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How rhinos helped shape Kaziranga's grasslands

A long ecological record from Kaziranga raises new questions about habitat connectivity for rhinos.

By [Rituparna Palit](#)

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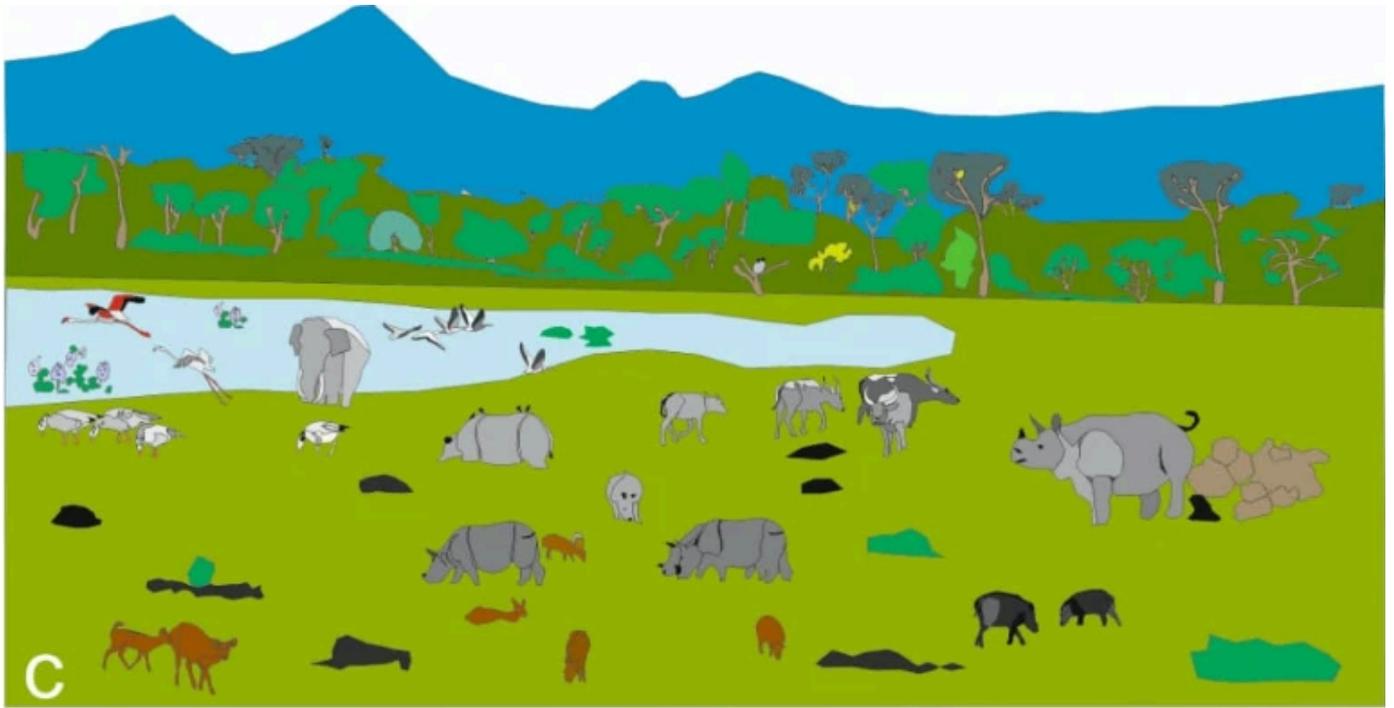


A greater one-horned rhinoceros in Kaziranga National Park Credit: Bibhab Talukdar

Long before they were confined to the northeast, Indian one-horned rhinoceroses roamed the entire northern subcontinent. A study¹ reveals that climatic shifts and human pressures pushed the species eastward over the past several millennia, making the Brahmaputra floodplains their stronghold.

According to a reconstruction of the ecological history of Kaziranga National Park (KNP) – along the river's banks – over the past 3,000 years, these megaherbivores may also have reshaped the landscape, transforming dense forests into grasslands. Driven by climatic shifts, including the cooling phase often associated with the *Little Ice Age*, and by human pressures, they appear to have retreated nearly a thousand miles to find a humid refuge within the Brahmaputra river system, say scientists at Lucknow's Birbal Sahni Institute of Palaeosciences (BSIP).

