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FROM JUNGLE MAHALS TO MODERN CONSERVATION POLICIES: HISTORICAL EVOLUTION OF TRIBAL–FOREST RELATIONSHIPS IN EASTERN INDIA AN ENVIRONMENTAL HISTORY AND POLITICAL ECOLOGY PERSPECTIVE

Sanjay Kumar Srivastava*, Dr. Tanu Pawar

Research scholar, Sunrise university Alwar Rajasthan.

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*Corresponding Author: Sanjay Kumar Srivastava

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Research scholar, Sunrise university Alwar Rajasthan.

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ABSTRACT

The forests of eastern India — stretching across the undulating uplands of the Jungle Mahals, the Chota Nagpur plateau, and the hill tracts of the Santhal Parganas — have historically constituted far more than a repository of timber and revenue; they have been the material and cultural foundation of tribal life-worlds. This paper traces the historical evolution of tribal–forest relationships in eastern India from pre-colonial commons-based regimes through the colonial reconfiguration of forests as state property, to contemporary conservation and community-forestry frameworks. Drawing on environmental history and political ecology, the study examines how colonial scientific forestry, inaugurated under Dietrich Brandis and institutionalised through the Forest Acts of 1865, 1878, and 1927, dismantled customary tribal access to forest resources and precipitated a sequence of ecological rebellions, including the Chuar uprising, the Halba revolt, the Paharia resistance, and the Santhal Hul. It further situates the persistence of shifting cultivation (jhum) in Northeast India as a site of continuing contestation between customary ecological practice and state-sanctioned notions of "scientific" land use. Employing a qualitative, comparative-historical methodology grounded in secondary archival and scholarly sources, the paper argues that colonial forestry inaugurated an enduring bifurcation between statist conservation and community-based ecological stewardship — a bifurcation only partially redressed by the Forest Rights Act, 2006. The paper concludes that meaningful biodiversity conservation and climate resilience in eastern India's forest landscapes require the substantive, rather than symbolic, recognition of indigenous ecological knowledge and community forest governance rights. The findings

contribute to environmental historiography and to contemporary debates on sustainable, equity-centred forest governance in the Anthropocene.

KEYWORDS: Environmental History; Political Ecology; Tribal Forest Rights; Scientific Forestry; Jungle Mahals; Forest Rights Act 2006; Indigenous Ecological Knowledge; Community Forest Governance.

1. INTRODUCTION

The forested uplands of eastern India — encompassing the undulating terrain historically designated as the "Jungle Mahals" of Bengal, the plateau tracts of Chota Nagpur, the Santhal Parganas, and the hill and forest belts extending into present-day Jharkhand, Odisha, and the northeastern hill states — have long occupied a paradoxical position within the political and ecological imagination of the Indian state. To colonial administrators, these tracts appeared unproductive, disorderly, and in need of "improvement"; to the tribal communities who inhabited them — the Santhals, Mundas, Oraons, Paharias, Halbas, Bhumij, Kols, and numerous other groups — the forest was neither wilderness nor waste but an integrated ecological and cultural commons, structuring subsistence, kinship, ritual, and cosmology. The term "Jungle Mahal" itself, coined by colonial revenue administrators in late eighteenth-century Bengal to denote the forested, hilly, and administratively "backward" tracts of Midnapore, Bankura, and adjoining districts, encapsulates this colonial gaze: a landscape defined by its resistance to settled agrarian revenue extraction, and hence by its association with tribal autonomy.

The history of tribal–forest relationships in eastern India cannot, therefore, be narrated simply as a history of ecological continuity disrupted by modern development. Rather, it is a history punctuated by successive and overlapping ruptures: the colonial assertion of eminent domain over forest tracts through a sequence of Forest Acts; the professionalisation of forestry under German-trained foresters such as Dietrich Brandis, which recast forests as sites of scientific, revenue-yielding timber production; the criminalisation of customary practices such as shifting cultivation, grazing, and the collection of minor forest produce; and the resultant eruption of tribal rebellions — the Chuar uprising, the Halba revolt, the Paharia resistance in the Rajmahal hills, and the Santhal Hul — each of which, though frequently read through the lens of anti-colonial nationalism, was at its core an ecological and agrarian revolt against the alienation of forest-based livelihoods.

This paper examines this layered history as a single, continuous field of inquiry, situating it within the analytical frameworks of environmental history and political ecology. It argues that the colonial forestry regime did not merely regulate an existing resource; it fundamentally reconstituted the categories through which forests, and the communities dependent upon them, were understood and governed — a reconstitution whose institutional and ideological residues persist, in modified form, within postcolonial Indian forest governance. At the same time, the paper resists a purely declensionist narrative of tribal dispossession, attending instead to the resilience of indigenous ecological knowledge systems and to the more recent, if imperfect, attempts at redress embodied in the Forest Rights Act of 2006 and community forest resource governance. The paper is structured to move from historiographical positioning, through detailed analysis of colonial policy, tribal resistance, and scientific forestry, to a comparative assessment of colonial and contemporary forest governance, concluding with policy recommendations oriented toward climate resilience, biodiversity conservation, and tribal self-determination.

