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Ethnobotanical Study Of Kaziranga National Park, Assam

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Abstract: Kaziranga National Park, a UNESCO World Heritage Site in Assam, is globally recognized for its wildlife biodiversity. However, its rich ethnobotanical heritage, particularly the traditional knowledge of plant use by indigenous communities, remains understudied. This research explores the diversity, usage, and conservation status of ethnobotanical plants in Kaziranga. Field studies with local communities, including the Mishing and Karbi tribes, reveal the extensive use of plants for medicine, food, rituals, and construction. The findings highlight the urgent need to conserve both plant species and associated indigenous knowledge, ensuring sustainable coexistence.

Keywords: Ethnobotany, Kaziranga National Park, Indigenous Knowledge, Mishing Tribe, Karbi Tribe, Medicinal Plants, Biodiversity, Conservation.

1. Introduction:

Kaziranga National Park, situated in Assam, India, is internationally celebrated for its remarkable biodiversity and its iconic population of the one-horned rhinoceros (*Rhinoceros unicornis*). A UNESCO World Heritage Site, the park sprawls across 1,085 square kilometers along the banks of the Brahmaputra River. While its wildlife and ecological importance often dominate the narrative, Kaziranga's rich ethnobotanical heritage remains a relatively unexplored dimension. This study delves into the intricate relationship between the park's flora and the indigenous communities that have historically depended on them for sustenance, medicine, rituals, and livelihoods.

Ethnobotany, the study of the interactions between plants and people, provides invaluable insights into how communities utilize plants for diverse purposes. In Kaziranga, the Mishing and Karbi tribes have preserved a treasure trove of traditional knowledge regarding the use of plants. These practices are not merely functional but deeply embedded in their cultural and spiritual lives. For example, medicinal plants such as *Andrographis paniculata* (Kalmegh) and *Centella asiatica* (Manimuni) are integral to their healthcare systems, while plants like *Ficus religiosa* play a vital role in rituals and ceremonies.

The landscapes of Kaziranga, ranging from floodplain grasslands to tropical forests and wetlands, support a diverse array of flora. This botanical diversity underpins both the ecological stability of the park and the cultural practices of its surrounding communities. However, several factors threaten this delicate balance. Habitat destruction due to deforestation, overharvesting of valuable plant species, and the erosion of indigenous knowledge as younger generations embrace modern lifestyles are critical concerns. Furthermore, the impacts of climate change, such as altered rainfall patterns and more frequent flooding, exacerbate these challenges.

This research aims to document and analyze the ethnobotanical practices in and around Kaziranga National Park, shedding light on the socio-economic importance of these plants to local tribes. It seeks to identify key species, their uses, and their conservation status while addressing the growing disconnect between traditional knowledge systems and modern conservation practices. By integrating ethnobotanical knowledge into biodiversity conservation efforts, this study advocates for sustainable coexistence, ensuring that both the biological and cultural heritage of Kaziranga is preserved for future generations. In doing so, it underscores the park's dual identity as a biodiversity hotspot and a cultural treasure.

2. Objectives of the Paper

i. To document the ethnobotanical knowledge of local tribes in Kaziranga National Park.
ii. To identify and classify plant species used for medicinal, dietary, and ritualistic purposes.
iii. To analyze the socio-economic importance of these plants in tribal communities.
iv. To assess the conservation status of ethnobotanical plants and their associated knowledge.
v. To propose strategies for integrating traditional knowledge into biodiversity conservation.

3. Methodology:

Study Area:

Kaziranga National Park lies between 26°30′N to 26°45′N latitude and 93°08′E to 93°36′E longitude, spanning 1,085 sq km along the Brahmaputra River. The park is divided into core and buffer zones, surrounded by villages inhabited by indigenous tribes.

Data Collection:

i. **Ethnobotanical Surveys:**
Conducted structured interviews with 50 households from the Mishing and Karbi tribes.
Focused on plant identification, local names, and usage.

ii. **Vegetation Sampling:**
Plants collected and identified using taxonomic keys.
Habitat characteristics recorded for medicinal and food plants.

iii. **Participant Observation:**
Observed traditional practices involving plants during cultural festivals and rituals.

iv. **Community Engagement:**
Organized workshops with tribal elders to validate ethnobotanical data.

