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Traditional Knowledge and Conservation Status of Ethnobotanical Resources Used by the Mishing and Tea-Tribe Communities of Golaghat District, Assam

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ABSTRACT :

This study examines ethnobotanical knowledge and plant resource conservation among the Mishing and Tea-Tribe communities in Golaghat District, Assam. Between January 2020 and December 2021, 240 informants from 18 villages participated in semi-structured interviews, focus group discussions, and field surveys. The research documented 127 plant species across 98 genera and 54 families used for medicinal, nutritional, ritual, and economic purposes. Quantitative analysis revealed significant use-value indices (0.82–1.94) for key species, while conservation assessments indicated 23% of documented plants face varying degrees of threat. The Mishing community demonstrated higher diversity in medicinal plant use (89 species) compared to Tea-Tribe communities (67 species), though overlap existed in food and fiber applications. Results show that younger generations (18–35 years) possess markedly reduced ethnobotanical knowledge compared to elders (above 60 years), with knowledge transmission declining by approximately 64%. Habitat degradation, commercial extraction, and socio-economic transitions emerged as primary threats to both knowledge systems and plant populations. Findings suggest that community-based conservation models integrated with traditional ecological knowledge could address resource depletion while supporting cultural preservation.

Keywords: *Ethnobotany, indigenous knowledge, Mishing community, Tea-Tribe, plant conservation, traditional ecological knowledge, Assam*

I. Introduction:

Plant based knowledge systems among indigenous and local communities represent centuries of careful observation, experimentation, and cultural transmission. These knowledge frameworks have enabled human societies to identify, utilize, and manage plant resources for survival, health maintenance, and spiritual practice (Uprety et al., 2012). In Northeast India, ethnobotanical traditions remain particularly rich due to the region's exceptional biodiversity and cultural heterogeneity. Assam hosts multiple ethnic groups, each maintaining distinct relationships with their botanical environment (Teron & Borthakur, 2013).

The Mishing community, one of Assam's major plains tribal groups, has historically occupied floodplain areas along the Brahmaputra and its tributaries. Their agrarian lifestyle, centered on wet rice cultivation and fishing, has developed alongside intimate knowledge of wetland and riparian vegetation (Pegu et al., 2019). The Tea-Tribe communities, descendants of laborers brought to Assam's tea plantations during British colonial rule from central and eastern India, have adapted their original ethnobotanical practices to Assam's ecological context while developing new plant use strategies (Sharma et al., 2020). Despite geographical proximity, these communities maintain separate cultural identities and potentially divergent plant knowledge systems.

Golaghat District occupies a transition zone between the Brahmaputra valley plains and Naga Hills, creating diverse habitats from wetlands to semi-evergreen forests. This ecological heterogeneity supports remarkable plant diversity, making the district significant for both biodiversity conservation and ethnobotanical research. However, recent decades have witnessed rapid environmental and social changes. Tea plantation expansion, agricultural intensification, infrastructure development, and commercial timber extraction have altered traditional landscapes (Borah et al., 2018). Simultaneously, modernization, formal education systems emphasizing mainstream knowledge, and migration have disrupted intergenerational knowledge transfer.

Previous ethnobotanical research in Assam has predominantly focused on single communities or specific use categories, particularly medicinal plants. Studies examining comparative ethnobotany between culturally distinct groups sharing similar geographical areas remain limited. Furthermore, systematic assessments linking traditional plant use with current conservation status are scarce, despite their importance for developing evidence-based conservation strategies.

II.Objectives : The main objectives in this paper are -

1. To document and compare ethnobotanical plant species used by Mishing and Tea-Tribe communities for medicinal, nutritional, ritual, and economic purposes.

2. To quantify plant use patterns through ethnobotanical indices and assess the conservation status of documented species.
3. To identify primary threats to ethnobotanical resources and evaluate community perceptions of resource availability changes.
4. To analyze intergenerational variation in ethnobotanical knowledge and identify factors influencing knowledge transmission between generations.

III.Methodology:

The present study was conducted in Golaghat district of eastern Assam, India, situated within the Indo-Burma biodiversity hotspot. The district experiences a humid subtropical climate with diverse ecosystems including tropical moist deciduous forests, riparian vegetation, wetlands, agricultural landscapes, and tea plantations. Fieldwork was carried out from January 2020 to December 2021, covering all four seasons to document seasonal variation in plant use. Two major ethnic groups the Mishing and Tea-Tribe communities—were selected due to their long-standing dependence on local biological resources and rich traditional knowledge systems. Eighteen villages were selected through purposive sampling, comprising nine Mishing villages and nine Tea-Tribe villages, based on population size, geographical distribution, presence of knowledgeable elders or healers, and community willingness to participate. A total of 240 informants (120 from each community) were selected using snowball sampling, beginning with key informants identified by community leaders. Selection criteria included age above 18 years, residence in the study area for at least 20 years, and recognized ethnobotanical knowledge. Prior informed consent was obtained from all participants following approved ethical protocols.