2. Literature Review

2.1 Previous Studies

The environmental historiography of colonial India has, since the 1980s, generated a substantial body of scholarship examining the relationship between state forestry and rural, particularly tribal, communities. Gadgil and Guha's foundational study of Indian environmental history demonstrated that the colonial forest administration inaugurated a shift from a diffuse, largely usufructuary system of resource access toward a centralised, revenue-oriented regime of state ownership, a transformation they characterised as the transition from "ecological" to "commercial" forestry. Guha's subsequent monograph on the Himalayan forests extended this analysis to popular resistance, showing how the imposition of reserved forests generated sustained peasant and tribal protest across diverse ecological zones of the subcontinent. Sivaramakrishnan's historical-ethnographic study of forest governance in Bengal's Jungle Mahals offered a more granular account, demonstrating that colonial forestry in eastern India was neither monolithic nor uniformly imposed, but was continually negotiated and locally inflected by tribal cultivators, contractors, and lower-level forest officials alike. Skaria's history of the Dangs highlighted the discursive construction of tribal communities as "wild" in colonial ethnography, a categorisation that legitimised both paternalist protection and coercive resource control. Rangarajan's study of the Central

Provinces forests similarly traced how "scientific" forest management served to fence in customary rights under the guise of conservation.

More regionally focused work has illuminated the specific trajectories of Santhal, Munda, and Oraon engagement with, and resistance to, colonial forest and land settlement policies, while Karlsson's ethnography of shifting cultivation in Northeast India has complicated colonial and postcolonial characterisations of jhum as ecologically destructive, situating it instead within long-standing, adaptive agro-ecological systems. On the postcolonial side, Sundar's work on community forestry and Springate-Baginski and Blaikie's comparative study of Joint Forest Management have examined the extent to which post-independence forest policy has departed from, or reproduced, colonial patterns of state control. More recent scholarship (2020–2024), including studies published in journals such as *Forest Policy and Economics*, *Land Use Policy*, and *Environmental Development*, alongside reports by the Forest Survey of India and the Ministry of Environment, Forest and Climate Change, has extended this analysis to the implementation gaps of the Forest Rights Act and the intersection of forest governance with climate mitigation frameworks.

2.2 Research Gap

Despite this considerable body of work, several gaps remain. First, much existing scholarship treats specific tribal revolts, specific colonial policies, or specific contemporary legislative interventions as discrete objects of study, rather than situating them within a single, continuous historical arc extending from pre-colonial commons through colonial dispossession to contemporary rights-based reform. Second, comparatively little scholarship undertakes a systematic, cross-regional comparison spanning the Jungle Mahals, the Chotanagpur plateau, the Santhal Parganas, and the shifting-cultivation zones of Northeast India within a single analytical frame, despite structural similarities in the colonial logic applied across these diverse ecological and ethnographic contexts. Third, the growing literature on climate change and biodiversity conservation has only recently begun to be integrated with the historiography of tribal forest relations, leaving underexplored the question of how historically rooted indigenous ecological knowledge might inform present-day climate-resilient forest governance.

2.3 Need for the Study

Addressing these gaps is not merely of historiographical interest. As India's forest governance architecture confronts simultaneous pressures — rising demand for forest-based climate mitigation, persistent implementation failures of the Forest Rights Act, and continuing tribal displacement associated with mining, dam construction, and compensatory afforestation

programmes — a historically grounded, comparative, and critically reflexive account of tribal–forest relationships in eastern India offers essential context for contemporary policy debate. This paper responds to that need by synthesising and critically extending the existing historiography into a single, comparative, and policy-oriented analytical frame.

3. Research Objectives

- To trace the historical evolution of tribal–forest relationships in eastern India from pre-colonial commons-based regimes through colonial forestry to contemporary conservation policy.
- To critically examine the objectives, instruments, and consequences of major colonial forest legislation, with particular reference to the role of Dietrich Brandis and scientific forestry.
- To analyse the ecological and agrarian dimensions of major tribal rebellions — the Chuar uprising, Halba revolt, Paharia resistance, and Santhal Hul — as forms of environmental justice claims.
- To examine the historical and contemporary status of shifting cultivation in Northeast India as a site of contestation between customary practice and state land-use policy.
- To conduct a comparative analysis of colonial and contemporary forest governance frameworks, culminating in policy recommendations for equitable, climate-resilient, and biodiversity-sensitive forest governance.

4. Research Questions

- How did colonial forest policy transform pre-existing tribal forest relationships in eastern India?
- To what extent did tribal rebellions in the region constitute articulations of environmental justice rather than solely anti-colonial political resistance?
- How did Dietrich Brandis's scientific forestry model reconcile, or fail to reconcile, conservationist and extractive objectives?
- What continuities and departures characterise the relationship between colonial forest governance and contemporary Indian forest policy, particularly the Forest Rights Act, 2006?
- What role can indigenous ecological knowledge systems play in shaping sustainable, community-centred forest governance under conditions of climate change?

5. METHODOLOGY

This study adopts a qualitative, historical-analytical research design, combining environmental history with the interpretive tools of political ecology. The research relies exclusively on secondary sources, including peer-reviewed scholarly monographs and journal articles, colonial gazetteers and administrative reports as mediated through secondary historiographical literature, government policy documents (including the National Forest Policy of 1988, the Forest Rights Act of 2006, and reports of the Ministry of Environment, Forest and Climate Change and the Forest Survey of India), and international assessments including those of the Food and Agriculture Organization and the Intergovernmental Panel on Climate Change. No primary archival fieldwork or original ethnographic data collection was undertaken; the study is accordingly positioned as a work of historical synthesis and critical interpretation rather than primary empirical research.

