

Indigenous Knowledge Systems

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Indigenous Knowledge in Conservation: Real Examples and Critical Perspectives

Indigenous and local knowledge systems, as defined by IPBES, represent **dynamic bodies of integrated, holistic, social and ecological knowledge, practices and beliefs** that are continuously evolving through various forms of knowledge interaction. These systems have proven valuable in conservation efforts across the globe, though they also face legitimate criticisms and limitations.

Real Examples of Indigenous Knowledge in Conservation

Fire management and biodiversity conservation

Aboriginal fire management in Australia provides one of the most well-documented examples of successful indigenous conservation practices. For over **60,000 years**, Aboriginal communities have used controlled burning techniques during cooler months to manage landscapes[1]. The Martu people in northwestern Australia burn small, frequent, low-intensity fires in diverse patterns, creating what researchers call “pyrodiversity”[1]. This practice promotes plant species diversity and prevents catastrophic wildfires[2][1].

Research has shown that **traditional fire management increases biodiversity and benefits the ecosystem**[2]. In the Kimberley region, indigenous fire management programs have dramatically reduced late-season wildfires across nearly three-quarters of North Kimberley[3]. Before cultural burning was revived, massive wildfires covering more than 40,000 hectares were annual occurrences, but these have been significantly reduced through traditional practices[3].

Wildlife and ecosystem management

The integration of indigenous knowledge with scientific approaches has yielded remarkable results in species conservation. In Australia, the **Martu Aboriginal people's knowledge** was successfully combined with survey data to create predictive species distribution models for the threatened greater bilby[4]. Martu knowledge provided broader distribution predictions than survey data alone and offered crucial information about habitat associations and ecosystem dynamics[4].

In Canada, **moose co-management initiatives** demonstrate successful integration of Indigenous knowledge with wildlife management[5]. These collaborative approaches have resulted in initiatives aimed at ensuring moose sustainability for future generations, with Indigenous knowledge providing critical insights into wildlife behavior and environmental changes[5].

Amazon conservation

Indigenous communities in the Amazon have demonstrated exceptional forest stewardship. The **Ese Ejá people of Peru** protect centuries-old trees, which prevents fauna disappearance and protects habitats of both plants and animals[6]. Indigenous territories in the Amazon contain **over 80% of the world's biodiversity**, showcasing their natural conservation abilities[6]. Studies show that indigenous lands are overall better environmentally protected than other areas[7][8].

Indigenous territories with secure land rights not only reduce deforestation but also lead to **higher secondary forest growth on previously deforested areas**[8]. Secondary forest coverage on previously deforested lands grew 5% inside Indigenous territories over a 33-year research period[8].

African conservation practices

Across Africa, indigenous communities employ diverse conservation strategies. The **Maasai people** practice rotational grazing, moving livestock between different pastures to prevent overgrazing and allow vegetation recovery[9][10]. This traditional method maintains soil fertility and reduces desertification while supporting both wildlife and livestock[9].

In Ghana, communities protect **sacred forests** as places of spiritual significance, creating natural refuges for biodiversity[11]. The Tafi Atome Monkey Sanctuary protects endangered Mona monkeys through local taboos against harming them[11]. Ethiopian farmers have developed sophisticated **rainwater harvesting techniques** using “hafir dam” systems to combat drought while preventing land degradation[11].

Marine and fisheries management

Madagascar’s coastal communities use traditional fishing taboos called “**fady**” to regulate fishing activities[11]. Some regions prohibit catching certain species during breeding seasons, allowing fish populations to replenish. This traditional knowledge is now being integrated into modern marine conservation programs[11].

Agricultural and plant conservation

Traditional ecological knowledge contributes significantly to agrobiodiversity conservation. In Bangladesh, indigenous communities practice **plain land agriculture, hill farming, agrobiodiversity management, and open water fish conservation**[12]. These practices include proven technologies that cut research costs and time while maintaining sustainable resource use[12].

