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Beyond Text and Technology: Elderly Adivasi Knowledge-Keepers as Living Libraries of Ecological Wisdom in Kerala's Western Ghats

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Abstract

This paper reimagines the role of elderly Adivasi knowledge-holders in Kerala's Western Ghats as "living libraries" embodied repositories of ecological, medicinal, and seasonal knowledge transmitted orally across generations. Drawing on ethnographic fieldwork among Kurichya, Kattunaickan, and Paniya elders (n=65), we examine how traditional environmental knowledge (TEK) functions outside institutional science education frameworks. Using participatory methods including life histories, semi-structured interviews, and intergenerational dialogues, we analyze the sociocultural mechanisms sustaining knowledge transmission and the structural barriers posed by formal schooling, language shift, and digital exclusion. We argue that dominant models of science education often delegitimize Indigenous ways of knowing, rendering elder wisdom invisible despite its relevance to biodiversity conservation, climate resilience, and sustainable living. Our findings reveal that these elders do not merely "hold" knowledge; they perform, contextualize, and teach it through storytelling, ritual, and lived practice, embodying pedagogical roles unrecognized by state curricula. By framing them as "living libraries," we challenge the text-centric bias in science education and advocate for curriculum reforms that recognize elders as co-educators. The study contributes to cultural studies of science education by centering marginalized epistemologies and proposing a model of relational knowledge stewardship where intergenerational dialogue, respect, and place-based learning become central to educational policy in ecologically sensitive regions.

Keywords: Indigenous knowledge systems, Traditional ecological knowledge (TEK), Science education and cultural diversity, Elder knowledge-keepers, Oral epistemologies, Adivasi communities, decolonizing science education.

1. Introduction

In global debates about sustainability, climate change, and biodiversity loss, Indigenous ecological knowledge has gained increasing attention as a complementary system to Western scientific paradigms. Yet within formal science education systems even in regions rich with such traditions this knowledge remains peripheral, if not actively excluded. In Kerala, a state lauded for high literacy and human development, tribal communities in the biodiverse Western Ghats continue to

preserve sophisticated understandings of forest ecosystems, plant medicine, and seasonal rhythms. These are not static facts but dynamic, context-sensitive practices passed down primarily through oral traditions and embodied experience.

Central to this transmission are elderly Adivasi individuals, many over the age of 60, who serve as custodians of ancestral wisdom. Despite their expertise in botany, meteorology, pharmacology, and ecology fields directly linked to science education they are rarely acknowledged as educators or knowledge authorities. Instead, school curricula treat such knowledge as folklore, while digital information infrastructures assume literacy and technological access, further marginalizing non-text-based epistemologies.

This paper intervenes at the intersection of cultural studies, science education, gerontology, and Indigenous knowledge systems. It asks: What happens when we shift our lens from archival storage to human embodiment of knowledge? How might science education benefit from recognizing elders not as relics of the past, but as active teachers of environmental literacy?

We propose the concept of "living libraries" a metaphor grounded in empirical reality to describe how elderly Adivasi knowledge-keepers in Wayanad and Idukki districts perform critical educational roles outside formal institutions. Through storytelling, demonstration, and ritualized teaching, they transmit complex scientific understandings embedded in culture and place. Their pedagogy is relational, experiential, and adaptive qualities increasingly valued in progressive science education discourse.

Drawing on participatory ethnography with three tribal communities, this study examines how TEK is preserved, challenged, and potentially integrated into broader educational ecosystems. It responds directly to calls in Cultural Studies of Science Education for research that decenters hegemonic knowledge forms and uplifts subaltern voices (Aikenhead, 2006; Bang et al., 2012; Oliveira et al., 2020).

By centering the lived experiences of aging knowledge-holders, we also engage with gerontological dimensions of identity, memory, and legacy often overlooked in educational research. As youth migrate and languages fade, the urgency to document not just record, but recognize these knowledge systems becomes both ethical and ecological. This work does not seek to extract or archive knowledge, but to reposition its holders within the moral and pedagogical landscape of science education. We ask: If an elder knows 80+ medicinal plants and their uses, seasonal indicators for sowing, and animal behavior patterns tied to monsoon cycles why she is not considered a science teacher?

Our findings call for a radical rethinking of who counts as an educator, what counts as science, and where learning truly takes place.

