
STUDIES ON GIGANTIC HERITAGE TREES OF JAISALMER DISTRICT, WESTERN RAJASTHAN

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Abstract

This research paper synthesizes existing knowledge on the large and culturally significant trees of the Jaisalmer district in Western Rajasthan. It examines their ecological, social, and cultural roles, reviews current threats and recent developments, and proposes an integrated field-survey methodology and conservation strategy. The study focuses on heritage tree specimens and sacred groves locally known as orans, dominated by species such as *Prosopis cineraria* (khejri), *Salvadora oleoides* (jal), *Capparis decidua* (kair), and *Ziziphus* species. Drawing on government reports, biodiversity assessments, recent media coverage, and published studies on sacred groves in Rajasthan, the paper highlights urgent concerns related to land-use change, solar energy projects, illegal tree cutting, and legal ambiguity surrounding oran lands. The study emphasizes the need for community-centered protection, formal mapping, and long-term ecological monitoring to safeguard this unique natural and cultural heritage.

Keywords: Jaisalmer, heritage trees, sacred groves, orans, khejri, conservation, arid landscapes



1. Introduction

Large and long-lived trees in arid and semi-arid environments function as keystone elements of biodiversity, traditional livelihoods, and cultural identity. In the Thar Desert region and the Jaisalmer district, isolated mature trees and small sacred groves (orans) create vital microhabitats, provide fodder and fuel, reduce wind erosion, enhance soil fertility through nitrogen fixation, and serve as focal points of ritual and belief for local communities. Although sparsely distributed compared to forests in humid regions, these trees act as ecological hubs and repositories of landscape memory. Their loss therefore results in disproportionately high ecological and socio-cultural impacts.

In recent years, local activism, legal disputes, and administrative interventions concerning the status of oran lands and their allocation for infrastructure projects—particularly solar parks—have brought renewed attention to the vulnerability of these living heritage elements. This paper seeks to integrate ecological and socio-cultural perspectives to better understand the importance and conservation needs of Jaisalmer's heritage trees.

The objectives of this study are to:

(1) synthesize existing literature and reports on heritage trees and orans in Jaisalmer;

- (2) propose a practical field methodology for identifying and documenting heritage trees;
- (3) summarize major threats and conservation challenges; and
- (4) offer prioritized recommendations for immediate and long-term protection.

2. Study Area: Jaisalmer District

The Jaisalmer district lies in the westernmost part of Rajasthan within the Thar Desert. The climate is extremely arid, with low and highly variable rainfall and large seasonal temperature fluctuations. The landscape is characterized by sand dunes, rocky outcrops, saline depressions, traditional water-harvesting structures (khadins), and extensive pastoral lands.

Vegetation is dominated by drought-resistant shrubs and trees, including *Prosopis cineraria*, *Capparis decidua*, *Salvadora oleoides*, and *Ziziphus nummularia*. The nearby Desert National Park and numerous scattered orans serve as important reservoirs of native biodiversity. Many large and old trees are associated with historical sites such as Bada Bagh, village deity shrines, clan worship sites, and traditional water sources, highlighting their integration into both natural and cultural landscapes.

3. Literature Review

3.1 Sacred Groves (Orans) in Rajasthan

Sacred groves in Rajasthan, locally referred to as orans, constitute an ancient and community-driven system of environmental protection, particularly significant in the arid and semi-arid landscapes of western India. These groves are traditionally dedicated to local deities, ancestral spirits, or village guardians, and are governed by customary rules that strictly regulate resource use. Activities such as tree felling, hunting, and unrestricted grazing within orans are socially prohibited and culturally discouraged, often reinforced through religious beliefs and community sanctions. As a result, orans have functioned for centuries as effective informal conservation units in regions where formal forest cover is sparse or absent.

From an ecological perspective, orans serve as critical biodiversity refuges in desert environments. Numerous studies from Rajasthan indicate that sacred groves support higher plant species richness, greater structural complexity, and better natural regeneration than adjacent non-protected landscapes. In the Jaisalmer district, orans frequently harbor old-growth individuals of drought-adapted tree species such as *Prosopis cineraria* (khejri), *Salvadora oleoides* (jal), and *Capparis decidua* (kair). These mature trees are often absent from surrounding agricultural fields and grazing lands due to historical clearing and resource extraction. Consequently, orans act as genetic reservoirs and seed sources that contribute to landscape-level ecological resilience.

Orans also play a vital role in supporting ecosystem services essential to desert livelihoods. Their vegetation cover enhances soil stability, reduces wind erosion, and improves local microclimatic conditions. During periods of drought, orans function as emergency resource zones by providing regulated access to fodder, shade for livestock, and limited non-timber forest products. In this way, they contribute directly to the adaptive capacity of pastoral and agro-pastoral communities in extreme climatic conditions.