The methodology proceeds along four interlocking lines. First, historical research is used to establish a chronological account of colonial and postcolonial forest policy in eastern India, drawing on the documented sequence of legislative and administrative interventions. Second, qualitative analysis is applied to interpret the social, economic, and ecological meanings of tribal resistance movements, moving beyond narrowly political readings to recover their agrarian and environmental dimensions. Third, the study relies on secondary data — drawn from published historiography, forest department statistics, and policy evaluation literature — to substantiate claims regarding forest cover change, biodiversity impacts, and the implementation record of contemporary legislation. Fourth, a comparative approach is employed throughout, juxtaposing colonial and contemporary policy instruments, and juxtaposing state-centred scientific forestry with indigenous ecological knowledge systems, in order to identify continuities, ruptures, and possibilities for reform. This multi-method qualitative design is appropriate to a research problem that is simultaneously historical, institutional, and normative in character, and that resists reduction to a single disciplinary lens.

6. Colonial Forest Policies and Their Objectives

The colonial state's engagement with the forests of eastern India evolved through several distinct phases, each reflecting shifting imperial priorities. In the earliest phase, spanning the late eighteenth and early nineteenth centuries, forests were of interest to the colonial state chiefly as impediments to agrarian revenue settlement; the Permanent Settlement of 1793 and subsequent revenue arrangements in Bengal treated the Jungle Mahals as a residual, low-

yield category requiring pacification and eventual conversion to settled cultivation. It was only from the mid-nineteenth century, as the demands of railway expansion, shipbuilding, and colonial commercial timber requirements intensified, that forests came to be understood as a strategic and finite resource requiring direct state control.

This shift was formalised through a sequence of legislative interventions. The Forest Act of 1865 represented the colonial state's first assertion of sovereign authority over forest land, granting government the power to declare any land covered with trees as "government forest" with minimal regard for existing customary rights. The more consequential Indian Forest Act of 1878 introduced the tripartite classification of forests into Reserved, Protected, and Village Forests — a classification that, critically, reversed the evidentiary burden faced by forest-dependent communities: rights of access, hitherto assumed as customary, now had to be formally proven and were subject to extinguishment through a settlement process controlled by the forest bureaucracy. Reserved forests, which yielded the most valuable timber, were subjected to the most stringent restrictions, effectively criminalising practices — grazing, shifting cultivation, the collection of fuelwood and minor forest produce — that had previously been integral to tribal subsistence. The Indian Forest Act of 1927, which consolidated and extended these provisions, remained the principal statutory framework governing Indian forests for the remainder of the colonial period and, with amendments, well into the postcolonial era.

The underlying objectives of this legislative sequence were threefold. First, a fiscal objective: forests were to be managed as a source of sustained state revenue through timber extraction, particularly of commercially valuable species such as teak (*Tectona grandis*) and sal (*Shorea robusta*). Second, a strategic-infrastructure objective: the explosive growth of the railway network from the 1850s onward generated an enormous demand for sal and teak sleepers, a demand that scientific forestry was explicitly designed to meet through sustained-yield management. Third, a political-administrative objective: the assertion of state control over forest tracts served to extend colonial sovereignty into regions — the Jungle Mahals, the Chotanagpur plateau, the Rajmahal hills — that had historically remained on the margins of direct administrative control, and where tribal polities retained considerable autonomy. Table 1 summarises the principal legislative milestones of this process and their stated objectives.

Table 1. Timeline of Major Colonial (and Early Postcolonial) Forest Policies in Eastern India.

Year	Policy / Event	Key Provisions / Objectives
1793	Permanent Settlement (Bengal)	Fixed land revenue in perpetuity; treated forest/jungle tracts as residual, low-yield land requiring conversion.
1864	Imperial Forest Department established	Dietrich Brandis appointed Inspector-General of Forests; introduction of the working-plan system.
1865	Indian Forest Act, 1865	First statutory assertion of state ownership over forest land; minimal recognition of customary rights.
1876	Santhal Parganas Tenancy Act	Post-Hul reform restricting alienation of Santhal land to non-tribal outsiders.
1878	Indian Forest Act, 1878	Classification into Reserved, Protected, and Village Forests; reversal of evidentiary burden for customary rights.
1894	Forest Policy Resolution, 1894	Prioritised commercial timber production; recognised limited local-use "concessions".
1927	Indian Forest Act, 1927	Consolidated and extended earlier acts; remained principal forest statute for decades.
1952	National Forest Policy, 1952 (post-independence)	Continued state-control emphasis; classified forests by functional priority.

Source: Compiled by the author from Gadgil and Guha (1992), Rangarajan (1996), and Sivaramakrishnan (1999).