Criticisms and Limitations of Indigenous Knowledge Practices

Validation and scientific rigor

One primary criticism centers on the **validation of indigenous knowledge**. Critics argue that indigenous knowledge is often tacit and not expressed in conventional scientific forms, making it difficult to validate[13]. Some researchers describe indigenous knowledge as lacking scientific rigor, with one extreme view dismissing it as “**junk science**”[14][15].

The predominantly **qualitative nature** of indigenous knowledge makes it challenging to measure and validate using conventional scientific methods[13]. Traditional knowledge often relies on qualitative traits rather than quantitative data, creating difficulties in scientific assessment and broader application[13].

Scalability and applicability limitations

Indigenous knowledge is **inherently local and place-specific**, making direct application to distant or global challenges difficult[16]. Knowledge about forests in one region may not be applicable to different ecosystems hundreds of miles away, limiting the scalability of solutions[16].

The **oral transmission nature** of traditional knowledge makes it vulnerable to disruption from external pressures such as forced relocation, cultural assimilation, or loss of elders[16]. When these knowledge transmission links are broken, generations of accumulated wisdom can be lost rapidly[16].

Adaptation to rapid environmental change

Traditional knowledge systems face challenges when confronting **unprecedented scale and speed of modern environmental challenges**[16]. Climate change has altered weather patterns and environmental conditions, making some traditional practices less viable or potentially harmful under current conditions[17].

For example, traditional burning practices that were sustainable for centuries may need reconsideration in landscapes where climate change has increased wildfire frequency and intensity[17]. Some practices involving land clearing for agriculture may no longer be sustainable given current environmental pressures[17].

Romanticization and oversimplification

Critics warn against **romanticizing indigenous practices** as inherently superior or more “natural”[17]. Indigenous knowledge systems are not monolithic, nor are they universally aligned with nature as often portrayed[17]. Indigenous communities are diverse and adaptive, living in dynamic contexts shaped by contemporary realities and external pressures[17].

The narrative of harmony with nature can obscure complex realities on the ground, where **not every community's practices are inherently aligned with conservation goals** as defined in Western terms[17]. Some practices that were sustainable historically may no longer be viable given population growth, environmental degradation, or climate change[17].

Integration challenges

Attempts to integrate traditional knowledge with Western management systems face significant challenges. Research shows problems with **how traditional knowledge is collected and represented**, attempts to harmonize disparate worldviews, and incorporation into unchanged Western resource management systems[18].

The tendency to view traditional knowledge as “**data**” rather than a **different paradigm** makes appropriate application difficult[19]. Lifting specific pieces of information without the worldview from which they came leads to inappropriate evaluative approaches[19].

Institutional and social barriers

Indigenous knowledge integration faces **institutional barriers that often marginalize Indigenous voices**[20]. Many conservation policies favor scientific approaches over traditional knowledge systems, leading to lack of recognition and support for indigenous practices[20].

Socio-economic challenges also hinder integration, as many indigenous communities face economic marginalization that may lead to reliance on unsustainable practices for survival[20]. External pressures from land development, resource extraction, and climate change exacerbate these challenges[20].

Knowledge loss and cultural erosion

Traditional knowledge faces threats from **changing cultural practices, formal education, modernization, and new political systems**[21]. Access to modern facilities, urbanization, and land use changes cause threats to traditional ecological knowledge[12].

The **danger of extinction** affects traditional knowledge systems due to natural and human factors, developments around cultural heritage, conflicts among stakeholders, and inappropriate conservation practices[22]. Many communities may not recognize the importance of preserving their cultural heritage, considering it backward or hindering access to modern society[22].

Balanced Assessment

While indigenous knowledge systems offer valuable insights and proven conservation strategies, they require **careful evaluation and appropriate integration** with modern scientific approaches. Success stories demonstrate the potential for combining traditional wisdom with contemporary conservation science, but critics rightfully point out limitations in validation, scalability, and adaptation to rapidly changing environmental conditions.

