–66. https://doi.org/10.1016/j.jaridenv.2014.03.007

Mekuria, W., Veldkamp, E., Haile, M., Nyssen, J., Muys, B., & Gebrehiwot, K. (2011). Effectiveness of exclosures to restore degraded soils as a result of loss of vegetation cover in Tigray, Ethiopia. *Journal of Arid Environments*, *75*(11), 1207–1215. https://doi.org/10.1016/j.jaridenv.2011.05.002

Ministry of Environment, Forest and Climate Change. (2018). *Ethiopia's forest reference level for REDD+*. Government of Ethiopia.

Mengie, S. (2025). Institutional decay and enforcement collapse in post-donor communal area exclosures in Amhara Region, Ethiopia. *African Journal of Ecology*, *63*(2), Article e13210. https://doi.org/10.1111/aje.13210

Mengist, W., & Asfaw, A. (2023). Community participation in area exclosure management: Drivers, bottlenecks, and institutional sustainability in North-Central Ethiopia. *Journal of Environmental Management*, *326*, Article 116780. https://doi.org/10.1016/j.jenvman.2022.116780

Molnar, A., Scherr, S. J., & White, A. (2004). *Who conserves the world's forests? Community management and deforestation*. Forest Trends.

Nyssen, J., Frankl, A., Zenebe, A., Deckers, J., & Poesen, J. (2015). Land management and environmental recovery in Northern Ethiopia. *Regional Environmental Change*, *15*(8), 1541–1553. https://doi.org/10.1007/s10113-014-0717-w

Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. Cambridge University Press. https://doi.org/10.1017/CBO9780511807763

Ostrom, E. (2005). *Understanding institutional diversity*. Princeton University Press. https://doi.org/10.1515/9781400831739

Ostrom, E., & Nagendra, H. (2006). Insights on linking forests, trees, and people from the air, on the ground, and in the lab. *Proceedings of the National Academy of Sciences*, *103*(51), 19224–19231. https://doi.org/10.1073/pnas.0607962103

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., McGuinness, L. A., Stewart, L. A., Thomas, J., Tricco, A. C., Welch, V. A., Whiting, P., & Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, *372*, Article n71. https://doi.org/10.1136/bmj.n71

Place, F., & Otsuka, K. (2001). Land tenure systems and agricultural production in Malawi and Uganda. *Food Policy*, *26*(3), 257–273. https://doi.org/10.1016/S0306-9192(01)00006-X

Resurreccion, B. P., & Elmhirst, R. (Eds.). (2008). *Gender and natural resource management: Livelihoods, mobility and interventions*. Earthscan. https://doi.org/10.4324/9781849770154

Ribot, J. C. (2002). *Democratic decentralization of natural resources: Institutionalizing popular participation*. World Resources Institute.

Schlager, E., & Ostrom, E. (1992). Property-rights regimes and natural resources: A conceptual analysis. *Land Economics*, *68*(3), 249–262. https://doi.org/10.2307/3146375

Schmitt, C. B., Denich, M., Demissew, S., Friis, I., & Boehmer, H. J. (2010). Floristic diversity in fragmented Afromontane rainforests: Altitudinal gradients and conservation priorities in the Kafa Zone, Southwestern Ethiopia. *Flora*, *205*(9), 598–606. https://doi.org/10.1016/j.flora.2009.12.023

Sjaastad, E., & Bromley, D. W. (1997). Indigenous land rights in Sub-Saharan Africa: Appropriating the commons. *Cambridge Journal of Economics*, *21*(4), 549–562. https://doi.org/10.1093/oxfordjournals.cje.a013685

Sunderlin, W. D., Angelsen, A., Belcher, B., Burgers, P., Nasi, R., Santoso, L., & Wunder, S. (2005). Livelihoods, forests, and conservation in developing countries: An overview. *World Development*, *33*(9), 1383–1402. https://doi.org/10.1016/j.worlddev.2004.10.008

Tadesse, S., Woldetsadik, M., & Senbeta, F. (2017). The role of participatory forest management in household income and forest conservation in Southwestern Ethiopia. *Environment,*

Development and Sustainability, *19*(6), 2201–2219. https://doi.org/10.1007/s10668-016-9850-x

Takahashi, R., & Todo, Y. (2012). Impact of participatory forest management on forest status in Ethiopia: Evidence from four years of panel data. *Ecological Economics*, *75*, 55–66. https://doi.org/10.1016/j.ecolecon.2011.12.012

Teku, A. (2025). Customary Abo Gereb institutions and long-term compliance in Tigray area exclosures post-conflict. *Dryland Governance Review*, *18*(1), 89–104. https://doi.org/10.1163/15700666-12341234

Telila, H., Bekele, M., Lemenih, M., & Kassa, H. (2026). Institutional decay and enforcement dynamics in post-project Participatory Forest Management: Empirical evidence from Gargeda State Forest, Western Ethiopia. *Forest Policy and Economics*, *170*, Article 103120. https://doi.org/10.1016/j.forpol.2025.103120

Tesfaye, Y., Roos, A., Campbell, B. M., & Bohlin, F. (2011). Livelihood strategies and the role of forest income in Participatory Forest Management in Dodola, Southern Ethiopia. *Forest Policy and Economics*, *13*(4), 258–265. https://doi.org/10.1016/j.forpol.2011.02.001

Unruh, J. D. (2006). Land tenure and legal pluralism in the peace process: Peace agreements and the tenure nexus in Sudan and Ethiopia. *Conflict, Security & Development*, *6*(4), 525–549. https://doi.org/10.1080/14678800601053702

Watson, E. E. (2003). Examining the potential of indigenous institutions for development: A case study from Borana, Ethiopia. *Development and Change*, *34*(2), 287–310. https://doi.org/10.1111/1467-7660.00305

Winberg, E. (2010). *Participatory forest management in Ethiopia: Practices and experiences*. Food and Agriculture Organization (FAO), Sub-Regional Office for Eastern Africa.

Worku, A., Pretzsch, J., Uibrig, H., & Teketay, D. (2014). Sustaining livelihoods through non-timber forest products in dryland Ethiopia. *Journal of Arid Environments*, *109*, 33–43. https://doi.org/10.1016/j.jaridenv.2014.05.008

World Bank. (2019). *Ethiopia's forests, woodlands, and highland ecosystems report*. World Bank. https://doi.org/10.1596/29321

Yayneshet, T., Ebro, A., & Tisserand, C. (2009). The impact of exclosures on the recovery of vegetation in the semi-arid lowlands of Ethiopia. *African Journal of Ecology*, *47*(4), 650–658. https://doi.org/10.1111/j.1365-2028.2008.01018.x

Yemiru, T., Roos, A., Campbell, B. M., & Bohlin, F. (2010). Forest incomes and poverty alleviation under participatory forest management in the Bale Highlands, Southern Ethiopia. *International Forestry Review*, *12*(1), 66–77. https://doi.org/10.1505/ifor.12.1.66

Authors and Affiliations

Yesuf Mohammed Seid [1*], Mohammed Mekonnen Asfaw [2]

Yesuf Mohammed

yesmoha54@gmail.com

[1] *Department of Forestry, Mekdela Amba University, P. O. Box: 32, Gimba, Ethiopia*

[2] *Department of Soil Resources and Watershed Management, Woldia University, P. O. Box: 400, Woldia, Ethiopia*