7. Shifting Cultivation: Historical Development and Colonial Opposition

Shifting cultivation — known variously as jhum in Northeast India, podu in Odisha and Andhra Pradesh, and by other regional names across the tribal belts of eastern and central India — constitutes one of the oldest and most ecologically adaptive agricultural systems practised by tribal communities in the region. The system typically involves the rotational clearing of forest patches by controlled burning, cultivation for a limited number of years, followed by an extended fallow period during which secondary forest regenerates and soil fertility is restored. Far from being an unplanned or destructive practice, jhum historically operated according to sophisticated, locally calibrated rules governing fallow-cycle length, plot selection, crop diversification, and the management of forest–fallow mosaics — rules embedded in customary institutions of land tenure and community decision-making, particularly among the Naga, Khasi, Garo, Mizo, and other communities of Northeast India, as well as among tribal groups of Odisha and the Eastern Ghats.

Colonial administrators, however, viewed shifting cultivation through an unambiguously negative lens, characterising it in official reports as wasteful, destructive of valuable timber, and an obstacle to the establishment of permanent, revenue-yielding forest estates. This characterisation reflected both a genuine, if superficial, ecological concern — the visible defoliation associated with jhum burns contrasted starkly with the orderly appearance of managed sal or teak plantations — and a deeper political-economic logic: land under long-fallow shifting cultivation could not be as readily converted into either reserved forest or settled revenue-paying agriculture as land under permanent cultivation. Successive forest policies, including provisions within the Forest Acts of 1878 and 1927 and subsequent administrative regulations specific to Northeast India, sought to restrict, regulate, or eliminate shifting cultivation, frequently through the coercive relocation of cultivating communities or the reservation of jhum lands as protected or reserved forest.

The postcolonial Indian state has, in important respects, inherited rather than revised this colonial framing. National policy documents, including the National Forest Policy of 1988, continue to identify shifting cultivation as a threat to forest cover and biodiversity, and state governments in Northeast India have periodically pursued jhum-control and jhum-alternative programmes, often with limited ecological or socio-economic success. This persistence is notable given the substantial body of contemporary agro-ecological research indicating that shifting cultivation, where fallow cycles remain sufficiently long, can sustain comparable or superior levels of biodiversity relative to permanent monoculture plantations, while also sequestering carbon across the fallow-regeneration cycle. The compression of fallow periods — itself frequently a consequence of land alienation, population pressure, and the loss of access to alternative forest tracts, rather than an inherent flaw of the system — has, in some areas, indeed generated genuine ecological stress; but this outcome reflects the erosion of the customary land-management regime under external pressure rather than an intrinsic deficiency of shifting cultivation as such. The persistence of state hostility to jhum thus exemplifies the durability of colonial-era categorisations of tribal ecological practice as inherently primitive and destructive — categorisations that this paper argues require sustained critical re-examination.

8. Tribal Resistance and Environmental Justice

The imposition of colonial forest and revenue control across eastern India's tribal tracts generated a sustained sequence of armed and organised resistance, of which the Chuar uprising, the Halba revolt, the Paharia resistance, and the Santhal Hul represent the most

historically significant instances. While each of these movements has frequently been narrated within nationalist historiography as an episode of anti-colonial rebellion, a closer reading — attentive to the specific grievances articulated by participants and the specific policy triggers that preceded each uprising — reveals each to have been, at its core, a struggle over access to land and forest resources: an early and geographically dispersed articulation of what contemporary scholarship would term environmental justice.

The Chuar rebellion, which erupted in the Jungle Mahals of Midnapore and adjoining districts in the late eighteenth century (with major phases around 1798–99 under leaders including Durjan Singh and later associated with figures such as Rani Shiromani), was precipitated directly by the Permanent Settlement's disruption of customary tribal land tenure and forest access. The Chuars — an umbrella term applied by colonial administrators to several forest-dwelling communities of the region — resisted the imposition of a revenue-farming system that alienated forest and marginal agricultural land from customary tribal control and transferred it to non-tribal zamindars and revenue farmers. The rebellion's repeated recourse to attacks on revenue and forest posts, rather than exclusively on symbols of colonial political authority, underscores its character as a struggle over resource access.

The Halba revolt, associated with the Halba tribal community of the central-eastern forest tracts, similarly arose from grievances concerning the erosion of customary forest and agricultural rights under colonial and colonially aligned princely administration, compounded by exploitative revenue and forced-labour (begar) demands. Although smaller in scale than the Santhal Hul, the Halba resistance is historiographically significant as an early instance of tribal mobilisation against the combined pressures of land alienation and forest restriction that would recur, in varied form, across the region for over a century.

The Paharia resistance in the Rajmahal hills presents a particularly instructive case. Following sustained conflict, the colonial administration under Augustus Cleveland in the 1770s and 1780s adopted a policy of demarcating the Damin-i-Koh ("skirts of the hills") as a buffer and settlement zone — ostensibly to protect Paharia autonomy, but in practice facilitating the settlement of Santhal cultivators in areas that further constrained Paharia shifting cultivation and forest-based subsistence. The Paharia case thus illustrates a distinctive dynamic: colonial "protective" policy could itself function as an instrument of ecological displacement, redirecting resource pressure onto Paharia forest tracts even while formally exempting the community from direct revenue settlement.