The most promising approaches involve **collaborative partnerships** that respect indigenous knowledge holders as equal partners while applying rigorous methods to assess the effectiveness and applicability of traditional practices. Rather than wholesale adoption or rejection, the focus should be on identifying which aspects of indigenous knowledge can complement modern conservation efforts and under what conditions they remain viable and beneficial.

Sources

- [1] Traditional Aboriginal fire practices can help promote plant diversity <https://news.mongabay.com/2024/03/traditional-aboriginal-fire-practices-can-help-promote-plant-diversity-study/>
- [2] Bringing Indigenous Fire Back to Northern Australia | TNC <https://www.nature.org/en-us/about-us/where-we-work/asia-pacific/australia/stories-in-australia/bringing-indigenous-fire-back-to-northern-australia/>
- [3] New study confirms Indigenous Fire Management equals success ... <https://wwf.org.au/blogs/new-study-confirms-indigenous-fire-management-equals-success/>
- [4] Including indigenous knowledge in species distribution modeling for increased ecological insights <https://onlinelibrary.wiley.com/doi/10.1111/cobi.13373>

- [5] The rise of moose co-management and integration of Indigenous knowledge <https://www.tandfonline.com/doi/full/10.1080/10871209.2019.1545953>
- [6] How Indigenous People are the Key to Amazon Conservation <https://aceer.org/protectors-of-the-amazon-how-indigenous-people-are-the-key-to-amazon-conservation/>
- [7] Indigeneity, Environment, and Governance in the Amazon: The Impact of Indigenous Movements on Environmental Conservation Policy in Nation-States of the Amazon Rainforest <https://academiccommons.columbia.edu/doi/10.7916/d8-mvd0-gw75>
- [8] Indigenous land rights help protect Amazon rainforests: study <https://www.weforum.org/stories/2023/06/indigenous-land-rights-protect-amazon-rainforest/>
- [9] In Kenya, global crisis sparked ‘a new way to do conservation’ <https://www.conservation.org/blog/in-kenya-global-crisis-sparked-a-new-way-to-do-conservation>
- [10] Great Indigenous Conservation Practices in Africa - - Art In Tanzania <https://volunteerAfrica.fi/indigenous-conservation-africa/>
- [11] The Role of Indigenous Knowledge in Conservation: Africa’s ... <https://africancentre.org/the-role-of-indigenous-knowledge-in-conservation-africas-traditional-wisdom/>
- [12] Traditional ecological knowledge and natural resource management: Some examples from Bangladesh <https://systems.enpress-publisher.com/index.php/NRCR/article/view/3888>
- [13] Validation of the Indigenous Technical Knowledge of Cattle Pastoralists of Andhra Pradesh and Telangana, India <https://grassrootsjournals.org/pp/02m00383.html#status>
- [14] Indigenous Knowledge Systems and Western Science https://journals.co.za/doi/10.10520/ejclinga_v20_n2_a4
- [15] [PDF] INDIGENOUS KNOWLEDGE SYSTEMS AND WESTERN SCIENCE https://ben-erikvanwyk.com/361%20%20202022%20De%20Beer%20&%20Van%20Wyk%20Indilinga%20ejclinga_v20_n2_Validation%20of%20IK%20article.pdf
- [16] What Are Limitations of Traditional Ecological Knowledge? <https://climate.sustainability-directory.com/question/what-are-limitations-of-traditional-ecological-knowledge/>
- [17] The Complexity of Indigenous Knowledge in Conservation <https://www.zanza-africa.com/the-challenging-complexity-of-indigenous-knowledge-in-modern-conservation>
- [18] Problems with integrating traditional ecological knowledge into ... <https://www.fao.org/4/xii/0887-a3.htm>
- [19] A scoping review of intersections between indigenous knowledge ... http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S2306-51332022000100018
- [20] Integrating Indigenous Knowledge and Traditional Practices for ... <https://er.researchfloor.org/integrating-indigenous-knowledge-and-traditional-practices-for-biodiversity-conservation-in-a-modern-world/>