Data were collected using semi-structured interviews, focus group discussions, field walks, and participant observation. Interviews documented local plant names, parts used, preparation methods, and application categories. Focus group discussions explored knowledge transmission, resource availability, and conservation concerns. Field walks facilitated in situ plant identification and observation of harvesting practices. Voucher specimens were collected using standard botanical methods and taxonomically verified at the Botanical Survey of India.

Data analysis involved qualitative thematic and content analysis, along with quantitative ethnobotanical indices such as Use Value, Informant Consensus Factor, and Fidelity Level. Descriptive and inferential statistics were computed using SPSS version 26.0. Conservation status was assessed through literature review, field observations, and informant perceptions of population trends.

IV.Result and Discussion:

4.1 Documented Plant Diversity

A total of 127 plant species across 98 genera and 54 families were documented. Families with highest species representation included Fabaceae (11 species), Euphorbiaceae (8 species), Zingiberaceae (7 species), Lamiaceae (6 species), Asteraceae (6 species), and Rutaceae (5 species). Growth forms included trees (42 species, 33.1%), herbs (38 species, 29.9%), shrubs (27 species, 21.3%), climbers (16 species, 12.6%), and ferns (4 species, 3.1%). Wild plants accounted for 74 species (58.3%), while 53 species (41.7%) were cultivated or semi-cultivated in homestead gardens.

Table 2. Summary of Documented Plant Diversity

Attribute	Number	Percentage (%)
Total species	127	100
Genera	98	–
Families	54	–
Wild species	74	58.3
Cultivated/semi-cultivated	53	41.7

Table 3. Growth Form Distribution of Documented Species

Growth Form	Number of Species	Percentage (%)
Trees	42	33.1
Herbs	38	29.9
Shrubs	27	21.3
Climbers	16	12.6
Ferns	4	3.1

4.2 Use Categories

Plants served multiple functions, with many species having applications across several use categories:

Table 4. Plant Use Categories and Species Representation

Use Category	Number of Species	Percentage (%)
Medicinal	104	81.9
Food and Nutrition	68	53.5
Ritual and Religious	34	26.8
Construction and Crafts	29	22.8
Fuel and Fodder	23	18.1
Other Uses	19	15.0

Medicinal Uses: The most prominent category, with 104 species (81.9%) used for treating various ailments. Common therapeutic applications included gastrointestinal disorders (48 species), respiratory ailments (32 species), skin diseases (29 species), fever and infections (27 species), wounds and injuries (24 species), and reproductive health issues (19 species).

Food and Nutrition: Sixty-eight species (53.5%) provided nutritional resources. Categories included leafy vegetables (31 species), fruits (19 species), seeds and nuts (11 species), tubers and roots (9 species), and condiments/spices (8 species). Many wild vegetables were seasonal, collected during specific months.

Ritual and Religious Uses: Thirty-four species (26.8%) played roles in religious ceremonies, festivals, and life-cycle rituals. Applications included offerings to deities, purification ceremonies, protective charms, and funeral rites.

Construction and Crafts: Twenty-nine species (22.8%) provided materials for house construction, tool making, basketry, rope making, and other crafts.

Fuel and Fodder: Twenty-three species (18.1%) served as fuelwood or fodder for livestock.

Other Uses: Additional applications included fish poison (7 species), soap substitutes (5 species), dyes (4 species), and insect repellents (3 species).

4.3 Comparative Analysis Between Communities

Significant differences emerged in plant use patterns between Mishing and Tea-Tribe communities:

Medicinal Plants: The Mishing community used 89 medicinal plant species, while Tea-Tribe communities used 67 species. Thirty-two species were exclusive to Mishing traditional medicine, 10 species were exclusive to Tea-Tribe use, and 57 species were used by both communities. Mishing medicinal practices showed stronger emphasis on plants for digestive disorders and respiratory ailments, while Tea-Tribe practices included more species for treating fevers and skin conditions.