The Santhal Hul of 1855–56, led by the brothers Sidhu and Kanhu Murmu, remains the most extensively documented and historiographically significant of these movements. Precipitated

by the depredations of moneylenders, revenue farmers, and railway contractors upon Santhal Parganas land and forest tracts — depredations facilitated by the very administrative and infrastructural expansion that scientific forestry was designed to serve — the Hul mobilised tens of thousands of Santhal cultivators in a sustained insurrection that was suppressed only through considerable colonial military force. The rebellion's aftermath produced the Santhal Parganas Tenancy Act of 1876, which instituted specific protections against the alienation of Santhal land to non-tribal outsiders — an early, if limited, colonial acknowledgment of the legitimacy of tribal land-based grievance.

Read comparatively, these four movements share a common underlying ecological grammar: each was triggered by the disruption of customary tribal access to land and forest resources through revenue settlement, forest reservation, or exploitative intermediation, and each articulated its resistance through direct action against the specific administrative and economic apparatus — revenue posts, moneylenders' records, forest boundary markers, railway construction camps — that embodied this disruption. Table 3 summarises the ecological and agrarian dimensions of these movements. Understood in this light, these rebellions constitute an important, if underexplored, chapter in the longer history of environmental justice movements in South Asia, anticipating by more than a century the vocabulary of resource rights and self-determination that would animate the Forest Rights Act movement of the early twenty-first century.

Table 2. Comparative Analysis of Colonial Scientific Forestry and Indigenous Forest Management.

Dimension	Colonial Scientific Forestry	Indigenous Forest Management
Epistemology	Quantifiable, sustained-yield, working-plan based	Experiential, generational, cosmologically embedded
Spatial unit	Forest compartment / division	Village/community forest and sacred grove
Locus of authority	Centralised forest bureaucracy	Village council / Gram Sabha, customary institutions
Species focus	Monoculture (sal, teak)	Mixed, multi-species, multi-use
Treatment of shifting cultivation	Criminalised or restricted	Integral, rotational, fallow-based
Primary objective	Revenue and timber yield	Subsistence, ecological balance, ritual value
Conservation	Statutory reservation, policing	Taboo, sacred grove, seasonal

Dimension	Colonial Scientific Forestry	Indigenous Forest Management
mechanism		restriction

Source: Compiled by the author, synthesising Sivaramakrishnan (1999), Skaria (1999), and Karlsson (2011).

Table 3. Major Tribal Revolts in Eastern India and Their Ecological/Agrarian Causes.

Revolt	Period / Region	Key Leaders	Ecological / Agrarian Cause
Chuar Rebellion	1798–99, Jungle Mahals (Midnapore)	Durjan Singh; Rani Shiromani	Permanent Settlement disrupted customary land/forest tenure; transfer to non-tribal revenue farmers.
Halba Revolt	Late 18th–19th c., central-eastern tracts	Halba community leadership	Erosion of customary forest/agricultural rights; exploitative forced-labour (begar) demands.
Paharia Resistance	1770s–1780s, Rajmahal Hills	Paharia community leadership	Damin-i-Koh demarcation redirected settlement and land pressure onto Paharia shifting-cultivation tracts.
Santhal Hul	1855–56, Santhal Parganas	Sidhu Murmu; Kanhu Murmu	Moneylender, zamindar, and railway-contractor encroachment on Santhal land and forest.

Source: Compiled by the author from Guha (1999), Damodaran (2006), and regional gazetteer-based secondary literature.

9. Dietrich Brandis and Scientific Forestry: Conservation or Colonial Resource Control?

No single figure looms larger in the institutional history of Indian forestry than Dietrich Brandis, the German-trained botanist and forester appointed in 1856 to oversee the forests of Pegu (Burma) and, subsequently from 1864, as the first Inspector-General of Forests for British India. Brandis is credited with establishing the Imperial Forest Department, introducing the working-plan system of forest management, founding forestry training institutions including the Imperial Forest School at Dehradun, and formulating the principle of sustained-yield management that would underpin Indian forestry for over a century.

Brandis's model of scientific forestry drew heavily on German, and more specifically Prussian, forestry traditions, which emphasised the systematic mapping, classification, and rotational management of forest compartments to ensure a continuous, calculable timber yield. Applied to the Indian context, this model necessitated the precise demarcation of forest boundaries, the exclusion of "disruptive" practices such as shifting cultivation and

uncontrolled grazing, and the subordination of local, customary forms of forest use to a centralised bureaucratic apparatus of forest officers, rangers, and guards. Brandis himself expressed, in various administrative writings, a genuine concern for forest conservation and for the establishment of a rational, long-term resource management system that would prevent the kind of rapid deforestation already evident in parts of Europe and in earlier phases of unregulated colonial timber extraction.

This dual character of Brandis's legacy — as both a genuine pioneer of systematic forest conservation and as the chief architect of an apparatus of colonial resource control — constitutes a central interpretive puzzle for environmental historians. On one reading, Brandis's insistence on sustained-yield management and forest demarcation represented a necessary corrective to the unregulated commercial exploitation that characterised earlier decades of colonial timber extraction, and his professional forestry model laid an institutional foundation that would, in modified form, inform post-independence Indian forest conservation efforts. On an alternative, and this paper argues more persuasive, reading, the conservationist vocabulary of scientific forestry functioned simultaneously, and inseparably, as a mechanism of colonial territorial and economic control: the very act of "scientifically" managing a forest required its prior alienation from customary tribal control, its reclassification as state property, and the criminalisation of forms of use that fell outside the parameters of the working plan. Sustained-yield management, in this sense, was sustained yield for the colonial state and its commercial concessionaires, achieved through the systematic exclusion of the tribal communities whose customary practices scientific foresters characterised as ecologically irrational.