Data Analysis:

Quantified plant usage categories (medicine, food, rituals, construction).
Assessed species abundance and diversity using the Shannon-Weiner Index.
Cross-referenced plant species with the IUCN Red List to determine conservation status.

4. Discussions and Field Study:

Ethnobotanical Practices:

a. **Medicinal Plants:**
Andrographis paniculata (Kalmegh): Used to treat fever and digestive disorders.
Centella asiatica (Manimuni): Utilized for wound healing and enhancing memory.
Curcuma longa (Haldi): A common antiseptic and anti-inflammatory agent.

b. **Edible Plants:**
Colocasia esculenta (Kochu): Tuber consumed as a staple food.
Ziziphus mauritiana (Bogori): Fruits used for making pickles and desserts.

c. **Ritualistic Plants:**

Ficus religiosa (Sacred fig): Leaves and twigs used in religious ceremonies.
Areca catechu (Tamol): Betel nuts are essential in Mishing rituals.

d. Construction Materials:

Bambusa spp. (Bamboo): Used for building houses and crafting tools.
Caryota urens (Fishtail palm): Thatching material for roofs.

5. Threats to Ethnobotanical Heritage:

a. Deforestation:

- Encroachment for agriculture and human settlements has resulted in significant habitat loss for key plant species.
- Reduction in forest cover directly impacts the availability of ethnobotanical resources, endangering both biodiversity and indigenous practices dependent on these plants.

b. Overharvesting:

- Unregulated and excessive collection of medicinal plants, such as *Andrographis paniculata*, for commercial and medicinal purposes has led to a decline in their natural populations.
- Overexploitation reduces the regeneration capacity of these species, pushing them toward local extinction and disrupting the ecological balance.

c. Modernization:

- Younger generations within indigenous communities are increasingly shifting toward modern lifestyles, leading to a gradual disconnect from traditional practices and knowledge systems.
- The loss of ethnobotanical knowledge disrupts the transmission of cultural heritage, threatening the survival of time-tested sustainable practices.

d. Climate Change:

- Altered rainfall patterns, rising temperatures, and frequent flooding in regions like Kaziranga affect the growth cycles, distribution, and availability of vital plant species.
- These climatic shifts not only disrupt the ecological balance but also impact the reliability of ethnobotanical resources traditionally relied upon by local communities.

The threats to ethnobotanical heritage are multifaceted, arising from both human activities and environmental changes. Addressing these challenges requires a combination of conservation efforts, policy interventions, and community engagement. It is essential to safeguard this invaluable heritage by promoting sustainable practices, preserving habitats, and revitalizing traditional knowledge for future generations.

5. Findings:

Rich Plant Diversity: Over 80 ethnobotanically important plant species were identified, spanning medicinal, dietary, ritualistic, and construction uses. Kaziranga is characterized by a mosaic of habitats that include alluvial grasslands, tropical semi-evergreen forests, tropical moist deciduous forests, and wetland ecosystems. These diverse habitats contribute significantly to the park's botanical wealth.

Grasslands: Kaziranga's grasslands dominate much of its landscape, especially in low-lying areas prone to annual flooding. The grasslands are a mix of tall and short grasses, classified as "wet alluvial grasslands." These include species such as Saccharum (wild sugarcane), Themeda arundinacea, and Imperata cylindrica. Tall grasses provide shelter and food for herbivores like the rhinoceros and elephants, while the shorter grasses sustain smaller animals and birds.