Food Plants: Greater overlap existed in food plant use. The Mishing community utilized 52 food plant species compared to 47 in Tea-Tribe communities. Exclusive use by Mishing informants was recorded for 17 species (primarily aquatic and wetland plants), while 12 species were exclusive to Tea-Tribe communities (several being plants native to their ancestral regions or introduced during migration). Thirty-five species were shared between communities.

Ritual Plants: The Mishing community employed 28 species for religious purposes, while Tea-Tribe communities used 18 species. Only 12 species overlapped, reflecting distinct spiritual traditions and ceremonial practices.

Plant Part Utilization: Both communities most frequently used leaves (42.5% of all use reports), followed by roots (18.3%), fruits (12.7%), whole plant (9.4%), bark (7.8%), seeds (5.2%), and flowers (4.1%). However, Mishing informants showed higher use of underground parts (roots, rhizomes, tubers) for medicinal purposes compared to Tea-Tribe communities.

4.4 Use Value Analysis

Use Value calculations identified species with highest cultural importance. Top-ranking species (UV > 1.5) included:

- *Zingiber officinale* Roscoe (ginger) - UV = 1.94
- *Curcuma longa* L. (turmeric) - UV = 1.89
- *Ocimum tenuiflorum* L. (holy basil) - UV = 1.87
- *Centella asiatica* (L.) Urb. (Asiatic pennywort) - UV = 1.76
- *Phyllanthus emblica* L. (Indian gooseberry) - UV = 1.68
- *Azadirachta indica* A.Juss. (neem) - UV = 1.65
- *Terminalia chebula* Retz. (chebulic myrobalan) - UV = 1.58

These species demonstrated multiple uses and high informant consensus. Lower UV values (0.04–0.20) were recorded for 23 species mentioned by only single informants or for highly specific applications.

4.5 Informant Consensus Analysis

Informant Consensus Factor values varied by use category:

- Gastrointestinal disorders: Fic = 0.86
- Respiratory ailments: Fic = 0.82
- Wounds and injuries: Fic = 0.79
- Skin diseases: Fic = 0.74

- Fever and infections: Fic = 0.71
- Reproductive health: Fic = 0.68

High consensus for gastrointestinal and respiratory categories indicates strong agreement on effective treatments for these common ailments. Lower consensus in reproductive health suggests more individualized knowledge or reluctance to share information about sensitive topics.

4.6 Conservation Status Assessment

Conservation assessment revealed concerning patterns:

IUCN Red List Species: Eight documented species appear on the IUCN Red List: *Aquilaria malaccensis* Lam. (Critically Endangered), *Phoebe hainesiana* Brandis (Endangered), *Garcinia pedunculata* Roxb. (Vulnerable), *Magnolia champaca* (L.) Baill. ex Pierre (Near Threatened), and four species listed as Least Concern.

Local Conservation Status: Based on field observations and informant assessments:

- Abundant: 42 species (33.1%)
- Common: 43 species (33.8%)
- Occasional: 25 species (19.7%)
- Rare: 14 species (11.0%)
- Depleted: 3 species (2.4%)

Twenty-nine species (22.8%) exhibited declining populations according to informant reports, with 14 species classified as rare or depleted locally. Species identified as facing greatest local conservation concern included *Aquilaria malaccensis*, *Dioscorea deltoidea* Wall. ex Kunth, *Piper longum* L., *Oroxylum indicum* (L.) Kurz, *Rauvolfia serpentina* (L.) Benth. ex Kurz, and *Costus speciosus* (J.Koenig) Sm.

4.7 Threats to Ethnobotanical Resources

Informants identified multiple threats affecting plant populations:

Habitat Loss and Degradation: Mentioned by 87.5% of informants as the primary threat. Specific factors included tea plantation expansion (68.3%), agricultural intensification (54.2%), infrastructure development (roads, buildings) (41.7%), and settlement expansion (35.8%). Mishing informants particularly emphasized wetland drainage and river system alteration affecting aquatic and riparian plants.

Over-Extraction: Reported by 69.2% of informants. Commercial collection of medicinal plants for external markets has increased extraction pressure on high-value species. Timber harvesting and fuelwood collection affect tree species. Unregulated harvest without considering population regeneration threatens vulnerable species.

Land Tenure and Access Restrictions: Mentioned by 52.5% of informants. Privatization of previously common-access areas, tea estate boundaries restricting forest access, and unclear forest rights limit community access to traditional collection sites.

Climate and Environmental Changes: Noted by 41.7% of informants. Altered rainfall patterns affect plant phenology and availability. Unpredictable weather events damage populations. Changes in flowering and fruiting times disrupt traditional collection schedules.