It is important to note that Brandis himself was, by the standards of his colonial contemporaries, relatively attentive to the question of customary rights, and advocated in several instances for their partial accommodation within the reserved-forest framework. However, the institutional apparatus he established rapidly outpaced this relatively moderate personal disposition: subsequent generations of forest officers, operating within a bureaucracy oriented overwhelmingly toward revenue targets, applied the working-plan system with considerably less regard for customary access than Brandis's own writings might suggest. The Brandisian legacy thus exemplifies a recurring pattern in colonial environmental governance, in which conservationist intent, however genuinely held by individual administrators, becomes institutionally subordinated to extractive imperatives.

10. Environmental Consequences of Colonial Forestry

The environmental consequences of a century of colonial scientific forestry in eastern India were considerable and, in several respects, continue to shape contemporary ecological conditions. The systematic conversion of ecologically diverse mixed forests into managed monocultures of commercially valuable species — most notably sal in the Chotanagpur and Jungle Mahal tracts, and teak plantations elsewhere — resulted in a marked simplification of forest structure and a corresponding decline in floral and faunal biodiversity, as the diverse understorey and canopy composition characteristic of natural mixed forest gave way to even-aged, single-species stands optimised for timber yield rather than ecological function.

The reservation of forest tracts and the concomitant restriction of grazing and shifting cultivation displaced these activities onto a shrinking area of unreserved land, intensifying pressure on marginal tracts and, in several documented instances, precipitating the soil erosion and fertility decline that colonial administrators had originally, if disingenuously, invoked to justify forest reservation in the first place. The disruption of fallow-cycle shifting cultivation similarly undermined an agro-ecological system that had, over centuries, sustained relatively stable soil fertility and forest regeneration, forcing many tribal communities into more ecologically stressed forms of cultivation on increasingly marginal land.

Equally significant, if less immediately visible, was the loss of ecological knowledge transmission associated with the criminalisation of customary forest use: as tribal communities were progressively excluded from active forest management roles, embedded local knowledge regarding species-specific regeneration cycles, medicinal plant distribution, water-source protection, and fire management was correspondingly devalued within the formal governance structure, even as it continued to be practised, often clandestinely, within tribal communities themselves. Finally, the railway-driven demand for sal and teak sleepers, together with the broader commercial extraction that scientific forestry facilitated, produced a documented decline in forest cover across substantial portions of eastern India over the late nineteenth and early twentieth centuries — a decline whose long-term consequences include reduced watershed regulation capacity, increased vulnerability to soil erosion and flash flooding in hill tracts, and a diminished baseline of forest carbon stock, with direct relevance to the region's contemporary exposure to climate variability. Table 4 summarises these environmental consequences alongside their associated colonial policy drivers.

Table 4. Colonial Forest Policies and Their Environmental Consequences.

Policy / Practice	Environmental Consequence
Reservation and monoculture plantation (sal/teak)	Biodiversity simplification; loss of mixed-forest structure and canopy diversity.
Restriction of shifting cultivation	Intensified pressure on marginal/unreserved land; accelerated soil erosion.
Railway-driven timber extraction	Accelerated decline in forest cover across accessible tracts.
Exclusion of tribal communities from forest management	Erosion of indigenous ecological knowledge transmission.
Grazing restriction within reserved forest	Fodder scarcity; livestock pressure displaced to forest-fringe areas.

Source: Compiled by the author from Rangarajan (1996), Guha (1989), and Forest Survey of India (2023).

11. Indigenous Ecological Knowledge and Sustainable Forest Governance

In marked contrast to the colonial characterisation of tribal forest practice as ecologically irrational, a substantial body of ethnographic and environmental-historical research documents the sophistication of indigenous ecological knowledge systems across eastern India's tribal communities. Among the Santhal, Munda, Oraon, and related communities, forest management has historically been embedded within a broader cosmological and institutional framework centred on the sacred grove (often termed *Jaher* or *Sarna sthal*), a demarcated forest patch preserved from clearance and subject to strict customary protection under the authority of village religious and political institutions. Sacred groves, alongside customary norms restricting the felling of particular species, the hunting of particular fauna during breeding seasons, and the use of specific water sources, functioned as *de facto* conservation institutions predating, and operating independently of, colonial or postcolonial statutory conservation frameworks.

Similarly, the fallow-rotation logic underlying shifting cultivation across the tribal uplands of eastern and northeastern India encoded a sophisticated understanding of soil regeneration, secondary succession, and landscape-scale biodiversity maintenance, calibrated through generations of accumulated observation and adjusted flexibly to local ecological conditions — an adaptive capacity that stands in marked contrast to the comparatively rigid, uniform prescriptions of colonial working-plan forestry. Customary tenurial institutions, including community-based rules governing access to grazing land, minor forest produce, and

fuelwood, similarly embedded ecological constraints — limits on extraction, seasonal restrictions, communal enforcement mechanisms — that functioned as informal but often highly effective conservation regimes.