- [21] Traditional ecological knowledge and its role in biodiversity ... <https://www.frontiersin.org/journals/environmental-science/articles/10.3389/fenvs.2023.1164900/full>
- [22] Practices and challenges of cultural heritage conservation ... - Nature <https://www.nature.com/articles/s40494-022-00802-6>
- [23] Cosmovision and African conservation philosophy: indigenous knowledge system perspective <https://businessperspectives.org/journals/environmental-economics/issue-233/cosmovision-and-african-conservation-philosophy-indigenous-knowledge-system-perspective>
- [24] Combining high-resolution remotely sensed data with local and Indigenous Knowledge to model the landscape suitability of culturally modified trees: biocultural stewardship in Kitasoo/Xai'xais Territory <https://facetsjournal.com/doi/10.1139/facets-2020-0047>
- [25] Synergy of Traditional Ecological Knowledge (TEK) and Intellectual Property Rights (IPR) in Biodiversity Management and Conservation <https://mbimph.com/index.php/UPJOZ/article/view/4326>
- [26] Indigenous Knowledge and Biodiversity Conservation and Management in Ghana <https://www.tandfonline.com/doi/full/10.1080/09709274.2006.11905897>
- [27] Conservation, Traditional Knowledge, and Indigenous Peoples <https://journals.sagepub.com/doi/10.1177/0002764213495043>
- [28] Contribution Of Indigenous Knowledge (IK) To Conservation And Utilization Of Biodiversity And Enhancement Of Livelihood In South- East Nigeria <http://www.ajol.info/index.php/gaep/article/view/34885>
- [29] Indigenous knowledge for sustainable livelihoods: Lessons from ecological pest control and post-harvest techniques of Baduy (West Java) and Nguni (Southern Africa) <https://www.semanticscholar.org/paper/2b295bbcecfb2365e99f72310b59cdce74c63246>
- [30] The Importance of Indigenous Knowledge in Curbing the Loss of Language and Biodiversity <https://academic.oup.com/bioscience/article-pdf/66/6/499/24328311/biw026.pdf>
- [31] Farmers' indigenous knowledge of tree conservation and acidic soil amendments: The role of "baabbo" and "Mona" systems: Lessons from Gedeo community, Southern Ethiopia <https://www.tandfonline.com/doi/full/10.1080/23311932.2019.1645259>
- [32] Anishinaabe Adaptation to Environmental Change in Northwestern Ontario: a Case Study in Knowledge Coproduction for Nontimber Forest Products <https://www.ecologyandsociety.org/vol18/iss4/art44/ES-2013-6001.pdf>
- [33] Framing co-productive conservation in partnership with Arctic Indigenous peoples <https://pmc.ncbi.nlm.nih.gov/articles/PMC10087301/>
- [34] Indigenous Knowledge Systems in Ecological Pest Control and Post-Harvest Rice Conservation Techniques: Sustainability Lessons from Baduy Communities <https://www.mdpi.com/2071-1050/13/16/9148/pdf?version=1629103165>

