IJRAR.ORG E-ISSN: 2348-1269, P-ISSN: 2349-5138

INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR) | IJRAR.ORG

An International Open Access, Peer-reviewed, Refereed Journal

Study on Community-Based Biodiversity Conservation as a Sacred Grove in the Shekhawati Landscape of Thar Desert

Gulshan Verma and G.R. Parihar

Biodiversity Unit, Department of zoology

Jai Narayan Vyas University, Jodhpur-342005(Raj.)

Abstract

Sacred Groves, often referred to locally as Orans or Devbanis, are the main example of community-based biodiversity conservation in the Shekhawati landscape of the Thar Desert. Hunting, tree-felling, and agricultural activities are strictly forbidden in these village commons, which are controlled by the community and devoted to local deities. Ecological and Biological Significance Sacred woods function as "mini biosphere reserves" and habitat for wildlife in this parched area. In Shekhawati, conservation is more strongly ingrained in socioreligious customs than in official regulations. Community-Based Conservation Mechanisms Rather than formal laws, conservation in Shekhawati must be deeply rooted in socio-religious norms. It is emphasized that, in addition to conservation, appropriate use and management of this biodiversity is required to support agricultural and human needs. The plan should be such that the public supports it.

Keywords: Biodiversity Conservation, Sacred Grove, Shekhawati Landscape, Thar Desert.

1. INTRODUCTION

Rajasthan is a unique state that exhibits significant regional difference in terms of vegetation, climate, and altitude. The western Thar desert, the Aravali hills, and the southeast plateau are the three main physiographic regions of Rajasthan. With an area of over 2,78,330 sq km, of which 1,96150 sq km, or almost 70%, are in Rajasthan, the Thar desert, also known as the Great Indian Desert, makes up a sizable chunk of western India.

In the Thar Desert, animal-human linkages and their involvement in desertification are crucial [1]. The districts of Sikar Jhunjhunu and Churu are part of the Thar desert's Shekhawati scenery. The Thar Desert of Punjab, Pakistan, supports a distinctive assemblage of wild flora that underpins both the ecological stability and traditional healthcare systems of local communities [2].

Singh et al, (2019) reported on Sacred Groves in Western Himalaya, India: Community-Managed Nature Refuges for Conservation of Biodiversity and Culture, and they have mentioned that Sacred Groves (SGs) are not only the important repositories of ethno-medicinal plant species, but also act as corridors for animal migration in anthropogenic landscapes [3].

The range of Aravali hills identifies the eastern half of the Shekhawati environment, while the wasteland and sand dunes identify the western half. Sand from the western half cannot enter this part due to the hills. Community forests/rangelands, called Orans and Gauchars in the western arid part of India, constitute a significant proportion of the total geographical area of the region [4].

Animals and trees are revered and thought to be God's dwelling. The sacred groove is home to valuable medicinal plants for both contemporary pharmacopoeia and the primary healthcare of village populations. Oran is a traditional biodiversity management system unique to Rajasthan, locally known as Devbani and these are common preserved sections of forest protected by villages in the name of gods or goddesses [5].

The Bishnoi community is a prime example of holy groove conservation, which preserves blackbuck and Khejari (Prosopis cineraria), two multipurpose "keystone species" that are essential to the region's way of life and have integrated into social and cultural life. The Thar Desert of western India is known for its rich and ancient culture system and traditions [6]. The physiological and ecological features of the area were proposed by researchers. As stakeholders, they offer information on how the characteristics of plants and animals affect people's lives. A global assessment of the available information indicates that the inherent low productivity of drylands, when combined with other adverse factors, can generate poverty [7].

A wide variety of animals and plants that have adapted to the severe circumstances can be found in deserts, which are biologically rich habitats. Huge portion of Rajasthan is desiccated and houses the biggest Indian desert—the Thar Desert [8]. Sacred groves are areas of jungle preserved by the local population in honour of saints, religion, and culture, as well as local deities like Bharuji, Mataji, and Mahadevji. The sacred groves along the forest belts of south India, which were traditionally managed by village communities, are gradually disappearing [9].

The study reported on used as weather indicator and coindicator by people through perception and long experience in Thar desert. Overlaps were seen in symbionts isolated from the native and exotic species suggesting that these hosts are open and inclusive towards a wide range of symbionts irrespective of their origin [10]. Some of the finest extant grasslands in India are found in Jaisalmer, Jodhpur and Bikaner districts of the Thar Desert in Rajasthan [11].