The push and pull





A schematic showing how vegetation gradually opened up — from dense forests and deep swamps with limited wildlife presence to grassland — wetland mosaics shaped by heavy grazing, including by rhinos. Credit: Sadhan K. Basumatary

Historical records [suggest](#) the rhino once ranged widely across the northern Indian subcontinent before hunting and habitat conversion fragmented its populations. In contrast, the stronger monsoonal regime of the northeast provided a stable sanctuary.

Explaining why this region remains suitable for rhinos, Bibhab Talukdar, secretary general of the IUCN Asian Rhino Specialist Group, says year-round edible grasses and wallowing sites are critical for these grazers. “Annual floods, especially in floodplain ecosystems like Kaziranga, energise them with renewed nutrients,” adds Talukdar, founder of the wildlife conservation non-profit Aaranyak, in Guwahati, Assam.

The sediment time-machine

BSIP scientists analysed a 110-cm sediment core from the Sohola swamp in the national park, revealing grains of pollen, fragments of charcoal and the spores of the dung-loving fungus *Sporormiella*.

The study identifies three distinct phases of palaeoecology and herbivore activity in Kaziranga spanning roughly 3,290 years.

Evergreen taxa declined over time, giving way to expanding grasslands and increasing wildlife density, says Swati Tripathi, the study's co-author. Tripathi says broader palaeoecological studies across the Brahmaputra basin using tools such as phytoliths, isotopes and ancient DNA could better guide long-term conservation in this dynamic landscape.

Grassland engineers

Studies² show that megafauna can influence vegetation structure, nutrient cycles and habitat dynamics over long time scales, helping maintain open landscapes in many parts of the world.

Conservation scientist, Alolika Sinha describes these 2,000-kg grazers as “engineers of the grassland ecosystem”. Through grazing and trampling, they prevent woody plants such as *Bombax* and *Lagerstroemia* from overtaking grasslands and create pathways used by smaller herbivores.

In their absence, grasses grow coarser and less diverse, impinging on species like the hog deer. “Rhinos also facilitate nutrient redistribution through communal latrines,” Sinha adds.

The paleoecology study confirms this link: layers with high *Sporormiella* concentrations coincide with signals of open, grass-dominated habitats.

Exotic invasion

Sinha warns of the deteriorating condition of these habitats, citing invasive alien plants (IAPs) as “one of the biggest threats to the grassland ecosystem in Assam”.

The Sohola sediment core also records the appearance of Mimosa-type pollen about 1,700 years ago, around the time rhinos were actively transforming forests into grasslands.

Researchers say the Mimosa-type pollen likely represents related native species rather than the modern invasive shrub, which spread in South Asia only in the past century.

Sinha lists species such as *Chromolaena odorata*³, *Mikania micrantha*, *Mimosa invisa*, *Parthenium* and *Ipomoea carnea* as spreading across protected areas such as Kaziranga, Manas, Orang and Pobitora, affecting both wildlife and local communities. She calls for a policy shift integrating grasslands into climate policy. “Grasslands are

important carbon sinks, but they are largely absent from the climate policies in India,” she says.

Fortress versus connectivity conservation

Conservationists worry⁴ that modern rhinos may have lost their ancient survival strategy. Hemmed in by a national highway and human settlements, Kaziranga’s rhinos are now bottled up in the sanctuary that saved them, raising urgent questions for the 15th Meeting of the Conference of the Parties to the Convention on the Conservation of Migratory Species of Wild Animals (CMS COP15).

“Our 3,000-year palaeoecological record challenges the management assumption that Kaziranga’s grasslands are historically stable and confined to their present boundaries,” says Tripathi.

For policymakers at COP-15, she adds, the key message is that ecosystems and wildlife habitats are “inherently dynamic”. Conservation must move beyond protected-area “fortresses” toward landscape-scale planning with ecological corridors.

There is some progress. Talukdar notes that the Assam government has expanded riverine habitats south of Orang, north of Burhachapori and west of Kaziranga to enable natural dispersal. In December 2023, eight rhinos moved from Orang NP to the Burhachapori and Laokhowa Wildlife Sanctuaries. Others have used the Brahmaputra’s riverine areas to move toward Majuli island.

He sees hope in COP bodies “now focusing on connectivity issues” and cites COP15 to the Convention on Biological Diversity (CBD), which adopted the Kunming-Montreal Global Biodiversity Framework (GBF) in December 2022, placing renewed focus on ecological connectivity to combat biodiversity loss.

But Talukdar cautions that connectivity alone will not solve the problem. Despite laws under the Wildlife Protection Act, 1972, conviction rates in wildlife crime cases remain low.

Without stronger enforcement, new corridors could simply become easier routes for poachers, he warns.

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