2. Research Questions

1. How do elderly Adivasi knowledge-keepers in Kerala's Western Ghats conceptualize their role in preserving and transmitting ecological knowledge?
2. What sociocultural, linguistic, and institutional factors support or hinder intergenerational transmission of Traditional Environmental Knowledge (TEK)?
3. In what ways do current science education policies and practices marginalize or invisibilize Indigenous elder knowledge?
4. How can the metaphor of the "living library" inform more inclusive, culturally responsive models of science education in tribal and hilly regions?

3. Literature Review

3.1 Indigenous Knowledge and Science Education: Beyond the "Supplement" Model

The relationship between Indigenous knowledge and science education has long been fraught with epistemic hierarchy. Early approaches treated Indigenous knowledge as a "supplement" to Western science useful for engagement but not legitimate as science itself (Aikenhead, 2006). Aikenhead's concept of "border crossing" highlighted how Indigenous students must navigate epistemological divides to succeed in school science, often at the cost of cultural disidentification.

More recently, scholars have called for epistemological parity recognizing Indigenous knowledge as a coherent, systematic, and empirically grounded way of understanding the natural world (Bang et al., 2012; Snively & Corsiglia, 2001; McKinley, 2008). In Cultural Studies of Science Education, Semken and Brandt (2010) argue that place-based, culturally responsive science education must begin by validating local knowledge systems as scientific. This shift is not merely pedagogical but political: it challenges the colonial legacy of science as a universal, culture-free enterprise (de la Cadena, 2015; Oliveira et al., 2020). This study contributes by focusing not on students' navigation of borders, but on elders as original architects of alternative scientific frameworks a perspective underrepresented even in progressive science education literature.

3.2 Elders as Knowledge Keepers and Educators

While youth are often the focus of science education research, the role of elders as knowledge transmitters has gained attention in anthropology, gerontology, and Indigenous studies. Cruikshank (1998) shows how storytelling by Yukon elders encodes complex ecological and moral knowledge. Similarly, Nabhan (2000) documents how aging Indigenous farmers in the Americas serve as "repositories of agronomic memory."

In educational contexts, elders are increasingly recognized as community-based science educators not through formal curricula, but through apprenticeship, demonstration, and ritual (Kawagley & Barnhardt, 1998). However, this role is rarely acknowledged in state schooling systems, which privilege youth, literacy, and standardization (Denison, 2011). Notably, gerontological perspectives remain marginal in science education research, despite the centrality of age in knowledge legitimacy within many Indigenous communities (Tidwell, 2013). This study bridges this gap by centering the pedagogical agency of elderly Adivasis, positioning aging not as decline but as accumulation and authority.

3.3 Orality, Embodiment, and Non-Textual Ways of Knowing

Western science education remains deeply text-centric and visual, privileging written records, diagrams, and laboratory reports. In contrast, many Indigenous knowledge systems are oral, performative, and embodied (Ingold, 2000). Knowledge is not "stored" but enacted through walking in the forest, preparing herbal poultices, or singing seasonal chants (Ingold & Kurttila, 2000).

This epistemological difference renders Indigenous knowledge vulnerable to erasure in digital and institutional archiving projects that assume text = permanence. As Whyte (2013) cautions, digitizing Indigenous knowledge without community control can replicate colonial extraction. Instead, scholars advocate for relational stewardship where knowledge remains tied to people, places, and protocols. The "living library" metaphor directly engages this critique, arguing that the elder's body and voice are the archive not a substitute for documentation, but its source and guardian.

3.4 Tribal Knowledge Systems in India: Erasure and Resilience

In the Indian context, Adivasi (tribal) knowledge systems have long been dismissed as "primitive" or "superstitious" (Sharma, 2009). Yet ethnobotanical studies confirm sophisticated taxonomies of plants, soils, and ecosystems among Kerala's tribal groups (Karthikeyan et al., 2003; Nair et al., 2018). The Kurichyas, for instance, maintain detailed knowledge of 80+ medicinal plants, monsoon indicators, and forest navigation knowledge directly relevant to climate adaptation.

Despite Kerala's high literacy, tribal epistemologies remain excluded from school science curricula (George & Joseph, 2020). State-led "documentation" efforts often occur without informed consent or benefit-sharing, reinforcing epistemic injustice (Sivaramakrishnan, 2018). Meanwhile, rapid urbanization, language loss (e.g., Paniya dialect), and youth migration threaten intergenerational transmission (Kannan & James, 2021). This study responds to this crisis not through salvage ethnography, but through collaborative recognition aligning with India's National Education Policy (2020) call to "integrate local and Indigenous knowledge systems" into education.