The biggest challenge facing humans globally is climate change, which is severely impacting glaciers and deserts, two of the most fragile ecosystems [12]. The Thar Desert, or Great Indian Desert, extends between 20°25′ and 30°30′N and 67° and 75°25′E across four states in India, i.e., Rajasthan, Haryana, Punjab and Gujarat [13]. Studies on biodiversity of selected areas in Thar Desert Rajasthan related to All living things that were revered in the ancient Indian tradition of nature worship as mentioned by Parihar (1997) [14].

Parihar (2015) reported on Faunal diversity richness of ecological institute in the village landscape of the thar eco-region Rajasthan, India and studied that survival of different animals ‘species in the Thar Desert depends on different specific plant species [15]. Any alteration in the flora will lead to survival problems for all those animals that are closely associated and survive on particular plant species by Parihar G.R. (2015), reported on Biodiversity.

Parihar & Kumar (2016) reported on significant role of common property Rresources utilization of Biodiversity conservation in the Thar Desert Rajasthan and bio-resources are used as food, fodder, firewood, fibre, herbal remedies, and industrial raw materials in daily life as well as during droughts and famines [16]. Native Americans who utilise plants and animals to their fullest potential for survival are well aware of this.

Kumaret al., (2016) reported on Occurrence of Albino Gazella bennetti in Viratra mata Oran (Sacred land) of Chohtan, Barmer (Thar Desert of Rajasthan) and recommended a variety of common property resources that are rich sources of biodiversity in the Thar desert and as They reported that the traditional resource management technique used by the indigenous people of the Thar Desert is a particularly distinctive method of conservation [17]. It could take the shape of ponds, Aagore, Pachhore, Gaucharland, and wasteland. The conservation of biodiversity greatly depends on the sustainable use of these common property resources.



Fig 1 Observed biodiversity status in the Shekhawati region

2 Materials and Methods

A questionnaire was used to collect data from a variety of sources from the local population in many villages close to the study site. which are straightforward, sporadic enquiries about how they used and preserved the resources. In order to determine the existence range of species in specific study regions of the sacred groove, direct wildlife sampling techniques, including as the visual and auditory methods, were used to observe the presence of foot prints, drooping faeces, burrows, impressions of finger claws, feet, and tails. Date, time, location, and habitat type were noted on the data sheet; the transect method and incidental sightings were useful in determining the presence and population status of species.

Habitat seeking was examined within a 250-meter radius of the sampling location, which is ideal for counting the variety of reptiles. Identification of floral diversity and its therapeutic benefits through literature and local names used by the local community or indigenous people living in the study area. The Biodiversity Conservation Network brought together conservation and development organizations and local communities to systematically test this hypothesis across 39 conservation project sites in Asia and the Pacific [18].

Table 1: Showing the number of grass species in rainy season in different landscape

S.No.	Season	Type of landscape	Number of grass species
1.	Rainy	Oran	7
2.		Gaucher	6
3.		Fallow/Agricultural	5
4.		Magra	4
5.		Sand dune	2

3 Result and discussion

3.1 Geographical status of the Thar Desert: About 85% of the 200,000-square-kilometer Thar Desert, also known as the Great Indian Desert, is in India (mostly Rajasthan), while the other 15% is in Pakistan. It is the seventh to seventeenth largest desert in the globe and is distinguished by shifting sand dunes, harsh summer and winter temperatures, and irregular, low rainfall (between 100 and 500 mm).

3.2 Important Geographical Features of the Thar Desert: Location: Surrounded by the Rann of Kutch (south), the Punjab Plains (north), the Aravalli Range (southeast), and the Indus River plain (west). The terrain is mostly made up of sand dunes (Marus thali in the west), rocky plains, and salt lakes (Sambhar, for example). Climate: Loam/sandy soil in a subtropical desert with strong wind erosion. Water Sources: Other than the man-made Indira Gandhi Canal, the Luni River is the sole major water source. Recent "greening" brought about by irrigation, groundwater pumping, and climate change has made it one of the world's most densely populated deserts despite its aridity. Community-based conservation (CBC) is based on the idea that if conservation and development could be simultaneously achieved, then the interests of both could be served [19].