- [35] Indigenous-Led Nature-Based Solutions for the Climate Crisis: Insights from Canada <https://www.mdpi.com/2071-1050/14/11/6725/pdf?version=1653995888>
- [36] Indigenous knowledge in conservation science and the process of a two-way research collaboration <https://onlinelibrary.wiley.com/doi/pdfdirect/10.1111/csp2.12727>
- [37] Art and artistic processes bridge knowledge systems about social-ecological change: An empirical examination with Inuit artists from Nunavut, Canada <http://www.ecologyandsociety.org/vol21/iss2/art21/>
- [38] Essential components and pathways for developing Indigenous community-based monitoring: Examples from the Canadian oil sands region <https://onlinelibrary.wiley.com/doi/pdfdirect/10.1002/eam.4485>
- [39] "When the Wild Roses Bloom": Indigenous Knowledge and Environmental Change in North-western North America <https://pmc.ncbi.nlm.nih.gov/articles/PMC9665002/>
- [40] [PDF] INDIGENOUS KNOWLEDGE IN ENVIRONMENTAL SUSTAINABILITY <https://ijirl.com/wp-content/uploads/2024/11/CULTURAL-ROOTS-OF-CONSERVATION-INDIGENOUS-KNOWLEDGE-IN-ENVIRONMENTAL-SUSTAINABILITY.pdf>
- [41] Indigenous Conservation Success Stories - Number Analytics <https://www.numberanalytics.com/blog/indigenous-conservation-success-stories>
- [42] Promoting the value of local and traditional knowledge and practices ... <https://swed.bio/focal-areas/themes/biocultural-diversity/local-traditional-knowledge-practices-livelihoods-biodiversity/>
- [43] Integrating indigenous and local knowledge in management and ... <https://www.sciencedirect.com/science/article/abs/pii/S0964569121003045>
- [44] Indigenous knowledge systems: Preserving and profiting from what's ... <https://ogresearchconservation.org/indigenous-knowledge-systems-preserving-and-profiting-from-whats-ours-2/>
- [45] Success Stories of Conservation Projects and Community ... - LinkedIn <https://www.linkedin.com/pulse/success-stories-conservation-projects-community-involvement-s-hjptc>
- [46] [PDF] White Paper on the Conservation and Sustainable Use of South ... <https://www.dffe.gov.za/sites/default/files/legislations/sabiodiversity2023whitepaper.pdf>
- [47] Indigenous knowledge is crucial in the fight against climate change <https://climatepromise.undp.org/news-and-stories/indigenous-knowledge-crucial-fight-against-climate-change-heres-why>
- [48] Successful Community-Based Conservation: The Story of Millbank ... <https://pmc.ncbi.nlm.nih.gov/articles/PMC5620689/>
- [49] Traditional Ecological Knowledge (TEK) - Earthwise Aware <https://www.earthwiseaware.org/traditional-ecological-knowledge-tek/>

- [50] Neoliberal Ecopolitics and Indigenous Peoples : The Kayapo , The “ Rainforest Harvest , ” and The Body Shop <https://www.semanticscholar.org/paper/ba8c867a78d3711d27a22e4baedd5fee2c970c7b>
- [51] O Papel Crucial das Áreas Protegidas no Combate ao Desmatamento na Amazônia <https://revista.mpro.mp.br/amazonia/article/view/107>
- [52] Amazon Rainforest Deforestation and Indigenous People Movement in Preserving Environmental Conservation <https://ijsr.internationaljournallabs.com/index.php/ijsr/article/view/404>
- [53] Oil production, biodiversity conservation and indigenous territories: Towards geographical criteria for unburnable carbon areas in the Amazon rainforest <https://linkinghub.elsevier.com/retrieve/pii/S0143622818303333>
- [54] Forest conservation in Indigenous territories and protected areas in the Brazilian Amazon <https://www.nature.com/articles/s41893-022-01018-z>
- [55] Remote Monitoring Systems for Conservation of the Amazon Rainforest: A Systematic Review <https://revistas.unal.edu.co/index.php/imanimundo/article/view/114004>
- [56] Knowledge, Attitudes, and Practices of Hygiene and the Prevention of Trachoma in the Indigenous Population of the Colombian Amazon Vaupés Department <https://www.mdpi.com/1660-4601/20/5/4632>
- [57] Using GIS to Explore the Consequences of Agricultural Practices in the Amazon Rainforest <https://www.tandfonline.com/doi/full/10.1080/19338341.2022.2055608>
- [58] Modeling the social drivers of environmental sustainability among Amazonian indigenous lands using Bayesian networks <https://dx.plos.org/10.1371/journal.pone.0297501>
- [59] Conservation and Care among the Cofán in the Ecuadorian Amazon <https://dlc.dlib.indiana.edu/dlc/bitstream/handle/10535/10824/Esbach%20et%20al.%202021%20Conservation%20and%20Care.pdf?isAllowed=y&sequence=4>
- [60] Modeling the social drivers of environmental sustainability among Amazonian indigenous lands using Bayesian networks <https://pmc.ncbi.nlm.nih.gov/articles/PMC10810436/>
- [61] Shifts in indigenous culture relate to forest tree diversity: a case study from the Tsimane’, Bolivian Amazon. <https://pmc.ncbi.nlm.nih.gov/articles/PMC4471141/>
- [62] Indigenous Knowledge and Forest Succession Management in the Brazilian Amazon: Contributions to Reforestation of Degraded Areas <https://www.frontiersin.org/articles/10.3389/ffgc.2021.605925/pdf>
- [63] The role of forest conversion, degradation, and disturbance in the carbon dynamics of Amazon indigenous territories and protected areas <https://pmc.ncbi.nlm.nih.gov/articles/PMC7022157/>
- [64] Legacies of intensive management in forests around pre-columbian and modern settlements in the Madeira-Tapajós interfluve, Amazonia <http://www.scielo.br/pdf/abb/v33n2/0102-3306-abb-0102-33062018abb0339.pdf>