Beyond their ecological value, orans are deeply embedded in the social and cultural fabric of rural Rajasthan. Rituals, seasonal festivals, and collective worship associated with sacred groves reinforce social cohesion and strengthen community stewardship. Oral traditions linked to specific trees or groves often preserve historical knowledge about settlement patterns, past droughts, and customary land-use practices. Thus, orans represent not only ecological assets but also repositories of cultural memory and traditional ecological knowledge.

Despite their long-standing importance, orans face increasing threats in contemporary Rajasthan. Rapid infrastructure development, expansion of renewable energy projects, changing land-tenure systems, and declining adherence to traditional institutions have weakened customary protection mechanisms. A major challenge is the lack of formal recognition of orans in official revenue and land-use records, leading to their misclassification as wastelands or common pasture lands. This legal invisibility has made many orans vulnerable to land diversion and degradation.

Recent community movements and legal interventions highlight growing recognition of the need to bridge the gap between customary governance and formal conservation frameworks. Scholars and policy practitioners increasingly emphasize participatory mapping, documentation of cultural

significance, and legal recognition of orans as protected commons or community-managed conservation areas. In the context of the Jaisalmer district, strengthening the institutional and legal protection of orans is especially critical, as these sacred groves represent some of the last remaining islands of mature tree cover in an otherwise highly fragmented desert landscape.

3.2 Dominant Tree Species and Ecological Roles

The vegetation of the Jaisalmer district is shaped by extreme aridity, high temperatures, nutrient-poor soils, and highly variable rainfall. Under these conditions, only a limited number of tree species are able to survive and attain large size. Among these, a small group of drought-adapted species has emerged as ecologically dominant and culturally significant, forming the backbone of heritage tree populations in the region. These species not only persist under harsh climatic stress but also perform critical ecosystem functions that sustain desert landscapes and human livelihoods.

Prosopis cineraria (khejri) is the most important and widely recognized heritage tree species of the Thar Desert. Its deep and extensive root system allows it to access groundwater and survive prolonged droughts. Ecologically, khejri plays a key role in soil enrichment through biological nitrogen fixation, thereby improving soil fertility in surrounding areas. This function has made it an integral component of traditional agroforestry systems in Rajasthan, where crops are often cultivated beneath its canopy. The tree provides high-quality fodder during dry periods, stabilizes sandy soils, and creates favorable microclimatic conditions that support understory vegetation. Due to its cultural reverence and ecological value, many large khejri individuals have been preserved for generations, making them prominent examples of heritage trees.

Salvadora oleoides (jal) is another ecologically significant species in the arid and semi-arid zones of Jaisalmer. It is particularly well adapted to saline and alkaline soils, where few other tree species can survive. Jal contributes to ecosystem stability by colonizing degraded lands and improving soil structure through its root system. The species is also valued for its medicinal properties and traditional uses, and its fruits and foliage provide supplementary resources for local communities and wildlife. Large, mature individuals of *Salvadora oleoides* are commonly found within orans and less-disturbed landscapes, highlighting the role of cultural protection in their persistence.

Capparis decidua (kair) is a hardy, leafless shrub-tree that thrives in open desert landscapes and rocky terrains. Its physiological adaptations, including reduced leaf surface and efficient water use, enable it to survive under extreme moisture stress. Ecologically, kair contributes to soil stabilization and serves as an important food source for birds and small mammals. Its edible fruits are widely used in local cuisine and have economic significance for rural households. In sacred groves and traditionally protected areas, *Capparis decidua* often forms dense stands, contributing to structural diversity and habitat complexity.

Species of the genus *Ziziphus*, particularly *Ziziphus nummularia*, also play a significant role in the desert ecosystem. These species are resilient to drought and grazing pressure and provide fruits that support both wildlife and local communities. Mature *Ziziphus* trees offer nesting sites for birds and act as nurse plants, facilitating the establishment of other vegetation under their canopies. Although often overlooked due to their smaller stature, older individuals can attain considerable size and qualify as heritage trees in specific local contexts.

Collectively, these dominant tree species function as keystone elements in the arid ecosystems of Jaisalmer. Their presence enhances biodiversity by supporting diverse faunal assemblages, regulating microclimatic conditions, and maintaining nutrient cycles. The loss of mature individuals from these species can therefore result in cascading ecological effects, including reduced soil fertility, increased erosion, and diminished habitat availability. Understanding the ecological roles of these dominant species is essential for developing effective conservation strategies aimed at protecting the heritage tree populations and the broader desert landscape in which they occur.

3.3 Recent Socio-environmental Developments

Over the past decade, the socio-environmental context of the Jaisalmer district has undergone significant change, with direct implications for the conservation of heritage trees and sacred groves. Rapid economic development, population growth, and large-scale infrastructure expansion have increasingly intersected with traditionally protected landscapes, including orans and long-preserved tree stands. These changes have altered land-use patterns and intensified pressure on common lands that historically functioned as ecological and cultural buffers in the desert environment.

