30×30 Is Not Enough: Indigenous Governance Literature Reveals Conditions for Effective and Equitable Conservation

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Abstract

Achieving 30×30 requires more than expanding conserved areas; it also depends on how conservation is governed. We conducted a global scoping review of 110 empirical studies (2002–2024) involving Indigenous Peoples, examining governance arrangements, governance principles, ecological, social, and cultural outcomes, and thematic overlap with Kunming–Montreal Global Biodiversity Framework (GBF) Targets 1, 3, 14, 21, and 22. Shared governance was the most frequently documented arrangement (64.5%), followed by governance by Indigenous Peoples and local communities (34.5%). Positive outcomes predominated, yet 27.0% of the governance arrangements analyzed were associated with both positive ecological and negative social and/or cultural outcomes. Procedural principles were less consistently documented, particularly fairness (41.8%) and transparency (44.5%); when documented, both co-occurred with high proportions of positive outcomes and comparatively low negative outcomes. Co-occurrence was highest with Targets 22 (94.5%), 21 (90.9%), followed by 3 (88.2%) and 1 (72%), whereas Target 14 was least represented (51.8%). Effective and equitable 30×30 implementation therefore requires attention to decision-making authority, governance principles, and ecological, social, and cultural outcomes, supported by the complementary roles of Targets 1, 14, 21, and 22.

Introduction

The accelerating loss of biodiversity, driven by intensifying anthropogenic pressures, including climate change, is forcing governments, conservation organizations, and researchers to rethink conservation governance (Esmail et al. 2023; CBD 2026). Recognition of Indigenous knowledge and practices has formed part of the Convention on Biological Diversity (CBD) since its adoption in 1992. Article 8(j) addresses the respect, preservation, and maintenance of the knowledge, innovations, and traditional practices of Indigenous and local communities relevant to the conservation and sustainable use of biodiversity, while Article 10(c) addresses customary use of biological resources in accordance with traditional cultural practices compatible with conservation or sustainable use (CBD 1992).

In 2022, the Conference of the Parties to the CBD adopted the Kunming–Montreal Global Biodiversity Framework (GBF), which establishes 23 global targets for 2030. Among these, Target 3 has emerged as the GBF's most prominent and widely recognized political commitment, commonly known as the "30×30" target (Hughes & Grumbine 2023; Reed et al. 2025). It calls for the conservation of at least 30% of terrestrial and inland water areas, and of marine and coastal areas. Beyond spatial coverage, Target 3 requires these areas to be effectively conserved and managed through ecologically representative, well-connected, and equitably governed systems, while recognizing Indigenous and traditional territories and respecting the rights of Indigenous Peoples and local communities (CBD 2022). This mandate places equity at the core of Target 3 implementation. Equity in conservation is commonly examined through three interrelated dimensions: recognitional equity, concerning pre-existing rights, customary tenure, and knowledge systems; procedural equity, concerning meaningful participation, transparency, and accountability; and

distributive equity, concerning the allocation of conservation costs and benefits (Dawson et al. 2018; Franks et al. 2018).

These issues are particularly relevant in Indigenous contexts. Indigenous Peoples manage or hold tenure rights over more than one quarter of the world's terrestrial surface, with substantial overlap with protected areas and ecologically intact landscapes (Garnett et al. 2018). Conservation involving Indigenous Peoples encompasses diverse governance arrangements, ranging from systems grounded in Indigenous institutions and customary authority to shared arrangements involving governments, non-governmental organizations, and other actors (Ban et al. 2019; von der Porten et al. 2019; Armitage et al. 2020). These arrangements differ in how decision-making authority is distributed and exercised, and formal participation does not necessarily imply an effective redistribution of decision-making power (Armitage et al. 2020). Their growing recognition in conservation research and practice also reflects increasing attention to the limitations of exclusionary conservation models that have restricted rights, customary practices, and access to resources (Méndez-López et al. 2014; Armitage et al. 2020; Esmail et al. 2023).

Beyond governance arrangements, understanding conservation governance also requires examining how decisions are made. Good governance frameworks identify principles such as legitimacy, accountability, inclusivity, transparency, knowledge co-production, and social-ecological fit as relevant dimensions for assessing governance quality and examining its relationship with conservation outcomes (Izurieta et al. 2011; Armitage et al. 2020; Ayambire et al. 2025). Several of these governance principles are also reflected in provisions of the GBF. Target 21 addresses access to and use of data, information, and knowledge, including traditional knowledge and associated safeguards, while Target 22 addresses effective participation and representation, access to information and justice, and

respect for the rights of Indigenous Peoples and local communities over their lands, territories, resources, and traditional knowledge (CBD 2022). Target 1 incorporates participatory and integrated spatial planning and management that considers biodiversity, while Target 14 promotes the integration of biodiversity into policies, planning processes, and sectors (CBD 2022).

However, empirical evidence examining governance arrangements, governance principles, and conservation outcomes together remains limited and fragmented (Ayambire et al. 2025). A related limitation is also evident in the tools used to assess protected-area effectiveness. In a global review of 2,736 indicators from assessment tools used in more than 180 countries, Corrigan et al. (2018) found that governance dimensions and Indigenous participation were poorly represented: fewer than 7% of the social indicators addressed governance aspects, and only 0.6% explicitly considered Indigenous engagement. To help address this gap, we conducted a global scoping review of empirical conservation research involving Indigenous Peoples, jointly examining governance arrangements, governance principles, reported ecological, social, and cultural outcomes, and their thematic overlap with components of GBF Targets 1, 3, 14, 21, and 22. Specifically, we ask: (i) Which governance arrangements are most frequently documented in the reviewed literature? (ii) What patterns of positive and negative ecological, social, and cultural outcomes are documented in association across different governance arrangements and principles? (iii) What do these patterns imply for implementing Target 3 in relation to Targets 1, 14, 21, and 22?