Tropical Forests: Semi-evergreen and moist deciduous forests form dense, lush areas, mostly on higher grounds. Species such as Albizia procera, Dillenia indica (elephant apple), Terminalia myriocarpa, and Tectona grandis (teak) thrive in these forests. These forests not only harbor

biodiversity but also act as vital refuges for wildlife during the monsoon floods.
Wetlands and Aquatic Vegetation: The numerous water bodies, beels (oxbow lakes), and marshes in Kaziranga support aquatic plants such as Eichhornia crassipes (water hyacinth), Nymphaea (water lilies), and Hydrilla. These wetlands are critical for migratory birds and serve as feeding and breeding grounds for a variety of aquatic species.
Floodplain Ecosystems: Seasonal flooding of the Brahmaputra River enriches the soil with alluvial deposits, promoting the growth of plants such as Phragmites karka and Arundo donax. These hardy plants help stabilize riverbanks and provide essential habitats for smaller mammals and birds.
Floral Diversity: Kaziranga is home to over 500 species of plants, which include grasses, herbs, shrubs, climbers, and trees. The key categories include:
Trees: Species like Bombax ceiba (silk cotton tree), Ficus spp. (figs), and Lagerstroemia speciosa (pride of India) are prominent.
Shrubs and Climbers: Mikania micrantha (a notorious invasive climber) and Clerodendrum spp. are common in understory layers.
Orchids: Orchids such as Vanda and Dendrobium are found in forested areas, showcasing the park's subtropical richness. Medicinal Plants: Kaziranga is also a repository of medicinal plants like Andrographis paniculata, Centella asiatica, and Tinospora cordifolia.

6. Importance of Plant Diversity:
Support for Wildlife: The plant diversity sustains a wide variety of herbivores, including rhinos, elephants, swamp deer, and wild buffaloes, which in turn support predators like tigers and leopards. Many plants also provide nesting and feeding sites for birds, reptiles, and insects.
Ecological Functions: Plants play a critical role in soil stabilization, nutrient cycling, and water retention, especially in flood-prone areas. They contribute to carbon sequestration and act as a buffer against climate change impacts.
Cultural and Economic Value: Local communities depend on plants for traditional medicine, food, and materials. For instance, Saccharum species are used for thatching houses.
Threats to Plant Diversity: Despite its richness, Kaziranga's plant diversity faces threats from:
Flooding and Erosion: While flooding rejuvenates the ecosystem, excessive erosion disrupts plant habitats.
Invasive Species: Species like water hyacinth and Mikania micrantha outcompete native plants.
Anthropogenic Pressures: Encroachment, deforestation in buffer areas, and illegal grazing affect natural vegetation.
Climate Change: Altered precipitation patterns and rising temperatures could impact plant growth and diversity.
Cultural Significance: Tribal communities have an intricate relationship with plants, with deep cultural and spiritual ties.
While it is renowned for its biodiversity and the iconic one-horned rhinoceros, Kaziranga holds profound cultural significance as well. Deeply intertwined with the traditions, livelihoods, and identity of the local people, the park reflects the symbiotic relationship between nature and culture. This cultural dimension enhances its value as not just a conservation area but also a living landscape of heritage. Kaziranga occupies a special place in Assam’s cultural ethos. The name "Kaziranga" itself is rooted in local legend, believed to originate from a love story between a village girl, Kazi, and a tribal boy, Ranga. Over time, the region became known for its vibrant natural and cultural heritage, playing a pivotal role in shaping Assam’s identity.
Eco-Tourism: The park’s eco-tourism initiatives promote not only wildlife conservation but also

local culture. Tourists can experience traditional Assamese cuisine, music, and crafts during their visits. Village tours and cultural performances by indigenous communities offer an immersive experience of Kaziranga's cultural heritage.

Cultural Products: Souvenirs like rhino-shaped artifacts, textiles with traditional motifs, and handmade bamboo items reflect the local culture. These products provide livelihood opportunities for local artisans and strengthen the cultural economy.

Conservation and Cultural Symbiosis: Kaziranga exemplifies the coexistence of conservation efforts and cultural heritage. Local traditions often align with sustainable practices, highlighting the importance of community involvement in protecting the park.

Community Participation: Local people play a key role in conservation initiatives, such as anti-poaching patrols and habitat restoration programs. Festivals and awareness campaigns celebrate the park's biodiversity, fostering a sense of stewardship among the communities.

Cultural Conservation: By promoting cultural tourism, Kaziranga helps preserve indigenous traditions and crafts, which might otherwise face decline.

Challenges to Cultural Integrity: Despite its cultural richness, Kaziranga faces challenges that threaten its cultural and ecological balance:

Encroachment and Displacement: Conservation measures sometimes lead to conflicts over land use, affecting local communities' access to traditional resources.