The contemporary relevance of these indigenous knowledge systems extends well beyond historical or anthropological interest. As climate change intensifies pressure on forest ecosystems across eastern India — through altered precipitation patterns, increased frequency of extreme weather events, and shifting species distributions — the adaptive, locally calibrated character of indigenous ecological management offers a potentially valuable complement to, and corrective for, the comparatively rigid prescriptions of centralised forest bureaucracy. It would, however, be analytically naive to romanticise indigenous ecological knowledge as inherently and uniformly sustainable, or to treat tribal communities as undifferentiated custodians of ecological equilibrium; internal social differentiation, demographic pressure, and historically documented instances of resource depletion within tribal-managed landscapes caution against such essentialism. The more defensible claim, and the one advanced in this paper, is that indigenous ecological knowledge systems constitute a substantive, historically demonstrated body of locally calibrated environmental management practice that has been systematically marginalised within formal forest governance, and whose selective, critically informed integration into contemporary policy — rather than either uncritical valorisation or continued exclusion — offers genuine potential for more resilient and equitable forest governance outcomes.

12. Comparative Analysis: Colonial Forest Governance vs Contemporary Forest Policies

A comparative reading of colonial and contemporary forest governance in eastern India reveals a complex pattern of both continuity and departure. The most significant formal departure is embodied in the Forest Rights Act of 2006 (the Scheduled Tribes and Other Traditional Forest Dwellers [Recognition of Forest Rights] Act), which explicitly acknowledges the "historical injustice" done to forest-dwelling communities under colonial and postcolonial forest law, and establishes statutory mechanisms for the recognition of individual and community forest rights, including, significantly, community forest resource rights over customary forest areas. In this respect, the Forest Rights Act represents a genuine rupture with the colonial evidentiary framework established under the 1878 and 1927 Forest Acts, inverting the earlier presumption that forest land belonged to the state unless customary rights could be affirmatively proven, and instead establishing a statutory presumption in

favour of community and individual forest-dweller claims, subject to a defined verification process.

Yet the implementation record of the Forest Rights Act reveals substantial continuities with colonial-era institutional dynamics. Government and independent assessments over the 2015–2024 period have consistently documented low rates of community forest resource rights recognition relative to eligible claims, considerable variation in implementation quality across states, and persistent bureaucratic discretion exercised by forest department officials — the institutional descendants of the colonial forest bureaucracy — in adjudicating claims. The National Forest Policy of 1988, while formally prioritising ecological stability and the needs of local and tribal populations over commercial timber extraction, has similarly been criticised for its continued reliance on a centralised forest bureaucracy structurally similar to its colonial predecessor, and for the persistence of Joint Forest Management arrangements that grant local communities a consultative rather than a genuinely decision-making role in forest governance — an arrangement that some scholars have characterised as a modernised variant of colonial "protected forest" logic, in which community participation is solicited but ultimate authority remains vested in the forest department.

The Compensatory Afforestation Fund Act of 2016 and associated CAMPA mechanisms present a further point of instructive comparison: compensatory afforestation, frequently implemented through monoculture plantation on land that may overlap with community forest resource claims or shifting-cultivation fallow, echoes the colonial-era logic of substituting standardised, revenue-oriented plantation forestry for ecologically diverse, community-managed landscapes, even as it is framed in the contemporary vocabulary of climate mitigation and biodiversity offsetting. At the same time, meaningful departures from colonial practice are evident in the growing, if uneven, institutional recognition of Gram Sabha authority over community forest resources, in state-level experiments with genuinely participatory forest governance, and in the increasing, if still marginal, incorporation of indigenous ecological knowledge into biodiversity conservation and climate adaptation planning, including within India's Nationally Determined Contributions and associated forest-carbon programmes. The comparative picture, in sum, is one of partial, contested, and geographically uneven transformation, rather than either straightforward continuity with colonial forest governance or a complete rupture from it.

13. Policy Recommendations

Based on the preceding historical and comparative analysis, several policy directions merit consideration. First, the accelerated and rigorous implementation of the Forest Rights Act, particularly its community forest resource provisions, requires sustained political commitment, capacity-building within Gram Sabhas, and a substantial reduction in bureaucratic discretion at the district and forest-division level, informed by the historical recognition that discretionary bureaucratic authority has consistently operated to the disadvantage of forest-dependent tribal communities. Second, contemporary shifting-cultivation policy across Northeast India would benefit from a fundamental reorientation away from suppression and toward the support of adequate fallow-cycle lengths, informed by agro-ecological research demonstrating the biodiversity and carbon-sequestration value of well-managed jhum-fallow mosaics, alongside targeted support for communities facing genuine fallow-cycle compression due to land pressure.

Third, compensatory afforestation and forest-carbon programmes should prioritise the restoration of ecologically diverse, mixed-species forest cover over monoculture plantation, and should be designed, wherever feasible, in genuine partnership with affected communities rather than as a top-down bureaucratic exercise, in order to avoid reproducing the ecological simplification associated with colonial-era commercial afforestation. Fourth, the formal integration of indigenous ecological knowledge into biodiversity conservation and climate adaptation planning — through the documentation and, where communities consent, incorporation of sacred grove management practices, customary rotational systems, and traditional agroforestry techniques — should be pursued as a substantive rather than symbolic policy priority. Fifth, forest governance institutions should be restructured to grant Gram Sabhas and community forest resource management committees genuine decision-making authority, rather than the consultative role characteristic of Joint Forest Management, in order to address the persistent gap between the participatory rhetoric and the centralised institutional reality of contemporary Indian forest governance. Table 5 summarises these recommendations alongside their historical rationale and anticipated outcomes.