Methods

Review approach

We conducted a global scoping review of empirical conservation research involving Indigenous Peoples to examine thematic overlap with components of GBF Targets 1, 3, 14, 21, and 22. These targets address spatial planning, area-based conservation, biodiversity mainstreaming, knowledge, participation, rights, and equity (CBD 2022). A scoping review was appropriate because the evidence spans diverse governance arrangements, geographic contexts, and ecological, social, and cultural outcomes, allowing patterns to be examined across a heterogeneous body of literature. We reported the review in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR; Tricco et al. 2018) (Figure S1). Further details appear in Supplementary Material S1–S3.

Literature search and study selection

We searched the Web of Science Core Collection using terms for Indigenous governance, co-management, community-based conservation, protected areas, and conservation (Supplementary Material S1). We filtered records by year (1993–2024), language (English or Spanish), and type (Article), then screened them in R using predefined thematic dictionaries for four eligibility dimensions: Indigenous identity, empirical or methodological evidence, governance arrangements, and conservation context. Automated screening retained only records in which all four dimensions were detected, yielding 164 records for full-text retrieval.

Studies were included when they: (1) explicitly addressed Indigenous Peoples' participation, roles, or authority; (2) reported empirical evidence relevant to conservation governance; (3) described governance arrangements or decision-making processes; and (4)

examined conservation or protected-area contexts. Of 164 records, 15 could not be retrieved; 149 underwent full-text assessment, 39 were excluded, and 110 empirical studies published between 2002 and 2024 were included. The lead author conducted automated and manual screening, with co-authors reviewing and validating uncertain eligibility decisions. Screening criteria, thematic dictionaries, and the study-selection flow diagram appear in Supplementary Material S1.

Analytical framework

We use 'governance' and 'IPLCs' as operational terms for consistent coding, recognizing that both are evolving and politically contested. Our framework comprised four components: (i) governance arrangements; (ii) governance principles; (iii) ecological, social, and cultural outcomes; and (iv) thematic overlap with components of GBF Targets 1, 3, 14, 21, and 22.

1. Governance arrangements. We classified governance arrangements using the IUCN typology (Borrini-Feyerabend et al. 2013), considering final decision-making authority under de jure and de facto governance. Where these differed, we prioritized de facto governance. Four categories were distinguished: (i) governance by government; (ii) shared governance through pluralist arrangements among rights-holders and stakeholders; (iii) private governance; and (iv) governance by Indigenous Peoples and local communities through their own institutions, customary norms, or traditional governance systems. Studies with multiple arrangements were coded in each applicable category, retaining each as a separate analytical unit (Supplementary Material Section S2.1).

2. Governance principles. We adapted governance principles from Ayambire et al. (2025) into three dimensions: institutional, procedural, and transformative. Institutional principles captured governance structures and regulations (fit, legitimacy, accountability); procedural

principles captured decision-making quality (fairness, transparency, inclusivity); and transformative principles captured capacities for adaptation and systemic change (support networks, capability, knowledge co-production, resilience) (Supplementary Material Section S2.3).

3. Ecological, social, and cultural outcomes. We grouped reported outcomes into ecological (biodiversity, species, habitats, ecosystem processes, resource use), social (participation, livelihoods, well-being, social cohesion, equity, empowerment), and cultural domains (identity, knowledge systems, cultural continuity and practices, relationships with territory, rights, cultural authority) (Supplementary Material Section S3.2).

4. Kunming–Montreal Global Biodiversity Framework (GBF) targets. We coded thematic overlap with five GBF targets encompassing governance, rights, knowledge, and planning: Target 1 (participatory, integrated, and biodiversity-inclusive spatial planning and management); Target 3 (area-based conservation, effective conservation and management, equitable governance, and recognition of Indigenous and traditional territories); Target 14 (integration of biodiversity across policies, planning, development processes, and sectors); Target 21 (access to and use of data, information, and scientific, Indigenous, and traditional knowledge, including safeguards for free, prior, and informed consent); and Target 22 (full, equitable, inclusive, and effective participation and representation, recognition of rights, and access to justice and biodiversity-related information; Supplementary Material Section S3.3).

We examined co-occurrence among these components without assuming hierarchical, linear, or causal relationships.

Data extraction and coding protocol

The lead author extracted full-text data from 110 studies using a standardized coding matrix, with co-authors assisting in reviewing and validating coding decisions. Data included geographic and ecosystem contexts, governance arrangements and principles, reported ecological, social, and cultural outcomes, and thematic overlap with GBF Targets 1, 3, 14, 21, and 22. Coding relied on full-text evidence rather than titles or abstracts alone. We applied a combined deductive and inductive coding approach. Governance arrangements and principles were coded deductively using predefined operational definitions (Supplementary Material Sections S2.1 and S2.3). Thematic overlap with GBF Targets 1, 3, 14, 21, and 22 was coded concurrently during full-text review using predefined operational elements derived from each Target (Supplementary Material Section S3.3). Target coding was independent of outcome and principle coding and reflected thematic overlap, not post-hoc inference or formal assessment of Target achievement. Ecological, social, and cultural domains were defined a priori, while recurring outcome subcategories emerged from the reviewed evidence. Outcomes were classified as positive or negative based on benefits or adverse effects explicitly reported or interpreted by the original authors. Positive ecological outcomes included favorable biodiversity or ecosystem conditions; negative outcomes reflected ecological degradation or resource depletion. Positive social outcomes included improvements in livelihoods, participation, and community empowerment; negative outcomes included restricted resource access, exclusion from decisions, or inequitable conservation costs and benefits. Cultural outcomes supported or undermined Indigenous knowledge, practices, identity, and relationships with territory. For studies with multiple governance arrangements, outcomes were linked to each relevant arrangement, while governance principles were coded at the study level. Positive

and negative outcomes could co-occur within or across domains for the same study–governance observation (Supplementary Material Section S3.2 and Table S4).