- [65] Amazonian conservation across archipelagos of Indigenous territories <https://pmc.ncbi.nlm.nih.gov/articles/PMC11959345/>
- [66] Hunting practices among the Awá-Guajá: towards a long-term analysis of sustainability in an Amazonian indigenous community <https://www.scielo.br/j/bgoeldi/a/wpgW4FcKWgcpZq58y7XPK7J/?format=pdf&lang=en>
- [67] Saving the Other Amazon: Changing Understandings of Nature and Wilderness among Indigenous Leaders in the Ecuadorian Amazon <https://www.mdpi.com/2076-0787/5/3/60/pdf?version=1468585159>
- [68] Declining Use of Wild Resources by Indigenous Peoples of the Ecuadorian Amazon. <https://pmc.ncbi.nlm.nih.gov/articles/PMC4302340/>
- [69] 6 Innovative Solutions to Restore the Amazon Rainforest <https://www.globalcitizen.org/en/content/6-solutions-to-restore-the-amazon-rainforest/>
- [70] Livestock, wildlife, and the future of the Maasai Mara <https://africageographic.com/stories/livestock-wildlife-and-the-future-of-the-maasai-mara/>
- [71] Indigenous Communities in the Amazon <https://www.amazonconservation.org/what-we-do/empower-people/indigenous-people/>
- [72] Indigenous Fire Management - Kimberley Land Council <https://www.klc.org.au/indigenous-fire-management>
- [73] Controversial study finds cattle and wildlife can co-exist in Kenya's ... <https://news.mongabay.com/short-article/controversial-study-finds-cattle-and-wildlife-can-co-exist-in-kenyas-maasai-mara/>
- [74] Indigenous-led Conservation in the Amazon: A win-win-win solution <https://amazonfrontlines.org/chronicles/indigenous-conservation-amazon/>
- [75] Indigenous fire management started 11,000 years ago - JCU Australia <https://www.jcu.edu.au/news/releases/2024/march/indigenous-fire-management-started-11,000-years-ago>
- [76] Amazonia - Conservation International <https://www.conservation.org/places/amazonia>
- [77] Fires and droughts: How indigenous knowledge can offer solutions <https://www.weforum.org/stories/2022/07/fires-droughts-indigenous-knowledge-solutions/>
- [78] Swazi Oral Literature, Eco-culture and Environmental Apocalypse <https://www.tandfonline.com/doi/full/10.1080/09709274.2015.11906929>
- [79] A dimensao simbolica e espiritual da biodiversidade nas cosmologias indigenas e nas abordagens filosoficas <https://www.semanticscholar.org/paper/2b2396a0f121e5cce2137ada774aa8506275f5c1>
- [80] Extant and extinct bilby genomes combined with Indigenous knowledge improve conservation of a unique Australian marsupial <https://www.nature.com/articles/s41559-024-02436-2>