Invasive Species: Mentioned by 28.3% of informants. Invasive plants like *Mikania micrantha* Kunth, *Chromolaena odorata* (L.) R.M.King & H.Rob., and *Lantana camara* L. were identified as displacing native vegetation and altering habitats.

4.8 Intergenerational Knowledge Variation

Analysis revealed significant differences in ethnobotanical knowledge across age groups. Knowledge scores, calculated based on the number of species identified and uses described by each informant, showed clear age-related patterns:

Table 5. Ethnobotanical Knowledge Scores by Age Group

Age Group (years)	Mean Species Identified	SD
>60	48.3	12.7
51–60	39.7	11.2
36–50	26.4	9.6
18–35	17.5	8.3

ANOVA: $F = 89.34$, $p < 0.001$

One-way ANOVA indicated highly significant differences between age groups ($F = 89.34$, $p < 0.001$). Post-hoc tests showed significant differences between all age group pairs except the two oldest groups.

Younger informants (18–35 years) possessed approximately 64% less knowledge than the oldest group (above 60 years). This decline was consistent across both communities, though Tea-Tribe youth showed slightly steeper knowledge loss.

Factors Influencing Knowledge Variation:

Formal Education: Inverse relationship existed between formal education level and ethnobotanical knowledge. Informants with no formal education averaged 42.1 species identified, while those with high school or higher education averaged 21.6 species ($t = 12.68$, $p < 0.001$).

Table 6. Factors Influencing Knowledge Variation

Factor	Comparison	Mean Species Identified	Statistical Result
Education	No formal vs ≥High school	42.1 vs 21.6	t = 12.68, p < 0.001
Occupation	Traditional vs non-traditional	41.3 vs 23.7	t = 9.82, p < 0.001
Proximity to forests	Adjacent vs non-adjacent	38.9 vs 28.4	t = 6.53, p < 0.001
Family transmission (<35	Yes	72% from healer families	–

Occupation: Informants engaged in agriculture or traditional livelihoods demonstrated significantly higher knowledge (mean = 41.3 species) compared to those in wage labor, business, or service occupations (mean = 23.7 species) (t = 9.82, p < 0.001).

Proximity to Natural Areas: Informants residing in villages adjacent to forests or wetlands showed higher knowledge (mean = 38.9 species) than those in more urbanized areas (mean = 28.4 species) (t = 6.53, p < 0.001).

Family Transmission: Only 38.3% of informants below 35 years reported learning plant knowledge from parents or grandparents, compared to 84.2% of informants above 60 years. Among younger informants who possessed substantial knowledge, 72% came from families of traditional healers or maintained close relationships with knowledgeable elders.

4.9 Knowledge Transmission Patterns

FGDs and interviews revealed changing patterns in how knowledge moves between generations:

Traditional Transmission: Historically, plant knowledge was transferred through daily life activities—children accompanying parents to collect plants, participating in food preparation, observing healing practices, and receiving explicit instruction from elders. Knowledge was contextualized within actual use situations.

Current Patterns: Younger generations spend considerably less time in activities involving plant use. School attendance occupies children during crucial learning periods. Migration for education or employment removes youth from home environments for extended periods. Reduced dependency on subsistence agriculture and wild food collection eliminates practical contexts for knowledge application. Commercial medicine and market-based food systems provide alternatives to traditional plant use, decreasing motivation for learning.

Informants repeatedly emphasized that younger community members “are not interested” in traditional knowledge. However, deeper exploration revealed structural barriers rather than simple disinterest. Young people face competing demands on their time and attention. Economic pressures favor wage employment over subsistence activities. Social pressure exists to adopt modern lifestyles and distance themselves from practices coded as “backward.”

Despite overall decline, pockets of knowledge retention persist. Some families, particularly those of traditional healers, continue active transmission. Certain knowledge domains, especially food plants still regularly consumed, show better retention than others. Young people demonstrated awareness of highly visible or frequently used species but lacked detailed knowledge about preparation methods, dosages, or less common applications.

4.10 Community Perceptions of Change

Informants provided extensive commentary on changes they have witnessed over their lifetimes:

Plant Availability: Eighty-four percent of informants above 50 years reported that many plants previously abundant have become difficult to find. Specific examples included medicinal species like *Rauvolfia serpentina*, *Asparagus racemosus* Willd., and *Tinospora cordifolia* (Willd.) Miers, now requiring travel to distant locations. Elders recalled when these plants grew near villages but noted their disappearance from familiar sites.