Modernization: Rapid urbanization and changing lifestyles are eroding traditional practices and knowledge.

Tourism Pressure: While tourism boosts the economy, unregulated activities can disrupt local culture and the environment.

Kaziranga National Park is more than a biodiversity hotspot; it is a living symbol of Assam's cultural identity and heritage. Its landscapes and wildlife are deeply woven into the traditions, livelihoods, and spiritual beliefs of local communities. To preserve Kaziranga's cultural significance, it is vital to balance conservation with cultural sustainability, ensuring that the park remains a source of pride and inspiration for future generations.

Conservation Gaps: Lack of awareness and regulation has led to unsustainable plant usage.

However, despite its achievements, the park faces several conservation gaps that challenge its long-term ecological and cultural sustainability. These gaps arise from a combination of environmental, social, and administrative issues that require urgent attention to safeguard the park's biodiversity and cultural significance.

7. Habitat Degradation and Fragmentation:

Habitat loss and fragmentation are significant challenges in Kaziranga, primarily due to natural and anthropogenic factors:

Flooding and Erosion: Annual floods from the Brahmaputra River rejuvenate the park but also erode large sections of land, reducing habitat availability. High floods lead to animal displacement, forcing wildlife into human settlements, increasing human-wildlife conflicts.

Infrastructure Development: Expansion of roads and highways, such as National Highway 37 along the park's boundary, disrupts wildlife corridors and increases roadkill incidents. Construction projects in buffer zones disturb breeding grounds and movement patterns of animals.

Human-Wildlife Conflicts: The park's proximity to human settlements creates frequent conflicts between wildlife and local communities: Animals such as elephants, rhinos, and wild boars often raid crops, causing significant economic losses to farmers. Retaliatory killings of wildlife by locals further threaten endangered species. Villages near the park lack adequate barriers or compensation mechanisms to mitigate these conflicts.

Poaching and Illegal Wildlife Trade: Despite stringent anti-poaching measures, Kaziranga faces ongoing threats from poachers targeting high-value species like the one-horned rhinoceros for their horns:

Sophisticated Poaching Networks: Poachers often use advanced weapons and tactics, outmatching the park's resources. Organized smuggling networks linked to international wildlife trade complicate enforcement efforts.

Resource Limitations: Insufficient patrolling staff and equipment in certain areas create enforcement gaps.

Climate Change Impacts: Climate change is increasingly impacting the ecological balance of Kaziranga:

Changing Flood Patterns: Erratic rainfall and extreme flooding events disrupt seasonal rhythms, affecting both vegetation and wildlife.

Temperature Variations: Altered climate conditions may shift the distribution of plant and animal species, threatening the park's existing biodiversity.

Invasive Species: The proliferation of invasive plant species like Mikania micrantha (mile-a-minute weed) and Eichhornia crassipes (water hyacinth) is a significant threat: These species outcompete native flora, reducing food availability for herbivores. Aquatic ecosystems are particularly vulnerable, as invasive plants choke water bodies and disrupt aquatic life.

Insufficient Community Engagement: While local communities play a vital role in conservation, gaps in their involvement hinder effective management:

Livelihood Dependence: Many locals depend on the park's resources for fishing, grazing, and fuelwood collection, leading to unsustainable extraction.

Limited Benefit Sharing: Communities often feel excluded from tourism revenue and conservation benefits, leading to resentment and reduced support for park policies.

Lack of Awareness: Insufficient awareness programs fail to educate locals about the ecological and economic importance of conservation.

Tourism Pressures: While eco-tourism is vital for generating revenue, unregulated tourism activities can harm the park:

Habitat Disturbance: Overcrowding in core zones disrupts wildlife behavior and damages fragile ecosystems.

Waste Management Issues: Inadequate waste disposal systems contribute to littering and pollution.

Resource and Policy Limitations: Kaziranga's management faces several institutional and resource-related challenges:

Staff Shortages: A lack of trained personnel limits effective monitoring and enforcement.

Funding Constraints: Insufficient financial resources hinder habitat restoration and anti-poaching measures.

Policy Conflicts: Overlapping jurisdiction between state and central authorities sometimes delays decision-making and implementation.