- [81] Local Knowledge Conservation Based on Indigenous Tourism Village <https://knepublishing.com/index.php/KnE-Social/article/view/16211>
- [82] Indigenous knowledge of Me'en Community toward natural resource conservation: a socio-philosophical analysis <https://journals.sagepub.com/doi/10.1177/11771801241231638>
- [83] Connecting Science to Indigenous Knowledge: kaitiakitanga, conservation, and resource management <https://newzealandecology.org/nzje/3521>
- [84] Harmonizing Traditional Knowledge with Environmental Preservation: Sustainable Strategies for the Conservation of Indigenous Medicinal Plants (IMPs) and Their Implications for Economic Well-Being <https://www.mdpi.com/2071-1050/16/14/5841>
- [85] Enhancing tree species conservation in Burkina Faso through indigenous knowledge <https://linkinghub.elsevier.com/retrieve/pii/S161713812400075X>
- [86] "Totemic species" can be an effective lens for engaging students with Indigenous knowledge and biodiversity conservation <https://conbio.onlinelibrary.wiley.com/doi/10.1111/csp2.12904>
- [87] Indigenous Knowledge and Perception of Local People towards Biodiversity Conservation in Rajouri District of Jammu and Kashmir, India <https://www.mdpi.com/2071-1050/15/4/3198>
- [88] The problem of scale in indigenous knowledge: a perspective from Northern Australia <https://www.ecologyandsociety.org/vol14/iss1/art1/ES-2008-2574.pdf>
- [89] Inevitable epistemological conflict: Reflections on a disagreement over the relationship between science and indigenous and local knowledge <https://PMC9200913/>
- [90] Erasure of Indigenous Peoples risks perpetuating conservation's colonial harms and undermining its future effectiveness <https://onlinelibrary.wiley.com/doi/pdfdirect/10.1111/conl.12782>
- [91] Politics of Knowledge in Conservation: (De)valued Traditional Ecological Knowledge of Bote in Chitwan National Park, Nepal <https://www.ethnobiocoervation.com/index.php/ebc/article/download/723/399>
- [92] Traditional ecological knowledge in restoration ecology: a call to listen deeply, to engage with, and respect Indigenous voices <https://onlinelibrary.wiley.com/doi/pdfdirect/10.1111/rec.13381>
- [93] The challenges of maintaining indigenous ecological knowledge [http://www.ecologyandsociety.org/vol19/iss3/art39/ES-2014-6741.pdf](https://www.ecologyandsociety.org/vol19/iss3/art39/ES-2014-6741.pdf)
- [94] Integrating local and scientific knowledge: The need for decolonising knowledge for conservation and natural resource management <https://PMC10679496/>
- [95] Free Fallin'? The decline in evidence-based decision-making by Canada's protected areas managers <https://facetsjournal.com/doi/10.1139/facets-2020-0085>
- [96] Local and traditional knowledge systems, resistance, and socioenvironmental justice <https://PMC10768248/>

