

Archaeological sites of Odisha and sacred groves as sources of medicinal plants: integrating cultural heritage, biodiversity conservation and traditional knowledge

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Odisha, one of India's most culturally rich state is distinguished by its remarkable archaeological heritage and biologically significant sacred groves (Das et al., 2022). These two seemingly distinct components of the landscape are interconnected through a long history of human interaction with nature, spirituality and traditional knowledge systems. Archaeological monuments such as temples, monasteries, caves and ancient settlements provide valuable insights into the socio-cultural evolution of the region, while sacred groves represent living repositories of biodiversity and indigenous conservation practices (Banda et al., 2024). Together, they form an integral part of Odisha's cultural and ecological heritage. The inspiration for this editorial emerged from a recent field visit to the Varahi Temple, Puri district of Odisha state, India with my research team (Figure 1). The site presents a unique and compelling example of the harmonious coexistence of archaeological heritage, sacred grove conservation and medicinal plant diversity. Observing its cultural, ecological and historical significance prompted a deeper reflection on the role of such sacred landscapes in safeguarding both tangible and intangible heritage. The communication aims to draw scholarly and public attention to these often-overlooked dimensions and to emphasize the need for their documentation, conservation and sustainable management. The archaeological wealth of Odisha reflects the legacy of ancient Kalinga and the flourishing traditions of Buddhism, Jainism and Hinduism. Monumental sites such as the Konark Sun Temple, the Buddhist complexes of Ratnagiri, Lalitgiri & Udayagiri, along with the rock-cut caves of Khandagiri & Udayagiri stand as testimonies to the artistic, architectural and spiritual achievements of past civilizations. These sites not only preserve historical narratives but also reveal the close association between religious practices and the natural environment. Ancient settlements were often established in ecologically favourable locations, demonstrating an understanding of sustainable coexistence with natural resources. Parallel to this archaeological heritage, Odisha possesses a rich tradition of sacred groves patches of forest protected by local communities through religious beliefs, cultural customs and sacred interdictions. These groves, distributed across tribal and rural regions of

the state, have been preserved for generations as abodes of local deities, ancestral spirits and sacred entities (Sen et al., 2020). Sacred groves function as natural gene banks, safeguarding numerous plant species that have disappeared from surrounding landscapes due to anthropogenic pressures. These groves are of particular importance due to their vital role in the conservation of medicinal plants (Parthasarathy and Naveen, 2021). Many sacred groves harbour a diverse range of ethnomedicinal species that continue to support traditional healthcare systems among local and tribal communities. Species such as *Azadirachta indica*, *Aegle marmelos*, *Phyllanthus emblica*, *Saraca asoca*, *Ficus religiosa* and *Mesua ferrea* are commonly found in these protected habitats and are widely used in Ayurvedic and folk medicine. The preservation of medicinal flora within sacred groves highlights the importance of traditional ecological knowledge. Indigenous communities have developed sophisticated understandings of plant properties, harvesting techniques and therapeutic applications over centuries. Such knowledge systems contribute not only to local healthcare but also to broader efforts in biodiversity conservation and sustainable resource management. Sacred groves therefore represent an invaluable intersection of cultural traditions, ecological stewardship and medicinal plant conservation. Despite their significance, both archaeological sites and sacred groves face increasing threats from urbanization, infrastructure development, tourism pressure, habitat fragmentation and changing socio-cultural values.



Figure 1: Discussion at Varahi temple, Puri, Odisha

The gradual erosion of traditional belief systems has weakened community-based conservation practices in some regions, leading to degradation of sacred landscapes and loss of valuable plant resources. Similarly, archaeological monuments require continuous protection from environmental and human-induced impacts. In the contemporary context of climate change, biodiversity loss and cultural homogenization, the conservation of Odisha's archaeological sites and sacred groves assumes greater importance. These heritage resources provide opportunities for interdisciplinary research involving archaeology, ethnobotany, ecology, anthropology and heritage management. Integrating cultural conservation with biodiversity protection can promote sustainable development while preserving the unique identity of the region. This issue highlights the need for a holistic approach to heritage conservation that recognizes the complementary roles of archaeological monuments and sacred groves. Protecting these landscapes will not only safeguard historical and cultural legacies but also ensure the continued availability of medicinal plant resources and traditional knowledge for future generations. Odisha's experience demonstrates how cultural heritage and biodiversity conservation can work together to support ecological resilience, community well-being and sustainable development.

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