3.3 Geographical status of the Shekhawati Landscape: The Shekhawati region, which is situated in northeastern Rajasthan and includes the districts of Churu, Sikar, and Jhunjhunu, is a portion of the Thar Desert that is semi-arid, sandy, and dominated by dunes. At an elevation of 26°26' to 29°20' N latitude and 74°44' to 76°34' E longitude, it is distinguished by low, irregular rainfall, hot temperatures, and scant vegetation. Damastuti, et al (2022) reported on effectiveness of community-based mangrove management for biodiversity conservation [20]. Scientifically, the community-based biodiversity conservation in shekhawati region is not good as reported in our study area (Geographical status of the Shekhawati Landscape, where research worked was carried out (Table 1,2 and Fig 1,2,3).

3.3.1 Important Geographical Features of the Shekhawati Landscape:

Districts: The area is dispersed over Churu, Sikar, and Jhunjhunu; it frequently crosses the Bagaar tract along the border with Haryana. Key Centers: Sikar, Jhunjhunu, Churu, Mandawa, and Nawalgarh are significant towns in this region. The area is frequently referred to as a "Open Air Art Gallery" because of the high concentration of painted havelis from the past. Physiography: Sand dunes make up about 71.7% of the territory, mostly in the west, while sandy alluvial plains make up around 19.3% in the east. Soil and Climate: Red loamy soil in the east (Sikar/Jhunjhunu) and sandy soil in the west (Churu) are examples of soil types. Extreme temperatures and frequent droughts characterise the severe, arid to semi-arid climate. Hydrology: The area is mostly dry, and, small salt-affected lakes (ranns) in the Churu region, and the seasonal/ephemeral river Kantli are the main sources of water. Vegetation: The region is home to xerophytic (drought-resistant) plants, such as shrubs and trees like Acacia nilotica. Ecology and Land Use: The region is rapidly changing as a result of increased irrigation, which has an effect on the local biodiversity (particularly in the arid northwestern areas). The main landforms, soil types, and land use in the Shekhawati region have been planned and analysed in this study. The Community-Based Biodiversity Conservation distribution in the area is described in this study. The Community-Based Biodiversity Conservation as a Sacred Grove in the Shekhawati region is examined in this article. Approaches to the management of protected areas that involve the participation of local communities are now being widely promoted [21].

Table 2: Number of different animal species in different landscape in summer season

Season	Landscape	Arthropods	Amphibians	Reptiles	Aves	Mammals
Summer Season	Oran	180	10	07	98	12
	Gaucher	171	08	06	87	09
	Fallow/ Agricultural Land	169	07	05	80	07
	Magra	80	02	10	50	05
	Sand dunes	50	01	05	36	03

3.4 Present / Current Situation:

3.4.1 Environmental challenges: these issues include high temperatures, frequent droughts, and excessive grazing that causes soil erosion.
3.4.2 Development: Groundwater exploitation is driving the region's fast-growing urbanization and intensification in agriculture.

3.5 Recommended research objectives:

In light of the aforementioned information, the current study is suggested to assess the: - Different aspects of the sacred grove's wild gene pool and faunal diversity for agricultural enhancement $ Biodiversity conservation. Common Property Resources' Contribution to Wealth and the Economy. The impact of environmental conditions and anthropogenic activity on the study area's sacred grove. The study area's natural water bodies and water catchment sources, such as ponds and Bawadi, are important for improving biodiversity conservation. Results may inform our understandings of why many participatory approaches to conservation have failed to achieve meaningful participation in practice [22].

3.6 Significance and Scope of Proposed Research

The indigenous people of the Thar Desert retain sacred groves known as oranland or orans as part of their traditional method of managing natural resources. These resources protect economically significant, endemic, and endangered animal and plant species that are vital to the preservation of biodiversity. A crucial first step in creating laws and regulations is the inventory of Orans, which should involve the methodical gathering of disaggregated land and economic data to account for the advantages and participation for certain groups through participatory assessment and evaluation. Conservation of biodiversity through the use of indigenous gods, saints, heroes, and high lights. Their tenets emphasise the preservation of nature in an understandable and straightforward manner. It is now abundantly evident that the village institutions, especially the Oran and Gaucher lands, are significant biodiversity reservoirs and the main land masses of common property resources (CPR). In the ponds, reservoirs, step wells (bawdi), streams, and springs that are an integral part of the Oran, the Orans preserve precious water. The majority of orans have a protected water source, which replenishes groundwater and maintains appropriate water levels. The exclusionary protected area-based approach to biodiversity conservation has succeeded at several places, but at a significant social cost and conflict, especially in the developing country tropics [23].