4. Methodology

4.1 Philosophical Orientation and Design

This study adopts a critical constructivist paradigm, recognizing knowledge as socially constructed, historically situated, and shaped by power relations. It draws from decolonial theory and feminist standpoint epistemology, privileging the perspectives of marginalized knowers. An ethnographic case study approach was employed across three Adivasi communities in Wayanad and Idukki districts: Kurichya, Kattunaickan, and Paniya. These groups were selected due to their deep forest dependence, distinct knowledge systems, and documented vulnerability to cultural erosion.

4.2 Participants

The study involved 63 participants in total:

- Primary: 35 elderly Adivasis (aged 60+) identified by community members as knowledge-holders.
- Secondary: 20 younger community members (ages 15–35).
- Key Informants: 8 individuals (teachers, ASHA workers, NGO staff).

Selection was via purposive and snowball sampling, ensuring representation of gender, subsistence roles, and types of knowledge.

4.3 Data Collection

All instruments were administered orally in Malayalam or native dialects with trained bilingual researchers. Methods included:

- Life History Interviews: Open-ended narratives exploring personal journeys in learning and teaching knowledge.
- Semi-Structured Interviews: Focused on knowledge domains, transmission practices, and perceptions of formal education.
- Intergenerational Dialogues: Facilitated conversations between elders and youth on continuity and change.
- Participant Observation: Attendance at rituals, healing sessions, forest walks, and community meetings.
- Visual Methods: Use of photo elicitation and hand-drawn seasonal calendars to access non-textual knowledge.

4.4 Ethical Framework

Informed consent was obtained verbally and through thumbprints. Approval was secured from the Institutional Ethics Committee and Tribal Welfare Department, Government of Kerala. The study adhered to UNDRIP principles: Free, Prior, and Informed Consent (FPIC). Data was shared back with communities in accessible formats (audio summaries, illustrated booklets), and pseudonyms were used throughout.

4.5 Data Analysis

Data was analyzed using thematic analysis via NVivo 14. The process involved:

- Inductive Coding: Initial open coding of interview transcripts and field notes.
- Axial Coding: Identifying patterns related to recognition, resistance, resilience, and erasure.
- Triangulation: Cross-verifying data across interviews, observations, and dialogues to enhance trustworthiness.
- Reflexivity: Maintained through researcher journaling and peer debriefing to mitigate researcher bias.

5. Results and Analysis

The analysis yielded four primary themes corresponding to the research questions, highlighting the tension between embodied Indigenous knowledge and formalized education systems.

5.1 Embodied Pedagogy: Knowledge as Practice

When asked where their knowledge resides, 88% of elder participants rejected the notion of the "mind" as the sole container. Instead, they described knowledge as residing in their "hands" and "voice." One Kurichya elder, Ammi (pseudonym), stated:

"You cannot write the smell of the rain on paper. You must stand in the forest when the wind changes. The knowledge is in my feet knowing the soil, not in a book."

This aligns with Ingold's (2000) concept of embodied knowledge. The data indicates that transmission occurs through performance rather than instruction. 30 out of 35 elders demonstrated teaching through action (e.g., weaving, plant identification) rather than verbal explanation alone. This confirms that TEK is dynamic and context-sensitive, challenging the static nature of textbook science.

5.2 Barriers to Transmission: Language and Migration

Intergenerational dialogues revealed significant friction in knowledge transmission. While 90% of elders expressed a desire to teach, only 40% of youth reported regular engagement with elders on ecological matters. Key barriers identified included:

- Language Shift: 25 of the 35 elders noted that younger generations are losing fluency in native dialects (e.g., Paniya), making nuanced ecological terms untranslatable.
- Formal Schooling: Youth attendance at formal schools was cited by 28 elders as a primary disruptor. As one Kattunaickan elder noted, "When they go to school, they learn that our ways are wrong. They come back and ask for medicine in English names I do not know."
- Migration: Economic migration of youth to urban centers was identified as a critical threat to continuity, corroborating findings by Kannan and James (2021).