One of the most prominent recent developments has been the large-scale expansion of renewable energy infrastructure, particularly solar power projects, across western Rajasthan. While renewable energy is a national and state-level priority, the siting of solar parks has frequently overlapped with grazing lands, orans, and areas containing mature heritage trees. In several cases, local communities have raised objections, citing the cultural and ecological significance of these landscapes. Such conflicts have drawn attention to the inadequacy of existing land records, which often fail to distinguish sacred groves and culturally protected lands from general wastelands or revenue commons.

Alongside renewable energy expansion, increased road construction, urban growth around towns and tourist centers, and mining-related activities have contributed to habitat fragmentation and direct tree loss. Heritage trees located outside formally protected areas are particularly vulnerable, as they often lack statutory protection despite their age, size, and cultural value. Illegal or semi-legal tree cutting, sometimes carried out under the guise of land clearance for development, has been reported as an additional threat. In some instances, trees have been deliberately damaged or burned to remove evidence prior to land-use conversion.

These environmental pressures have triggered notable social responses. Between 2018 and 2021, several community-led movements emerged in Jaisalmer and neighboring districts, demanding official recognition of orans as distinct land categories. Villagers, pastoral groups, and civil society organizations have mobilized through protests, petitions, and legal action to prevent the diversion of sacred and grazing lands. Judicial and administrative interventions, including temporary stays on land allocation and directives for verification of oran status, reflect growing institutional acknowledgment of these concerns.

However, these developments also reveal structural governance challenges. Traditional systems of community regulation that once ensured compliance with conservation norms have weakened in some areas due to socio-economic change, migration, and declining authority of customary institutions. At the same time, formal conservation frameworks have not adequately incorporated customary land classifications, resulting in a governance gap. This disconnect has left many heritage trees and sacred groves in a precarious position—recognized and protected socially, but invisible within formal planning and legal systems.

Recent socio-environmental developments therefore underscore the urgent need for integrative approaches to conservation in Jaisalmer. Participatory mapping of orans and heritage trees, inclusion of cultural landscape categories in land-use planning, and early-stage environmental and social screening of development projects are increasingly viewed as essential measures. Addressing these challenges is critical not only for conserving individual trees or groves, but also for maintaining the broader socio-ecological resilience of desert landscapes under accelerating development and climate stress.

4. Materials and Methods (Proposed Field Approach)

Due to the limited availability of district-wide quantitative data on giant heritage trees, this study adopts a combined approach of literature synthesis and a proposed field-survey framework. The methodology is designed for use by researchers, forest departments, and conservation organizations.

The proposed survey aims to locate and map heritage trees and orans, record biometric parameters such as girth, height, crown spread, and health status, and document associated cultural attributes including rituals, oral histories, and land-tenure contexts. GPS-based spatial mapping and the creation of a centralized digital database are integral components of the approach. Data analysis would include size-class distributions, spatial clustering of heritage trees, and qualitative assessment of cultural significance.

5. Results (Synthesis from Existing Sources)

Existing reports indicate that *Prosopis cineraria* is the most prominent heritage tree species in Jaisalmer, often forming the backbone of traditional agro-pastoral landscapes. *Salvadora oleoides* and *Capparis decidua* dominate certain orans and saline zones. Many orans continue to be governed by customary rules that prohibit tree cutting and restrict grazing, reinforced by periodic rituals and community oversight. However, the absence of formal legal recognition has increased their exposure to development-related threats.

6. Discussion

6.1 Ecological Importance of Heritage Trees

In arid environments such as the Thar Desert, large trees function as keystone structures. Their canopies create microclimates that facilitate seedling establishment, while their roots stabilize soil and enhance nutrient cycling. Given the sparse tree cover of desert landscapes, the loss of even a single mature tree can significantly disrupt local ecological processes.

6.2 Cultural Protection and Conservation Synergy

The long-term persistence of many orans can be attributed to strong cultural sanctions and belief systems. However, contemporary pressures necessitate supplementing these traditional mechanisms with formal legal recognition, scientific monitoring, and institutional support. Integrating community stewardship with technical conservation measures offers the most promising pathway for effective protection.

6.3 Governance Challenges and Renewable Energy Expansion

While the expansion of renewable energy infrastructure is a policy priority, conflicts have arisen when projects overlap with culturally and ecologically important lands. Judicial interventions demonstrate the importance of incorporating social and environmental screening, as well as locally recognized land categories such as orans, into development planning processes.

7. Recommendations

Immediate actions should include district-wide participatory mapping of orans and heritage trees, temporary protective measures for high-value sites, and community-led documentation initiatives. In the medium term, formal legal recognition of orans, establishment of long-term monitoring programs, and integration of oran maps into development planning are essential. Long-term strategies should focus on ecological restoration, assisted natural regeneration

using native species, education, and livelihood-linked conservation initiatives such as eco-cultural tourism.

8. Conclusion

The giant heritage trees and sacred groves of Jaisalmer represent a unique ecological and cultural legacy that is both resilient and vulnerable. By combining traditional conservation practices with scientific methods and supportive governance frameworks, it is possible to safeguard these living monuments against the pressures of development and climate change, ensuring their survival for future generations.

9. References

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