3.7 Biological and Ecological Significance:

In this dry area, sacred woods function as "mini biosphere reserves" and havens for biodiversity. The dominant approach to conservation in the 20th century was the establishment of protected areas from which people were excluded [24].

Flora: They maintain xerophytic vegetation, such as the state trees Peelu/Jaal (Salvadora oleoides), Rohida (Tecomella undulata), Kair (Capparis decidua), and Khejri (Prosopis cineraria). Additionally, these locations serve as vital stores for therapeutic plants such as Pimpa (Caralluma edulis) and Gugul (Commiphora wightii).

Fauna: Antilope cenvicapra (black buck), Chinkara (Indian Gazelle), and a variety of migrating birds are among the desert-adapted animals that depend on these groves for vital habitat.
Environmental Services: They are essential for preventing desertification by stabilising sand dunes, desilting ponds, and conserving soil and water.

3.8 Mechanisms for Community-Based Conservation:

In Shekhawati, conservation is more strongly ingrained in socioreligious customs than in official laws. Community-based conservation is experiencing a crisis of identity and purpose as a result of a disappointing track record and unresolved deficiencies [25].

Traditional Taboos: According to local beliefs, disturbing the grove or cutting green wood will result in the anger of the presiding deity and bring disaster to the individual or the community.
Local Custodianship: Committees at the village level or priests (Bhopas) who uphold social norms are frequently in charge of management.

Sustainable Use: Communities are frequently allowed to gather dry wood, wild fruits, and medicinal herbs without endangering the living ecology, even while falling is allowed.

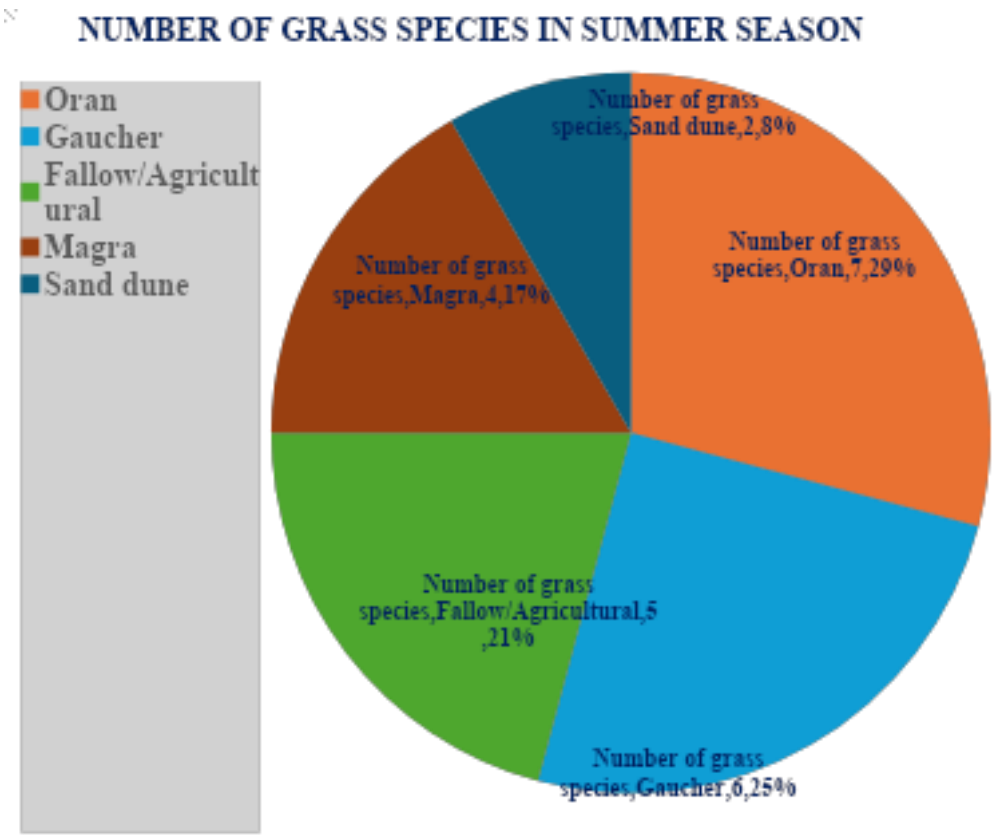


Fig 2: Showing number of different species in different landscape

3.9 Obstacles and Changes in Policy:

Dangers: These sites have deteriorated as a result of modernization, changes in land use, and "mismanagement" (such as designating Orans as "Culturable Waste Land" in revenue records).