Landscape Transformation: Informants described dramatic landscape changes. Areas once forested have converted to tea plantations or agricultural fields. Wetlands have been drained or filled. River courses have shifted. These transformations have eliminated habitats where important plant species grew.

Knowledge Status: Many elders expressed concern about knowledge loss, stating variations of “when we die, this knowledge will die with us.” Some reported attempting to teach younger family members with limited success. Others had resigned themselves to knowledge disappearance, viewing it as inevitable given changing times.

Future Outlook: Opinions varied regarding future trajectories. Some informants expressed pessimism, believing traditional knowledge and plants would largely disappear within a generation. Others maintained cautious optimism, noting recent increased interest in traditional medicine and organic foods as potentially reviving interest in plant knowledge. Several suggested documentation projects, cultivation initiatives, and education programs as possible interventions.

The documentation of 127 plant species from 54 families demonstrates significant ethnobotanical diversity in Golaghat District. This diversity reflects both the region's rich floristic composition and these communities' extensive botanical engagement. Compared to previous studies in Assam—Saikia et al. (2010) documenting 83 species among Tai-Ahom, Borah and Prasad (2017) recording 67 species with Tiwa tribe, and Pegu et al. (2019) identifying 91 species in Mishing communities elsewhere—this study reveals comparable or higher diversity, validating the area's ethnobotanical significance.

The comparative analysis revealed both shared knowledge and distinct cultural patterns. Fifty-seven medicinal species used by both communities suggests either shared ecological knowledge developed through parallel experience with local flora or knowledge exchange through interaction. However, substantial non-overlap (32 Mishing-exclusive species, 10 Tea-Tribe-exclusive species) indicates cultural specificity in plant selection and application. This variation likely reflects different medical paradigms, distinct cultural concepts of disease etiology, and historical knowledge from different geographical origins.

The Mishing community's higher medicinal plant diversity (89 vs. 67 species) may relate to their longer regional presence and deeper integration with local ecosystems. Mishing traditional medicine shows clear influences from both indigenous Tibeto-Burman practices and Ayurvedic principles absorbed through Hindu contact. Tea-Tribe communities' medicinal knowledge appears to blend practices from ancestral regions with plants adopted after settling in Assam. Their use of species native to central and eastern India, still maintained through cultivation or memory, exemplifies knowledge persistence despite geographical displacement.

Greater overlap in food plants suggests convergence driven by nutritional necessity and ecological availability. Wild food plants offer free, accessible nutrition, creating strong incentive for knowledge sharing across cultural boundaries. Ritual plant differences reflect distinct religious frameworks and cosmologies that remain more culturally bounded than practical botanical knowledge.

V.Conclusion:

This research provides comprehensive documentation of ethnobotanical knowledge and resources among the Mishing and Tea-Tribe communities of Golaghat District, Assam. The 127 documented plant species spanning medicinal, nutritional, ritual, and material applications demonstrate remarkable botanical diversity and cultural richness. Comparative analysis reveals both shared ecological knowledge and distinct cultural patterns in plant selection and use, supporting the hypothesis that ethnobotanical knowledge varies between communities with different cultural origins and histories.

Conservation assessment indicates significant concern, with approximately 23% of documented species facing population decline or conservation threat. Habitat loss from tea plantation expansion and agricultural intensification emerges as the primary threat, supplemented by commercial over-extraction and climate change impacts. The finding that high cultural importance combined with habitat specialization and commercial value predicts elevated conservation concern supports targeted protection for such species.

Intergenerational analysis reveals substantial knowledge erosion, with younger age cohorts possessing approximately 64% less ethnobotanical knowledge than elders. This pattern reflects disrupted knowledge transmission resulting from formal education, occupational change, reduced practical engagement with plant resources, and transformed economic contexts. The hypothesis that knowledge decreases with age while formal education inversely correlates with traditional knowledge receives strong support.

These findings underscore the interconnected nature of biological and cultural diversity conservation. Effective approaches must simultaneously address plant population threats and knowledge transmission disruption. Community-based conservation frameworks integrating traditional ecological knowledge with scientific conservation, establishing community resource rights, creating sustainable use protocols, and supporting knowledge transmission offer promising pathways forward.

The research contributes baseline data essential for conservation planning, cultural preservation initiatives, and policy development. It demonstrates the value of comparative ethnobotany, quantitative ethnobotanical assessment, and integrated analysis of both biological resources and associated knowledge systems. For the Mishing and Tea-Tribe communities of Golaghat, this documentation provides a resource for knowledge revitalization, conservation advocacy, and community empowerment in resource management decisions.

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