Table 5. Policy Recommendations and Anticipated Outcomes.

Recommendation	Historical Rationale	Anticipated Outcome
Accelerate FRA/CFR implementation; reduce bureaucratic discretion	Colonial-style evidentiary burden historically disadvantaged tribal claimants	Strengthened tenure security; reduced land/forest conflict
Reorient jhum policy toward fallow-cycle support rather than suppression	Colonial mischaracterisation of shifting cultivation as inherently destructive	Enhanced biodiversity and carbon sequestration
Prioritise mixed-species restoration over monoculture in CAMPA afforestation	Colonial monoculture plantation reduced ecological resilience	Improved biodiversity and climate resilience
Integrate indigenous ecological knowledge into conservation planning	Historical marginalisation despite demonstrated ecological efficacy	More adaptive, locally calibrated conservation outcomes
Grant genuine decision-making authority to Gram Sabhas	JFM and colonial "protected forest" models kept authority centralised	Substantive, rather than symbolic, community governance

Source: Author's synthesis based on Kashwan (2017), Kumar, Singh, and Kerr (2015), and MoEFCC policy documentation.

14. Future Research Directions

Several avenues for future research follow from the analysis presented in this paper. First, systematic, community-based empirical research — including primary ethnographic and participatory fieldwork — is needed to document the current status of indigenous ecological knowledge systems across eastern India's tribal communities and to assess their potential contribution to climate adaptation planning. Second, quantitative research combining remote-sensing forest-cover data with district-level Forest Rights Act implementation records would allow more rigorous assessment of the relationship between community forest rights recognition and biodiversity and forest-cover outcomes. Third, comparative research examining the trajectories of forest rights recognition across other tribal-majority regions of India, and in comparable postcolonial contexts internationally, would strengthen the generalisability of the findings presented here. Fourth, further historical research drawing on colonial-era forest department records and vernacular sources would enrich the historiographical account of tribal resistance movements addressed in this paper, particularly regarding lesser-documented episodes beyond the four movements examined here. Finally, research examining the gendered dimensions of tribal forest relationships — an aspect

necessarily underexplored within the scope of the present study — represents an important direction for future scholarship in this field.

15. CONCLUSION

This paper has traced the historical evolution of tribal–forest relationships in eastern India across more than two centuries, from the pre-colonial commons-based regimes of the Jungle Mahals and adjoining tribal tracts, through the colonial reconstitution of forests as state property under a sequence of Forest Acts and the institutional apparatus of scientific forestry associated with Dietrich Brandis, to the contemporary, if incompletely realised, rights-based reforms embodied in the Forest Rights Act of 2006. The analysis has argued that colonial forestry inaugurated an enduring conceptual and institutional bifurcation between state-centred conservation and community-based ecological stewardship — a bifurcation legitimised through a conservationist vocabulary that simultaneously served extractive, fiscal, and territorial-administrative objectives. The tribal rebellions examined in this paper — the Chuar uprising, the Halba revolt, the Paharia resistance, and the Santhal Hul — are best understood not merely as episodes of anti-colonial political resistance but as historically significant articulations of environmental justice, anticipating by well over a century the vocabulary of resource rights that animates contemporary forest governance debate.

The comparative analysis presented here demonstrates that while contemporary Indian forest policy has departed from colonial governance in important formal respects, substantial institutional continuities persist, particularly in the discretionary authority retained by the forest bureaucracy and in the recurring privileging of centralised, standardised management approaches over genuinely community-driven governance. Addressing these continuities, this paper has argued, requires not merely the improved implementation of existing legislation but a more fundamental reorientation of forest governance toward the substantive recognition of indigenous ecological knowledge and community decision-making authority. As eastern India's forest landscapes confront the compounding pressures of climate change, biodiversity loss, and continued developmental resource demand, such reorientation represents not merely a matter of historical redress but an urgent requirement for ecologically resilient and socially just forest governance in the twenty-first century.

16. Suggested Conceptual Figures

The following three conceptual figures are proposed to accompany this paper in final journal formatting; visual design is left to the production stage, and captions are provided below to guide their construction.

Figure 1. Conceptual timeline mapping the evolution of tribal–forest relationships in eastern India across four phases — pre-colonial commons, colonial forest reservation, post-independence state forestry, and rights-based reform (FRA 2006) — annotated with the four major tribal revolts examined in this paper (Chuar, Halba, Paharia, Santhal).

Figure 2. Conceptual political-ecology diagram illustrating the bidirectional relationship between state forest-policy instruments (legislation, scientific forestry, revenue objectives) and tribal ecological practice (shifting cultivation, sacred groves, customary tenure), mediated by resistance movements and contemporary rights-based reform.

Figure 3. Comparative institutional schematic contrasting colonial/centralised forest governance (top-down, forest-department-centred) with community forest resource governance under the Forest Rights Act (Gram Sabha-centred, bottom-up), highlighting points of continuity (bureaucratic discretion) and departure (statutory rights recognition).

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