Legal Recognition: The Rajasthan government was ordered by a landmark Supreme Court of India ruling in December 2024 to map and designate all sacred groves as "Deemed Forest" in order to grant them formal protection. Biodiversity has been declining rapidly in developing countries during the last half century [26].

Restoration Efforts: To revitalize these historic systems, groups (like local organization) collaborate with local volunteers to desilt ponds and plant native species.

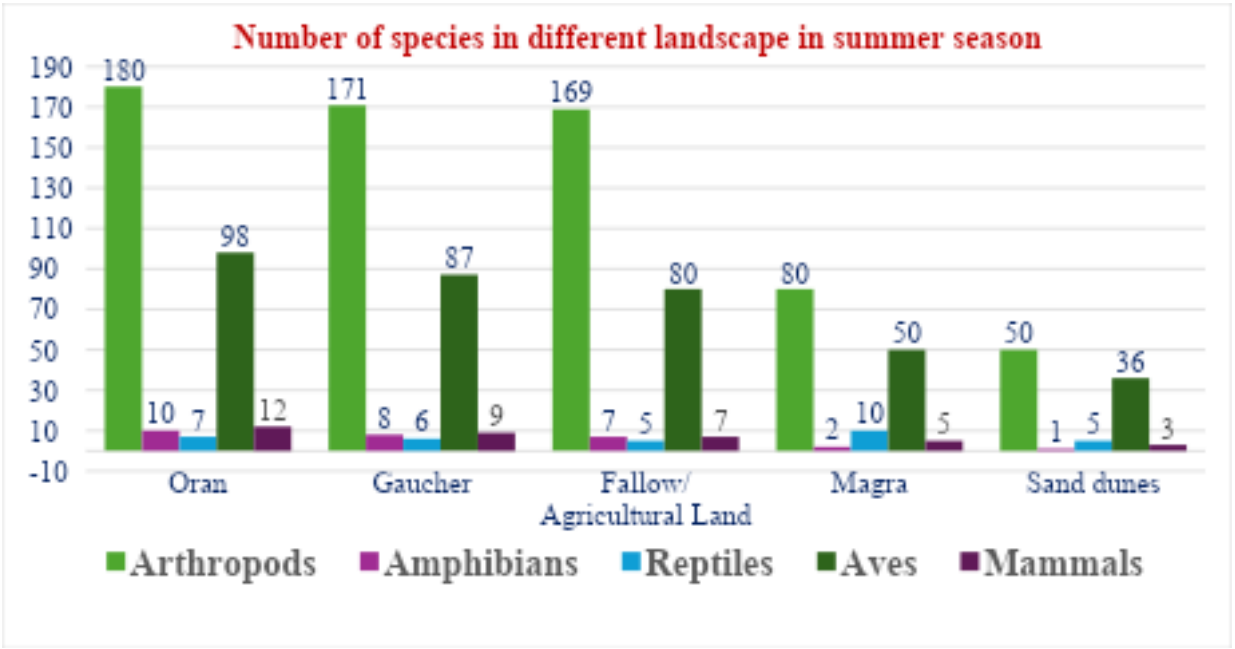


Fig 3: Showing number of different species in different landscape

4 Conclusion:

Orans are a source of renewable energy for wildlife and are rich in biogenetic variety. In order to preserve the desert germplasm and increase biomass for sustainability through native multispecies plantations, Oran land needs to be revitalized. However, the majority of them are being destroyed as a result of modernization and poor management, therefore higher authorities must assist the underprivileged and the local community, which is directly tied to land preservation. It will be a great study of how local communities safeguarded their shared resource base and supplied food and water for animals as well as shade, fire wood, fodder, and food for people in arid and severe environments. Numerous plant and animal species that are endangered in the forest are nevertheless well preserved in select sacred groves, according to research. It has been observed that several medicinal plants that are not to be found in the forest are abundant in the sacred grove. Considering the aforementioned information, we may conclude that the custom of sacred groves offers a potent instrument for guaranteeing biodiversity protection through community involvement.