Data synthesis

We used descriptive analyses to identify recurring configurations and intersections. Overall patterns were summarized at the study level, whereas comparisons among governance arrangements used each distinct study–governance arrangement as the analytical unit. Studies with multiple arrangements contributed separate observations and their associated outcomes for each applicable governance category, while governance principles and GBF Targets were assessed at the study level. We identified observations combining positive ecological with negative social or cultural outcomes. These analyses describe co-occurrence, not causal effects of governance arrangements or principles on outcomes.

We assessed thematic overlap with GBF Targets 1, 3, 14, 21, and 22 using predefined operational elements. A study was coded for a Target if it documented at least one associated element; this did not indicate Target achievement.

To avoid unstable percentages, governance-specific figures included only categories represented by at least five studies ($n \geq 5$). Private governance ($n = 2$) was excluded from these figures but remained in the descriptive results and Supplementary Material. We modeled annual publication frequency (2002–2024) using Poisson regression, with publication year as a continuous predictor, including years with zero publications. Coding reflected what studies reported; a governance principle, outcome, or GBF Target component coded as not documented was not necessarily absent in practice.

Results

Geographic, temporal, and governance patterns

A total of 110 studies were included in the review (Figure 1). Studies were unevenly distributed geographically, with the largest concentrations in Canada and Australia, while the evidence base remained comparatively dispersed across other regions (Figure 1A). Publication frequency increased significantly over time (Poisson regression: $\beta = 0.087$, IRR = 1.09, 95% CI = 1.06–1.12, $p < 0.001$), corresponding to an average increase of approximately 9% in the expected annual number of publications. Sixty percent of studies were published after 2015, with a peak of 10 studies in 2019 (Figure 1B). Terrestrial ecosystems were the most frequently represented context, accounting for 53.6% of studies (n = 59), followed by mixed ecosystem contexts (26.4%, n = 29) and marine ecosystems (17.3%, n = 19), whereas freshwater ecosystems were represented in only 2.7% of studies (n = 3).

Shared governance was the most frequently represented arrangement, documented in 71 studies (64.5%), followed by governance by Indigenous Peoples and local communities (n = 38, 34.5%), governance by government (n = 11, 10.0%), and private governance (n = 2, 1.8%) (Figure 1C). Governance categories were not mutually exclusive, and studies documenting more than one governance arrangement were counted once in each applicable category. Consequently, percentages across governance arrangements may sum to more than 100%. Eleven studies documented more than one governance arrangement, yielding 122 study–governance observations for subsequent governance-specific analyses.