Wildlife Corridor Disruptions: Wildlife corridors connecting Kaziranga to nearby forests, such as Karbi Anglong, are under increasing threat:

Encroachment: Human settlements and agricultural expansion block traditional migration routes for animals.

Connectivity Loss: Fragmentation reduces genetic exchange among wildlife populations, increasing vulnerability to diseases and inbreeding.

Monitoring and Research Gaps: Effective conservation requires robust research and monitoring systems, but Kaziranga has several gaps in this area:

Biodiversity Data: Limited data on lesser-known species, such as amphibians, reptiles, and invertebrates, hinders comprehensive conservation planning.
Climate Impact Studies: There is a lack of detailed research on how climate change affects the park's ecosystems.
Knowledge Erosion: Traditional knowledge is rapidly vanishing due to generational shifts and modernization. Alongside ecological challenges, the region also faces significant knowledge erosion, especially concerning the indigenous and traditional practices of the local communities. This loss impacts cultural identity, conservation efforts, and the symbiotic relationship between the people and the environment.

8. Causes of Knowledge Erosion in Kaziranga:
Generational Disconnection: Indigenous communities, such as the Mishing, Karbi, and Assamese, have historically lived in harmony with the environment, relying on traditional knowledge for farming, fishing, and sustainable living. Urban migration and modernization have led to younger generations moving away from traditional lifestyles, resulting in a decline in the transmission of knowledge.
Loss of Traditional Practices: Practices like sustainable fishing in Kaziranga's wetlands and flood-resilient agriculture are increasingly being replaced by modern methods, which often overlook ecological sustainability.Traditional crafts, such as weaving and bamboo-based handicrafts, are also declining due to competition from industrially manufactured goods.
Language and Oral Tradition Decline: The oral traditions of the local communities, including songs, stories, and rituals tied to the environment, are fading. Indigenous languages and dialects that encapsulate ecological knowledge are at risk of extinction, further contributing to knowledge erosion.
Tourism and Globalization: While tourism brings economic benefits, it also introduces external influences that overshadow local customs and knowledge systems. The focus on wildlife tourism often sidelines the cultural and ecological wisdom of the local people.
Environmental Changes: Flooding, habitat destruction, and climate change disrupt the ecosystems that local knowledge is based upon. For instance, changes in fish availability in Kaziranga's wetlands impact traditional fishing techniques.

9. Conclusion:
Kaziranga National Park, a UNESCO World Heritage Site, is renowned not only for its exceptional wildlife but also for its rich ethnobotanical diversity, which forms an essential part of its biodiversity and cultural heritage. The indigenous tribes, including the Mishing and Karbi communities, have long relied on the park's diverse flora for food, medicine, rituals, and livelihoods. Plants such as *Andrographis paniculata* for fever, *Centella asiatica* for memory enhancement, and *Ficus religiosa* for spiritual ceremonies highlight the deep-rooted connections between these communities and the natural environment.
The documentation of traditional tribal knowledge underscores the indispensable role that plants play in the daily lives of indigenous communities. This knowledge, accumulated over generations, is a vital repository of sustainable practices that offer insights into the utilization and preservation of natural resources. However, modern challenges are threatening this fragile balance. Habitat degradation due to deforestation, agricultural expansion, and urbanization is causing the loss of valuable plant species. Additionally, younger generations are gradually disconnecting from traditional practices, leading to the erosion of indigenous knowledge systems.
Addressing these challenges requires immediate and concerted efforts to integrate traditional

wisdom with modern conservation science. Conservation strategies should focus on sustainable management of ethnobotanical resources, ensuring that the cultural and ecological dimensions of biodiversity are preserved. Collaborative efforts involving local communities, researchers, and policymakers are vital for the success of these initiatives. Empowering indigenous communities as stewards of their environment can bridge the gap between cultural traditions and scientific approaches, fostering a holistic model of conservation.

Preserving Kaziranga's ethnobotanical legacy is not just a matter of protecting its cultural heritage; it is a crucial step toward achieving long-term ecological sustainability. By valuing and integrating tribal knowledge, we can ensure that this unique interplay of biodiversity and culture continues to thrive.

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