ACKNOWLEDGMENT: The authors are grateful to Local bodies, Shekhawati area of Thar Desert Region, Rajasthan, for kind support during field visit. The authors are thankful to the Head, Department of Zoology, Jai Narayan Vyas University, Jodhpur-342005 (Rajasthan), for providing all necessary facilities. One of authors, **Gulshan Verma is also thankful to Prof. Dr. GR Parihar**, Department of Zoology, Jai Narayan Vyas University, Jodhpur-342005 (Rajasthan.), Rajasthan for scientific guidance during research work.

Funding: No funding was received.

Authors' Contributions: Authors, Gulshan Verma and Prof. Dr. GR Parihar, have contributed in every aspect of this research work including the conception, design of the work, the acquisition, experimentation, analysis, interpretation of data, original writing of manuscript, review of manuscript, editing and finalization of manuscript, etc. Additionally, author Gulshan Verma has contributed as corresponding author, visualization, writing, review, editing, formal analysis, and investigation. Prof. Dr. GR Parihar has also contributed as mentor and supervisor of the research work. All authors have approved the submitted version (including the final version).

References

1. Vijayan, A.S. (2023). Community Land Management in the Thar Desert. In: Varghese, N., Burark, S.S., Varghese, K. (eds) Natural Resource Management in the Thar Desert Region of Rajasthan. Springer, Cham. https://doi.org/10.1007/978-3-031-34556-2_9
2. Iqbal, U., Gul, M.F., Naseem, Z. et al. Thal desert flora: diversity, abundance, phytochemistry, therapeutic potential, and conservation status. Genet Resour Crop Evol 73, 102 (2026). https://doi.org/10.1007/s10722-025-02715-2
3. Singh, S., Bhat, J. A., Malik, Z. A., Youssouf, M., Bussmann, R. W., & Kunwar, R. M. (2019). Sacred Groves in Western Himalaya, India: Community-Managed Nature Refuges for Conservation of Biodiversity and Culture. Ethnobotany Research and Applications, 18, 1–21. Retrieved from https://ethnobotanyjournal.org/index.php/era/article/view/1415
4. Chaudhry, P., Bohra, N. K., & Choudhary, K. R. (2011). Conserving biodiversity of community forests and rangelands of a hot arid region of India. Land Use Policy, 28(3), 506-513. https://doi.org/10.1016/j.landusepol.2010.10.005
5. Singh, D., Choudhary, M.K., Meena, M.L., Roy, M.M. (2016). Oran Dynamics: A Community-Based Biodiversity Management System in India's Arid Zone. In: Bose, P., van Dijk, H. (eds) Dryland Forests. Springer, Cham. https://doi.org/10.1007/978-3-319-19405-9_4
6. Gaur, M.K., Gaur, H. Combating Desertification: Building on Traditional Knowledge Systems of the Thar Desert Communities. Environ Monit Assess 99, 89–103 (2004). https://doi.org/10.1007/s10661-004-4005-7
7. Safriel, U., Adeel, Z. Development paths of drylands: thresholds and sustainability. Sustain Sci 3, 117–123 (2008). https://doi.org/10.1007/s11625-007-0038-5
8. Varghese, N., & Singh, N. P. (2016). Linkages between land use changes, desertification and human development in the Thar Desert Region of India. Land Use Policy, 51, 18-25. https://doi.org/10.1016/j.landusepol.2015.11.001