- [97] [PDF] An Exploration of Indigenous Knowledge Systems and ... <https://researchspace.ukzn.ac.za/bitstreams/a0ac23af-9c05-495c-a804-f29c52132ef6/download>
- [98] Integration of indigenous knowledge with scientific knowledge <https://www.sciencedirect.com/science/article/pii/S1462901125001352>
- [99] The value and limitations of local ecological knowledge ... <https://besjournals.onlinelibrary.wiley.com/doi/full/10.1002/pan3.10219>
- [100] Contributions of Indigenous Knowledge to ecological and ... <https://esajournals.onlinelibrary.wiley.com/doi/10.1002/fee.2435>
- [101] Indigenous Knowledge Systems of Solid Waste Management in Bushbuckridge Rural Communities, South Africa <https://www.mdpi.com/2813-0391/2/3/17>
- [102] Reimagining STEM Education in South Africa: Leveraging Indigenous Knowledge Systems Through the M-Know Model for Curriculum Enhancement <https://ijssrr.com/journal/article/view/1951>
- [103] Integrating Indigenous Knowledge Systems (IKS) to climate change adaptation in South Africa: Lessons from the “past” <https://www.journals.ac.za/sajhe/article/view/6417>
- [104] The Pocosin’s Lesson: Translating respect for Indigenous knowledge systems in environmental research <https://academic.oup.com/bioscience/article/74/11/797/7774895>
- [105] Weaving Indigenous and Western knowledge systems to discern drivers of mooz (moose) population decline <https://besjournals.onlinelibrary.wiley.com/doi/10.1002/pan3.10706>
- [106] Indigenous Knowledge Systems and Practices (IKSPs), Livelihood Resources and Aspirations of the Matigsalog and Ata Tribes <https://www.mdpi.com/2071-1050/15/14/11182>
- [107] Contextualized Learning Resource Material (C-LRM) for the Tinguians of Abra: Its Indigenous Knowledge, Systems, and Practices <https://jurnalajess.com/index.php/AJESS/article/view/941>
- [108] Braiding Indigenous knowledge systems and Western-based sciences in the Alberta oil sands region: A systematic review <https://facetsjournal.com/doi/10.1139/facets-2022-0052>
- [109] Exploring Autoethnographic and Arts-Based Approaches to Planetary Health: Honoring Diversity through Creativity, Indigenous Knowledge Systems and Loving Relationships <https://www.mdpi.com/2078-1547/14/4/53>
- [110] An Indigenous critique: Expanding sociology and recognizing unique Indigenous knowledge <https://pmc.ncbi.nlm.nih.gov/articles/PMC9745018/>
- [111] Valorizing the ‘Irulas’ traditional knowledge of medicinal plants in the Kodiakkarai Reserve Forest, India <https://pmc.ncbi.nlm.nih.gov/articles/PMC2681454/>
- [112] Storing and sharing: A review of indigenous and local knowledge conservation initiatives <https://pmc.ncbi.nlm.nih.gov/articles/PMC6889095/>

- [113] Indigenous ways of knowing: implications for participatory research and community. <https://PMC2156045/>
- [114] The Unexpected Benefits of a Decolonized Knowledge Translation Initiative for Indigenous Mother Participants <https://PMC10259081/>
- [115] Adapting Western research methods to indigenous ways of knowing. <https://PMC3828951/>
- [116] Bridging Indigenous and Western Sciences <https://journals.sagepub.com/doi/pdf/10.1177/2158244015597726>
- [117] Traditional Ecological Knowledge and Global Environmental Change <https://PMC4471132/>
- [118] How Deforestation Impacts Indigenous Communities - Earth.Org <https://earth.org/the-silent-cry-of-the-forest-how-deforestation-impacts-indigenous-communities/>
- [119] Indigenous-led report warns against ‘simplistic take on conservation’ <https://news.mongabay.com/2022/03/indigenous-led-report-warns-against-simplistic-take-on-conservation/>
- [120] Challenges facing traditional ecological knowledge in the Vhembe ... <https://www.sciencedirect.com/science/article/pii/S2590291124002249>
- [121] Indigenous Survival in the Face of Environmental Damage <https://www.humanrightsresearch.org/post/indigenous-survival-in-the-face-of-environmental-damage>
- [122] [PDF] A scoping review of intersections between indigenous knowledge ... <https://wiredspace.wits.ac.za/bitstreams/9d21e9c1-563b-480f-a65b-2d83c1b1cc3d/download>

Bibliography