5.3 Institutional Invisibility and Epistemic Injustice

Encounters with formal systems were predominantly negative. None of the 35 elders had ever been invited to a school as a resource person. When asked about "science," 20 elders associated the word with "hospital" or "government office," indicating a disconnect between local ecology and institutional science.

Extraction vs. Recognition: Key informants (NGO staff) reported that researchers often document knowledge without returning benefits. This reinforces Sivaramakrishnan's (2018) argument on epistemic injustice.

Curriculum Exclusion: Teachers interviewed admitted that while they value local knowledge, the state curriculum leaves no space for it. "There is no column in the lesson plan for grandmother's stories," one teacher noted.

5.4 The "Living Library" Metaphor

When introduced to the metaphor of the "living library," 32 of 35 elders resonated with the concept but added crucial caveats. They agreed they are repositories but emphasized that a library implies static storage.

"A book stays on the shelf. I must walk to teach. If I stop walking, the knowledge dies," said a Paniya elder.

This suggests that while the metaphor is useful for policy advocacy (framing elders as educational assets), it must be understood as a dynamic library. Youth participants expressed interest in "learning from the library" if it occurred in the forest rather than a classroom, supporting the need for place-based learning models (Semken & Brandt, 2010).

6. Discussion

The findings underscore a profound epistemological clash between the text-centric bias of formal science education and the oral-embodied nature of Adivasi TEK. Consistent with Aikenhead (2006), the current system forces Indigenous students to cross borders that delegitimize their home knowledge. However, this study extends that critique by showing that the "border" is not just for students; it excludes the elders themselves from the category of "educator."

The conceptualization of elders as "living libraries" offers a potent policy tool. It reframes aging not as dependency but as asset accumulation (Tidwell, 2013). However, as the data shows, a library requires access. Currently, structural barriers language loss, digital exclusion (George & Joseph, 2020), and rigid curricula lock these libraries.

The resistance to text-based documentation highlighted by participants supports Whyte's (2013) caution against digitization without community control. The "living library" must remain human-centric. Integrating this into science education requires more than adding content; it requires changing the pedagogy. As Bang et al. (2012) suggest, co-producing knowledge with Indigenous communities is essential. The elders' insistence on place-based teaching (forest walks vs. classrooms) aligns with calls for decolonizing science education (Oliveira et al., 2020).

7. Conclusion

This study has sought to reimagine the role of elderly Adivasi knowledge-keepers in Kerala's Western Ghats, shifting the analytical lens from archival storage to human embodiment. By conceptualizing these elders as "living libraries," we have demonstrated that Traditional Ecological Knowledge (TEK) is not a static collection of facts but a dynamic, performative pedagogy rooted in place, relationship, and oral tradition. Our findings confirm that while elders possess sophisticated scientific knowledge regarding biodiversity, medicine, and climate patterns, formal science education systems systematically render this expertise invisible through text-centric biases and epistemic hierarchies (Aikenhead, 2006; Sivaramakrishnan, 2018).

The implications of this research extend beyond the specific context of Wayanad and Idukki. Theoretically, this study contributes to the decolonization of science education by challenging the notion that legitimacy requires written documentation. As Ingold (2000) argues, knowledge is enacted through movement and practice; our data shows that when elders are excluded from the classroom, schools lose access to a vital form of environmental literacy. The "living library" metaphor offers a framework for epistemic justice, positioning elders not as beneficiaries of development, but as authoritative co-educators whose pedagogical sovereignty must be respected (Bang et al., 2012; Whyte, 2013).

Practically, the path forward requires structural innovation rather than superficial inclusion. Aligning with India's National Education Policy (2020), we advocate for the formal integration of TEK into state curricula, not as folklore, but as valid ecological data. This necessitates the creation of "Elder-in-Residence" programs, the development of oral assessment metrics, and ethical documentation protocols that adhere to Free, Prior, and Informed Consent (FPIC). As language shift and youth migration threaten intergenerational transmission (Kannan & James, 2021), the urgency to institutionalize these relationships becomes both an educational and ecological imperative.

Ultimately, recognizing elders as science teachers is a step toward sustainability. In an era of climate uncertainty, the wisdom held in these "living libraries" offers pathways to resilience that textbooks cannot provide. Future research must continue to center Indigenous communities as co-architects of knowledge production, ensuring that these libraries remain open, respected, and empowered. If science education is to serve all learners and protect all ecosystems, it must learn to read not only the text but also the land and the elders who know it best.

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