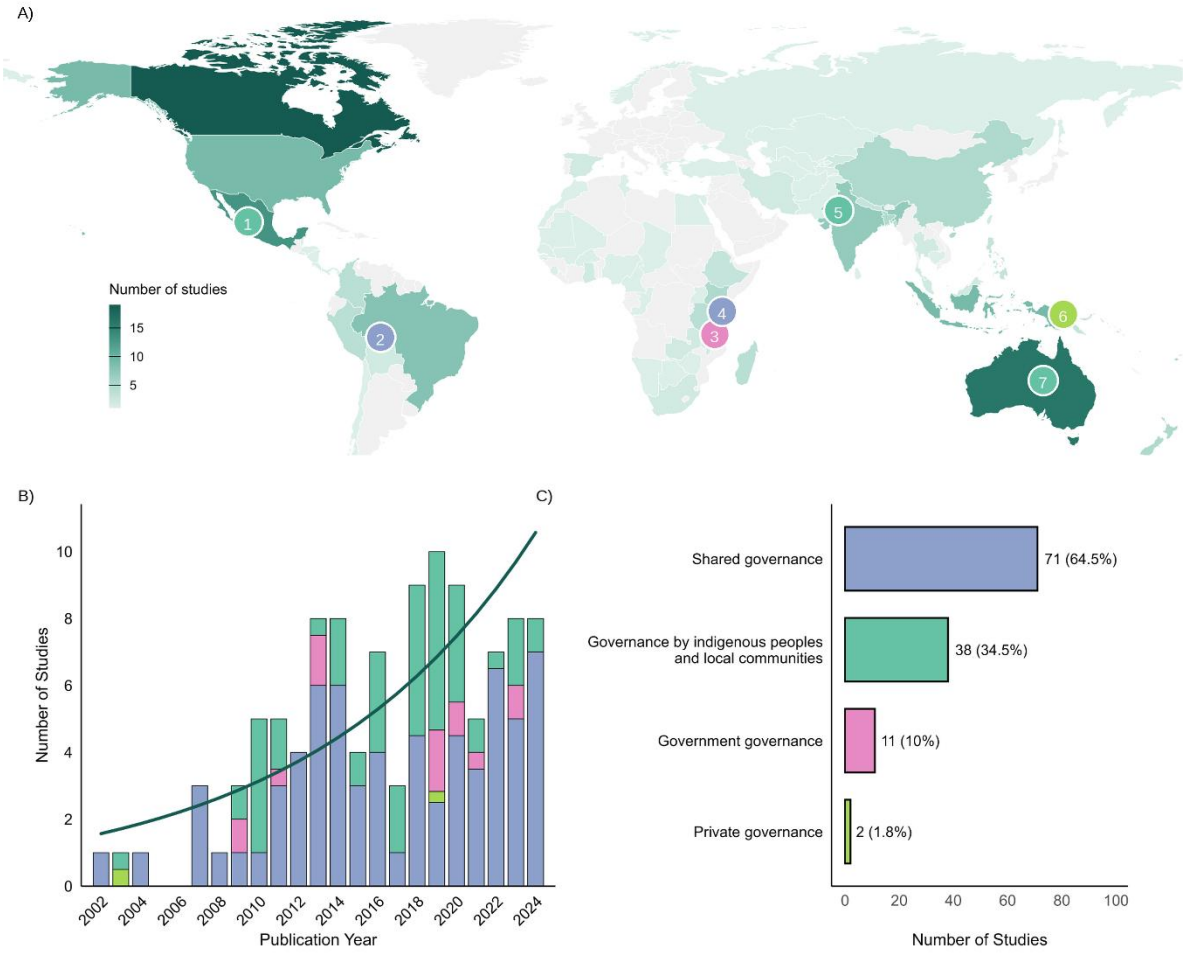


Figure 1. Geographic, temporal, and governance patterns in the reviewed literature. (A) Geographic distribution of the 110 included studies; numbered markers identify seven illustrative cases (Table S6) and indicate broader study regions rather than exact locations. (B) Annual number of studies published between 2002 and 2024 by governance arrangement; the fitted line shows the Poisson temporal trend. (C) Studies associated with each governance arrangement (n = 110). Governance categories are not mutually exclusive; therefore, percentages may sum to more than 100%.

Positive outcomes predominate, but negative social and cultural outcomes remain

Positive outcomes predominated across ecological, social, and cultural domains, although negative outcomes were also documented (Figure 2; Supplementary Material Table S7).

Shared governance showed consistently high proportions of positive outcomes across all three domains (86–92%), while negative social (31%) and cultural (27%) outcomes were also reported. Governance by Indigenous Peoples and local communities showed a similar predominance of positive outcomes (84–87%), alongside negative outcomes in approximately one quarter of studies across domains. Governance by government showed a more mixed pattern, particularly for social outcomes, where positive outcomes were reported in 55% of studies and negative outcomes in 36%.

Positive ecological outcomes sometimes co-occurred with negative social or cultural outcomes within the same study–governance observation. Across all governance arrangements, 33 of 122 observations (27.0%) reported positive ecological outcomes together with at least one negative social and/or cultural outcome. Of these, 29 observations (23.8%) combined positive ecological and negative social outcomes, 23 (18.9%) combined positive ecological and negative cultural outcomes, and 19 (15.6%) reported positive ecological outcomes together with both negative social and cultural outcomes (Supplementary Material Table S8).

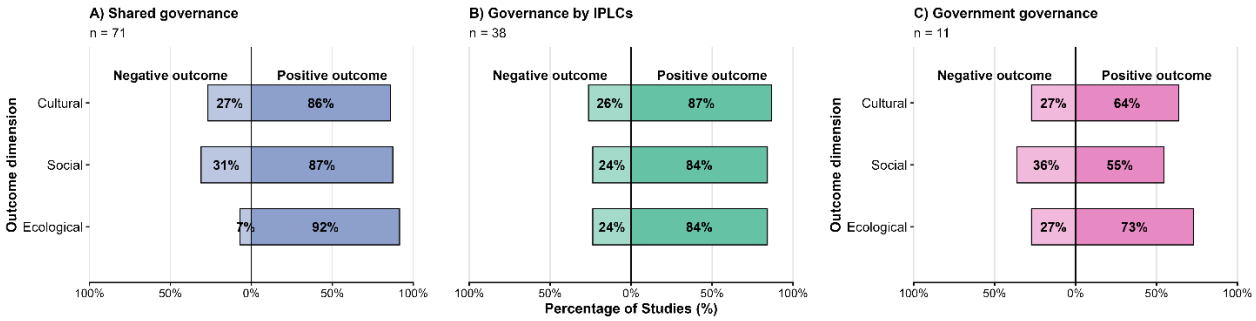


Figure 2. Positive and negative ecological, social, and cultural outcomes across governance arrangements. Bars show the percentage of studies within each governance arrangement reporting each outcome. Studies documenting multiple governance arrangements could contribute to more than one category, and positive and negative outcomes were not mutually exclusive. Private governance (n = 2) was excluded from the figure because of the small sample size; data are provided in Table S7.

Procedural principles are less consistently documented

Governance principles were unevenly represented across the reviewed studies. Transformative principles were frequently documented (82.7–92.7%), and the institutional principle fit was similarly common (92.7%). In contrast, procedural principles were less consistently represented, particularly fairness (41.8%) and transparency (44.5%); inclusivity was documented in 58.2% of studies. Among the remaining institutional principles, legitimacy and accountability were each documented in 52.7% of studies (Supplementary Material Tables S9 and S10).

This contrast was also evident across governance arrangements (Figure 3). Shared governance showed high representation of resilience, fit, and support networks (94–96%), whereas fairness (42.3%) and transparency (52.1%) were less frequently documented. Governance by Indigenous Peoples and local communities showed a similar pattern, with fit,

resilience, and capability among the most frequently documented principles (89–92%), while transparency was documented in only 34.2% of studies and fairness, legitimacy, and accountability in approximately 42–45%. In governance by government, transparency and accountability were each documented in 27.3% of studies, although this pattern should be interpreted cautiously given the small number of studies in this category (n = 11).