9. Chandrakanth, M.G., Bhat, M.G. and Accavva, M.S. (2004), Socio-economic changes and sacred groves in South India: Protecting a community-based resource management institution. Natural Resources Forum, 28: 102-111. https://doi.org/10.1111/j.1477-8947.2004.00077.x
10. Bissa, G., Tak, N., Chouhan, B. et al. The native Indian mimosoid tree Prosopis cineraria shares diverse root nodulating rhizobia symbionts with exotic species of Neltuma (ex-Prosopis). Plant Soil 511, 683–711 (2025). https://doi.org/10.1007/s11104-024-07011-z
11. Islam, M. Z. ul, & Rahmani, A. R. (2011). Thar Desert, Rajasthan, India: anthropogenic influence on biodiversity and grasslands. Biodiversity, 12(2), 75–89. https://doi.org/10.1080/14888386.2011.585931
12. Singh, P., Sohail, A., Mamta, Solanki, M.S., Kumar, R. (2026). Sustainable Management of Nature and Natural Resources of the Thar Desert. In: Sobti, R.C. (eds) Biotechnology Innovations for a Sustainable Future. Springer, Singapore. https://doi.org/10.1007/978-981-97-9859-9_14
13. Idris, M. (2009). Eco-Biodiversity of Rodent Fauna of the Thar Desert. In: Sivaperuman, C., Baqri, Q.H., Ramaswamy, G., Naseema, M. (eds) Faunal Ecology and Conservation of the Great Indian Desert. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-540-87409-6_13
14. Parihar, G.R. (1997): Studies on biodiversity of some selected areas in Thar Desert Rajasthan, India. Ph.D. Thesis.
15. Parihar G.R. (2015), Faunal diversity richness of ecological institute in the village landscape of the thar eco-region Rajasthan, India, International Journal of Engineering, Management & Science, 2(6), 6-8. https://d1wqtxts1xzle7.cloudfront.net/38139149/IJEMS_V2IS60006-libre.pdf1436438179 & responsecontentdisposition=inline%3B+filename%3DFaunal_Diversity_Richness_of_Ecological . pdf
16. Parihar, G. R., & Kumar, K. (2016). Significant role of Common Property Resources Utilization of Biodiversity Conservation in the Thar Desert Rajasthan. International Journal of Engineering, Management & Sciences (IJEMS), 3(9), 2348-3733. https://www.academia.edu/download/51013698/IJEMS_V3IS90021.pdf
17. Kumar, K., Vaishnav, V., Ojha, A.P., Parihar, P., Barmera, R., & Parihar, G. R. (2016). Occurrence of Albino Gazella bennetti in Viratra mata Oran (Sacred land) of Chohtan, Barmer (Thar Desert of Rajasthan). India International Journal of Environmental & Agriculture Research, 2(11), 87-90. https://scholar.google.com/scholar?cluster=14932376641074558821&hl=en&oi=scholarr
18. Salafsky, N., Cauley, H., Balachander, G., Cordes, B., Parks, J., Margoluis, C., ... & Margoluis, R. (2001). A systematic test of an enterprise strategy for community-based biodiversity conservation. Conservation biology, 15(6), 1585-1595. https://doi.org/10.1046/j.1523-1739.2001.00220.x
19. Berkes, F. (2004). Rethinking community-based conservation. Conservation biology, 18(3), 621-630. https://doi.org/10.1111/j.1523-1739.2004.00077.x
20. Damastuti, E., de Groot, R., Debrot, A. O., & Silvius, M. J. (2022). Effectiveness of community-based mangrove management for biodiversity conservation: A case study from Central Java, Indonesia. Trees, Forests and People, 7, 100202. https://doi.org/10.1016/j.tfp.2022.100202
21. Bajracharya, S.B., Furley, P.A. & Newton, A.C. Impacts of Community-based Conservation on Local Communities in the Annapurna Conservation Area, Nepal. Biodivers Conserv 15, 2765–2786 (2006). https://doi.org/10.1007/s10531-005-1343-x
22. Campbell, L.M., Vainio-Mattila, A. Participatory Development and Community-Based Conservation: Opportunities Missed for Lessons Learned? Human Ecology 31, 417–437 (2003). https://doi.org/10.1023/A:1025071822388
23. Lele, S., Wilshusen, P., Brockington, D., Seidler, R., & Bawa, K. (2010). Beyond exclusion: alternative approaches to biodiversity conservation in the developing tropics. Current Opinion in Environmental Sustainability, 2(1-2), 94-100. https://doi.org/10.1016/j.cosust.2010.03.006
24. Hutton, J., Adams, W. M., & Murombedzi, J. C. (2005). Back to the Barriers? Changing Narratives in Biodiversity Conservation. Forum for Development Studies, 32(2), 341–370. https://doi.org/10.1080/08039410.2005.9666319
25. Mulrennan, M. E., Mark, R., & Scott, C. H. (2012). Revamping community-based conservation through participatory research. The Canadian Geographer/Le Géographe canadien, 56(2), 243-259. https://doi.org/10.1111/j.1541-0064.2012.00415.x
26. Calfucura, E. (2018). Governance, land and distribution: A discussion on the political economy of community-based conservation. Ecological economics, 145, 18-26. https://doi.org/10.1016/j.ecolecon.2017.05.012