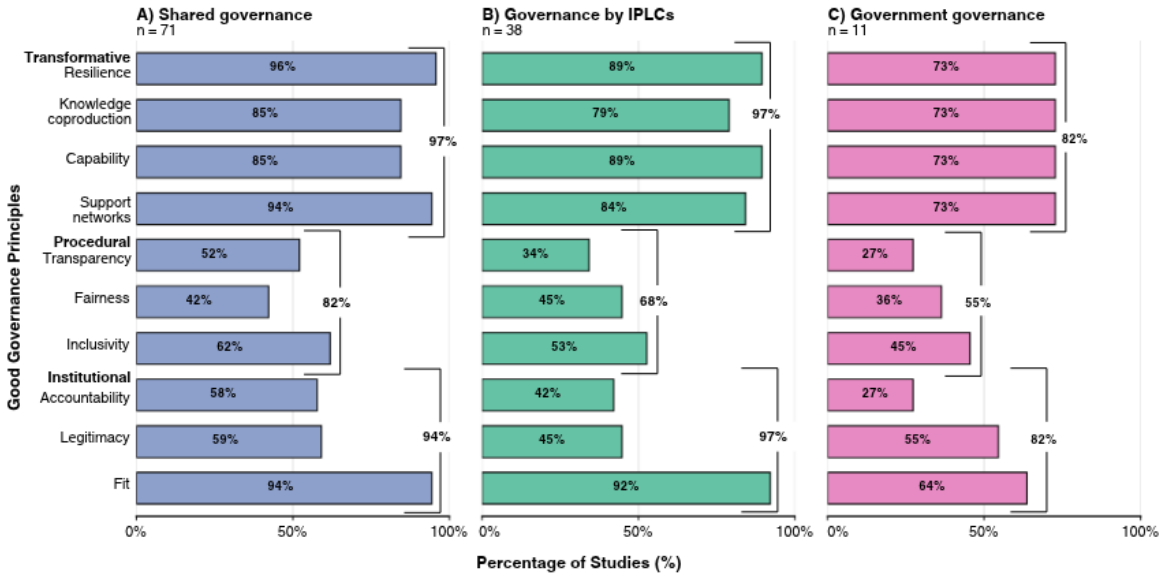


Figure 3. Distribution of governance principles across governance arrangements. Bars show the percentage of studies documenting each principle in (A) shared governance (n = 71), (B) governance by Indigenous Peoples and local communities (n = 38), and (C) governance by government (n = 11). Principles are grouped into transformative, procedural, and institutional dimensions. Private governance (n = 2) was excluded because of the small sample size; data are provided in Table S10.

Positive outcomes predominate across governance principles

Positive outcomes co-occurred widely across governance principles, whereas negative outcomes varied among domains (Figure 4A). Although fairness and transparency were among the least frequently documented principles, they co-occurred with high proportions

of positive ecological, social, and cultural outcomes (93–98%) and relatively low proportions of negative outcomes (11–15% for fairness and 4–16% for transparency). Institutional and transformative principles also predominantly co-occurred with positive outcomes, although some also co-occurred with negative social and cultural outcomes.

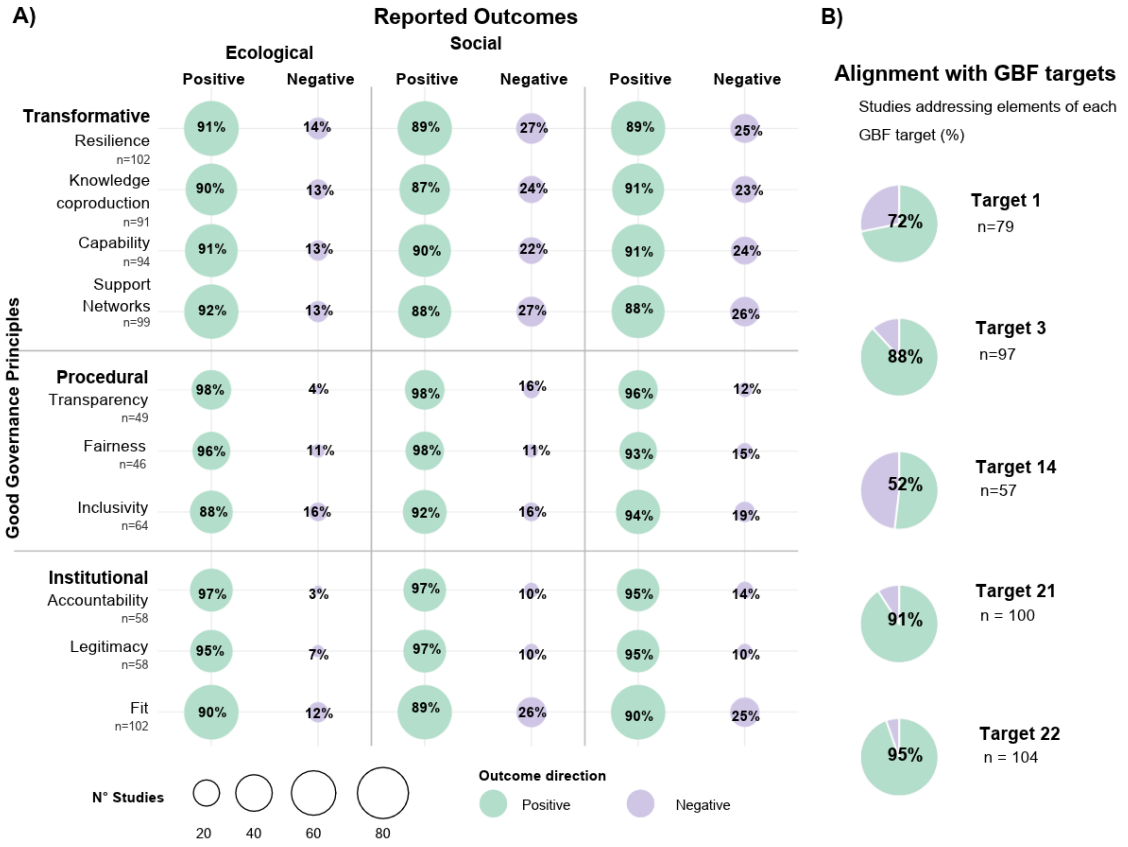


Figure 4. Co-occurrence of governance principles with ecological, social, and cultural outcomes and thematic overlap with GBF Targets. (A) Percentage of studies documenting each governance principle that also reported positive or negative outcomes; bubble size indicates the number of studies. (B) Percentage and number of studies corresponding to the operational elements of GBF Targets 1, 3, 14, 21, and 22.

Implementing Target 3 requires more than area-based conservation

Thematic overlap with GBF Targets varied across the reviewed evidence (Figure 4B). Representation was highest for Target 22 (94.5%, n = 104) and Target 21 (90.9%, n = 100), followed by Target 3 (88.2%, n = 97). Target 1 was represented in 71.8% of studies (n = 79), whereas Target 14 showed the lowest representation (51.8%, n = 57; Supplementary Material Table S11). Thus, the reviewed evidence more frequently represented the participation, rights, and knowledge dimensions associated with Targets 22 and 21 than the cross-sectoral integration dimension captured by Target 14.

Discussion

Beyond state-based governance: Indigenous authority in conservation decision-making

The pattern observed in the reviewed literature suggests that implementing Target 3 requires moving beyond predominantly state-centered models, without implying the withdrawal of state institutions (Borrini-Feyerabend et al. 2013; Dawson et al. 2021). Among the governance arrangements compared, governance by government (n = 11) showed the lowest proportion of positive social outcomes (54.5%) and the highest proportion of negative social outcomes (36.4%); transparency and accountability were each documented in only 27.3% of the studies associated with this category. Given the small number of studies, these patterns should be interpreted cautiously. Nevertheless, two cases illustrate limitations that may arise under centralized arrangements. In China's Wulingyuan protected area, Li et al. (2023) documented forced relocation, conflicts between conservation and tourism-related interests, and substantial changes in local cultural practices and place meanings. In Tanzania, Jodoin (2019) showed that participatory mechanisms incorporated into REDD+ governance coexisted with strong state control and the continued marginalization of Indigenous Peoples from representation and decision-making.

Evidence on governance by Indigenous Peoples and local communities shows a different configuration. Within this category (n = 38), positive ecological and social outcomes were documented in 84.2% of studies, and positive cultural outcomes in 86.8%. Several cases illustrate how customary institutions and Indigenous authority can support ecological and cultural objectives simultaneously. In Mexico, Zapotec self-governance grounded in *comunalidad* contributed to conserving high avian diversity through locally rooted institutions and territorial practices (Alcántara-Salinas et al. 2015). In Canada, customary closures established by First Nations supported the recovery of depleted Dungeness crab populations where federal management had shown limited results (Frid et al. 2016). These cases do not demonstrate that one governance category universally produces better outcomes, but they illustrate how conservation can be grounded in Indigenous institutions. In some studies, negative outcomes documented under this form of governance were associated with external pressures, including restrictions on territorial rights, exclusionary conservation policies, and extractive activities (Chiaravalloti 2019; Carson et al. 2018; Hviding 2003).

Shared governance was the most frequently documented arrangement in the reviewed literature (n = 71; 64.5%), but its predominance is better interpreted as part of a diversification of conservation authority than as a replacement of state governance. These arrangements can articulate state, Indigenous, community, and civil-society institutions and recognize pre-existing customary institutions within formal conservation structures. In Australia, centering of Dja Dja Wurrung cultural authority within a joint-management arrangement enabled Indigenous knowledge, language, and cultural values to be incorporated into formal park planning and management (Carter et al. 2022). By contrast, the formal inclusion of the Agta in protected-area management bodies in the Philippines did not ensure equivalent influence over decisions because of persistent power asymmetries and barriers to

accessing information and institutional procedures (Major et al. 2018). Shared governance can therefore expand Indigenous recognition and influence, but it can also maintain asymmetric relationships where state institutions retain substantive authority. Sharing a governance structure does not necessarily mean sharing decision-making power.

For Target 3, formal governance arrangements are insufficient indicators of equitable implementation; what matters is how Indigenous and community rights, institutions, and decision-making authority are recognized and exercised in practice.

Positive ecological outcomes can co-occur with negative social and cultural outcomes

Across the reviewed cases, positive ecological outcomes predominated, but in a substantial proportion they co-occurred with negative social or cultural outcomes. Across all governance arrangements, 33 of 122 observations (27.0%) reported positive ecological outcomes together with at least one negative social and/or cultural outcome; this proportion reached 33.8% under shared governance (Table S8). This pattern is consistent with broader evidence showing that externally controlled interventions aimed at replacing customary practices or institutions can be associated with negative social outcomes, whereas arrangements that recognize and empower local actors are more likely to combine positive ecological and socioeconomic outcomes (Oldekop et al. 2016; Dawson et al. 2021).

The reviewed cases illustrate how tensions across outcome domains can emerge in practice. In British Columbia, Klain et al. (2014) documented ecologically sustainable fisheries alongside inequities in decision-making authority, access to licenses, customary harvesting rights, and benefit distribution. In Kenya, Lesorogol and Lesorogol (2024) showed that community conservancies prioritized wildlife conservation while restricting pastoralists' access to dry-season grazing areas and disrupting customary grazing practices and institutions. These findings matter because conservation interventions can restrict access to

resources, alter livelihoods, and distribute costs and benefits unevenly (Armitage et al. 2020; Dawson et al. 2021; Martin et al. 2016). In Indigenous contexts, these tensions are particularly important because ecological, social, and cultural dimensions are closely tied to territory, tenure, and customary management practices (Godden & Cowell 2016).

However, the coexistence of positive ecological outcomes and social or cultural costs is not inevitable. In Papahānaumokuākea, Hawai‘i, the incorporation of Native Hawaiian cosmology into marine protected-area governance supported large-scale ecological protection alongside cultural revitalization (Quiocho et al. 2023). In southern Brazil, collaborative management integrating local traditional knowledge increased Araucaria forest cover while also generating livelihood benefits through sustainable seed harvesting (Tagliari et al. 2021). These cases show that ecological, cultural, and social objectives can reinforce one another when conservation arrangements recognize local knowledge, practices, and institutions.

Evaluating Target 3 exclusively through conserved area or ecological performance may therefore conceal substantial social and cultural costs (Martin et al. 2016; Dawson et al. 2021). The negative outcomes identified in the review should not be interpreted as an inherent consequence of shared governance, but rather as evidence of variation within this category and of the importance of how conservation arrangements operate. Target 3 effectiveness should therefore be assessed across ecological, social, and cultural outcomes together, rather than inferred from ecological gains alone (Dawson et al. 2021; Zafra-Calvo et al. 2019).

The procedural gap: participation is not enough

The comparatively low documentation of fairness (41.8%) and transparency (44.5%) reveals a substantial procedural gap in the reviewed evidence. This pattern is consistent with broader evidence showing that empirical assessments linking governance principles to conservation

outcomes remain limited (Ayambire et al. 2025). In conservation policy and practice, participation is often treated as an indicator of good governance; however, formal participation does not necessarily ensure meaningful influence over decisions, equitable representation, or transparent deliberation (Ruano-Chamorro et al. 2022).

Across protected-area systems, transparency, access to justice, and satisfaction with decision-making have been identified among the weaker dimensions of governance equity (Zafra-Calvo et al. 2019). More broadly, institutional labels such as "participatory," "co-managed," or "community-based" may conceal substantial differences in the authority actually exercised by IPLCs. Our finding that fairness and transparency were among the least frequently documented principles reinforces the need to distinguish nominal participation from substantive decision-making authority.

This procedural disconnect was evident across reviewed cases. In the Philippines, formal inclusion of the Agta in protected-area management boards did not ensure meaningful influence over decisions, as persistent power asymmetries and limited access to institutional and legal information constrained their participation (Major et al. 2018). In Brazilian Amazonia, multistakeholder forest-governance platforms produced contrasting experiences: in Acre, the use of accessible language and Indigenous ethno-zoning supported greater transparency and participation, whereas in Mato Grosso similar institutional mechanisms operated within persistent power imbalances that constrained the influence of Indigenous and traditional communities relative to dominant agribusiness interests (Gonzales Tovar et al. 2021).

Our co-occurrence analysis further showed that, where procedural principles were documented, fairness and transparency co-occurred with high proportions of positive ecological, social, and cultural outcomes (93–98%) and comparatively low proportions of

469 negative outcomes (4–16% for transparency and 11–15% for fairness; Figure 4A). These
470 patterns suggest that procedural principles deserve greater attention when evaluating
471 conservation governance. In Australia, Dja Dja Wurrung cultural authority was
472 operationalized through formal free, prior, and informed consent (FPIC) processes led by the
473 Dja Dja Wurrung Clans Aboriginal Corporation and through participatory spatial planning
474 (Carter et al. 2022). Similarly, customary collective governance among the Atayal in Taiwan
475 used transparent, assembly-based mechanisms for benefit distribution to address ecotourism
476 disputes while supporting forest conservation and social equity (Tang & Tang 2010).
477 The procedural challenge under Target 3 is therefore not simply who participates, but
478 whether participation translates into meaningful influence, transparent decision-making,
479 accountability, and respect for rights. In this sense, Target 22 provides a critical complement
480 to Target 3 by embedding participation, access to information, justice, and rights within the
481 broader governance architecture of conservation.

482 **Target 3 does not stand alone**

483 Taken together, our findings position Target 3 within a broader GBF governance architecture.
484 Targets 21 and 22 contribute complementary dimensions of knowledge, participation, rights,
485 and justice; Target 1 situates area-based conservation within participatory, integrated, and
486 biodiversity-inclusive spatial planning; and Target 14 extends biodiversity integration across
487 policies, planning, development processes, and sectors. Figure 5 synthesizes how these
488 targets intersect with governance arrangements, governance principles, and multidimensional
489 outcomes. The governance dimensions examined here may also be relevant to other GBF
490 targets, including ecosystem restoration (Target 2), customary sustainable use (Target 9),
491 reform of harmful incentives (Target 18), biodiversity finance (Target 19), and gender
492 equality (Target 23).

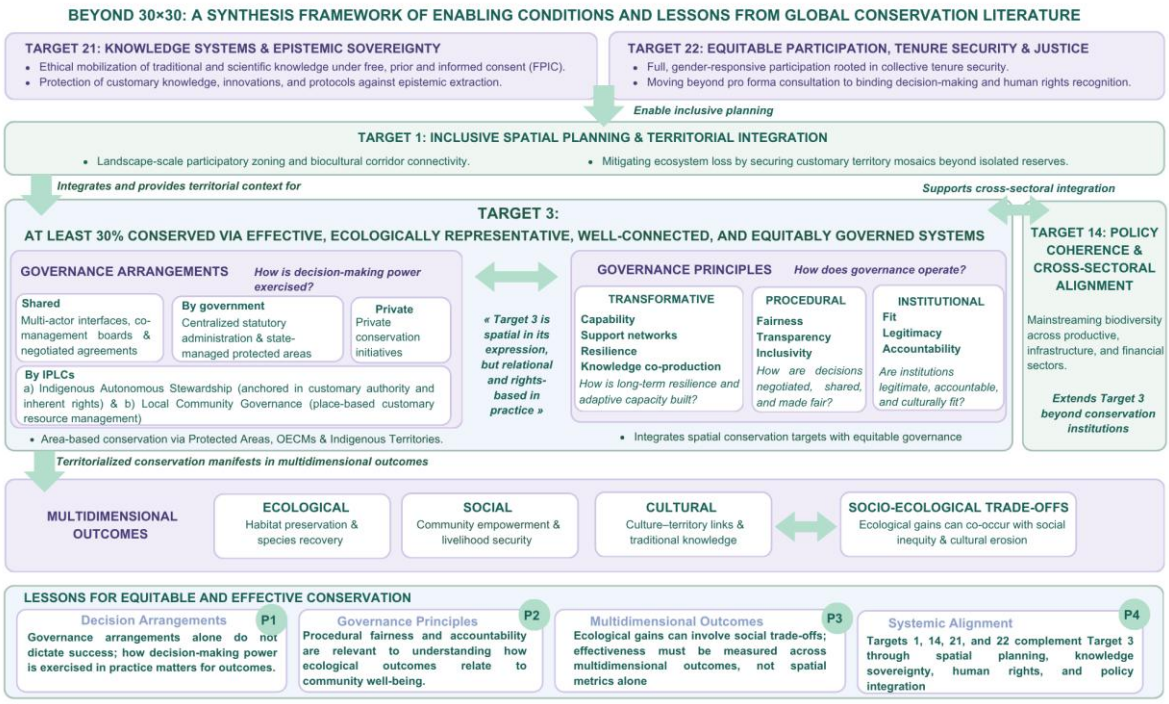


Figure 5. Conceptual governance architecture for the effective and equitable implementation of GBF Target 3. The framework integrates governance arrangements, governance principles, and multidimensional ecological, social, and cultural outcomes, while situating Target 3 within the complementary roles of Targets 1, 14, 21, and 22. The lower panel (P1–P4) summarizes the main propositions emerging from the review.

Study limitations

First, the search was limited to the Web of Science Core Collection, and eligible studies were restricted to peer-reviewed articles published in English or Spanish. This may have excluded relevant evidence indexed in other databases, published in other languages, or available as gray literature. Second, publishing this review in English may limit the accessibility of its findings and their communication back to Indigenous Peoples, local communities, and decision-makers whose primary languages are not English, particularly in the Global South. Third, the automated screening of titles and abstracts may have missed relevant studies whose

governance-related content was not explicitly described in the screened records. In addition, the evidence base was geographically uneven, and the level of detail reported varied across studies. Therefore, the absence of a documented principle or outcome should not be interpreted as evidence of its absence in practice. Finally, the co-occurrences identified among governance arrangements, governance principles, and outcomes are descriptive and do not establish causal relationships.

Policy and practice relevance

Our findings suggest three priorities for implementing Target 3. First, shared governance was the most documented arrangement (64.5% of studies), yet socio-ecological trade-offs were identified in 33.8% of its observations, with positive ecological outcomes co-occurring with negative social or cultural outcomes. Formal inclusion alone does not ensure equity. Conservation instruments should be co-designed from the outset, recognizing Indigenous Peoples as self-determining rights-holders with territorial authority rather than passive stakeholders. This requires respecting FPIC and customary tenure from the design phase. Second, positive ecological outcomes were documented in 87.7% of study–governance observations but co-occurred with negative social or cultural outcomes in 27.0%. Together with the limited documentation of fairness and transparency, this highlights gaps in reported conservation evidence. Target 3 monitoring should complement spatial and ecological indicators with social, cultural, and governance measures, including effective participation, decision-making authority, fairness, transparency, and the distribution of costs and benefits, while respecting Indigenous Peoples' control over their data and knowledge. Third, negative outcomes were also documented under governance by IPLCs. Some studies identified external pressures, including tenure insecurity and extractive activities, highlighting risks beyond conserved-area boundaries. Target 14 can complement Target 3 by integrating

biodiversity into sectoral policies to address these pressures. Monitoring should guide adjustments to governance and management when persistent inequities or negative outcomes are identified.

Author Contributions

Conceptualization, AS and MJMH; Methodology, AS and MJMH; Investigation, AS and ULO; Data curation, AS and ULO; Formal analysis, AS, ULO, and JACM; Visualization, ULO, AS, and MJMH; Writing – original draft, all authors; Writing – review and editing, all authors; Supervision, MJMH; Project administration, JACM, AS, ULO, and MJMH.

Authors' positionality and reflexivity

The authors approach this study from interdisciplinary backgrounds in natural resource conservation, socio-ecological governance, and environmental policy. As non-Indigenous researchers working within academic institutions, we recognize that we do not speak on behalf of IPLCs, nor do we seek to represent their diverse worldviews, knowledge systems, or customary authorities. Our analysis is based on published empirical literature and reflects the perspectives and limitations inherent in that evidence base and in our own academic positioning. We therefore approach the interpretation of Indigenous governance with reflexivity and respect for Indigenous rights, institutions, knowledge systems, and self-determination**.**

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Conflict of Interest Statement

The authors declare no conflicts of interest.

Data Availability Statement

The study–governance coding dataset supporting the findings of this study is openly available in Zenodo at https://doi.org/10.5281/zenodo.23932471.

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