

Role of the Places of Sacred Eco Heritage in Conserving Traditional Knowledge Systems: The Case of the Braj Region in India

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Abstract

Sacred eco heritage places are specific natural locations that hold profound cultural, spiritual, and ecological significance for indigenous and local communities. This study examines the role of sacred eco heritage places in the preservation of traditional knowledge systems by examining the sacred ecology of Braj and how it has evolved alongside the terrain, vegetation, and water bodies. While Braj exhibits similarities to other pilgrimage destinations in India, it stands out due to its distinctive religious and cultural values that revolve around pastoralism. The area boasts a significant array of holy places situated along the banks of the Yamuna River, the Aravalli Hills, as well as various riverfronts and bodies of water.

The research employs an exploratory case study and gather qualitative data through interviews, observations, and document analysis, and explores the connections between traditional knowledge systems, cultural practices, and ecological conservation in the context of this region.

The study reveals that these sites have played a key role in conserving traditional knowledge through practices rooted in animism and a deep understanding of biodiversity. However, in contemporary times, the dense urban development of places like Vrindavan (historically a sacred eco heritage site) and the disappearance of kunds, kunjis, wetlands, and forests pose a significant threat to these sacred eco-heritage sites. The encroachments on these areas jeopardize the invaluable traditional knowledge systems embedded within them, along with the associated cultural and ecological heritage.

Keywords: Braj Region, Sacred Eco Heritage Sites, Traditional Knowledge Systems, Conservation, Cultural heritage.

Introduction

The sacred geography of the Indian subcontinent is a network of sacred sites where a direct and intimate encounter with Nature occurs for millions of religious devotees and other visitors (Singh, 1997). Indian religions attach great importance to Nature, as they believe that

natural elements possess sacred energies that enable individuals to realize divinity within themselves. Elements such as mountains, caves, water, vegetation, and their combinations have the potential to become *axis mundi*, a point of connection where divine realms becomes attainable (Sinha, 2006). While built heritage represents the corporeal dimensions of the identity of place, natural sites remain outstanding assets of humanity, the trajectory of ancient heritage values having special spiritual significance. IUCN broadly categorized Sacred Sites as follows.

- 1) human-crafted and associated with the uniqueness of a specific faith, such as temples, mosques, churches or similar places of worship,
- 2) a place in nature that bears no special making, just some mythic forces (spirituality) imbued in the cultural traditions, such as sacred forests, sacred hills, etc. (Valentine, 2008).

If nurtured, these special places can contribute meaningfully to both the protection of biological diversity and the maintenance of cultural identity. All over the world, Sacred Eco Heritage sites are diverse in nature, attributed to their genesis, cultural associations, geographical context and socioeconomic processes shaping the environment. Though this category of sacred sites are much acknowledged and revered in India since historic times, yet we lack any understanding and documentation of such sites which leads to poor management and conservation of these cultural landscapes in the face of rapid urbanization (Pathak et al., 2009).

Each succeeding revolution in history has affected human interactions with the natural ecosystem. Thus, these cultural landscapes are the living history of natural and cultural transformations. In addition to representing a vast cultural library, these sacred sites also serve as a retreat to plant and animal species. The stronghold of indigenous communities and spiritual values attached to these sites result in high levels of biodiversity in some cases, while increased human disturbances cause modifications in the ecosystem. The sacred natural physiographic features such as, hills, forests, groves, caves, and rocks often become symbolic or emblematic (Amirthalingam, 2016).

Sinha (1996) conceptualizes natural archetypes such as rivers, hills, flora and fauna as manifestations of Gods and Goddesses. Eck (2012) characterizes the sacred geography of India as being densely populated with multiple centers, forming an "imagined landscape" that reflects a particular expression of religious devotion tied to specific locations. This landscape is brought into existence through the countless journeys undertaken by millions of pilgrims. It is celebrated in myths, depicted in various art forms, and portrayed in literature, primarily serving as a means to visually connect with the divine. As described by IUCN (2008), the reasons of sacrality of these sacred eco heritage sites may be perceived as:

- abodes of deities and ancestral spirits
- sources of healing water and medicinal plants
- places of contact with the spiritual realm, or
- sites of revelation and transformation
- burial grounds of ancestors, shrines, or sites. In some cases, they are associated with special events, saints, and spiritual leaders considered sacred.

These natural landscapes exist since the prehistoric times in different climatic zones. Anthropogenic (cultural) involvement in them had started with the Neolithic revolution with the stimulation of farming: pastoral activities (Myga-Piatek, 2011). Paleoanthropological evidence suggests that ancient people, such as Neanderthals, practiced ancestor worship at the burial grounds more than 60,000 years ago, possibly one of the origins of sacred sites. Worship of highly significant natural features such as high mountains and rivers appear to be common features of all the human cultures, similar to burial ground worship. It can be traced back 50,000 years. Australian rock paintings which are considered sacred in Nature, date 20,000 years back

(Verschuuren et al., 2012). The phases of the historical evolution of the Sacred Eco Heritage Sites can be summarized as:

Table 1: Phases of the historical evolution of the Sacred Eco Heritage Sites

Source: Authors

Prehistory	Ancient	Medieval	Modern Era
It ranges from the earliest human ancestors to around 3000 BC. These sites are often defined by unique natural features such as rock formations, caves, and springs, as well as relics and art from prehistoric cultures (Renfrew et al., 2008).	It ranges from around 3000 BC. Up to 500 AD. Great civilizations such as the Greeks, Egyptians and Mayans created elaborate temple complexes and sacred sites that blended nature and architecture (Tate, 2006).	This period corresponds to the Middle Ages in Europe and the Islamic Golden Age in the Middle East. It spans approximately AD 500 to AD 1500. These sites were often defined by natural features such as mountains, rivers, and forests, and the spiritual and cultural significance ascribed to them by religious traditions (Ramos et al., 2015).	This era includes the Renaissance in Europe, the Enlightenment, the Industrial Revolution, and the expansion of European influence around the world. It ranges from approximately AD 1500 to AD 1900. The modern era of sacred eco heritage began in the late 19th century with the emergence of conservation movements to protect natural areas and wildlife from the destructive effects of human activity.

There is a lack of conservation guidelines for Sacred Eco Heritage Sites (SEH) and they are not listed as protected areas (Pathak and Kothari, 2009). This can be seen as a reason for prioritizing development controls and regulations to preserve the built heritage. The lack of guidelines and legal protections for SEHs in India means that they are often at risk of destruction or degradation due to a variety of factors such as land use change, infrastructure development and over-exploitation of the natural resources (Studley, 2018). In contrast, heritage constructed as monuments, buildings and archaeological sites are protected by various laws and regulations, such as the Ancient Monuments and Archaeological Sites and Monuments Act 1958 and the National Building Code of India. The absence of conservation guidelines for SEH sites also means that they are often not considered in the development and land-use planning processes (Verschuuren et al., 2012; Studley, 2018). This may lead to the loss of important ecological, cultural and traditional values associated with these sites.

Sacred Eco Heritage sites (SEH) are the reflection of the knowledge and societal values of our ancestors, communicating a large array of archival information to future generations. Traditional knowledge systems (TKS) refer to the accumulated knowledge, skills, practices and beliefs that have been developed within indigenous and local communities and passed down through generations (Berkes et al., 1994). These include a wide range of knowledge, such as ecological knowledge, agricultural practices, medical knowledge, spiritual beliefs, stories, and cultural practices.

This study aims to fill this gap of knowledge by examining the role of sacred ecological heritage in the preservation of traditional knowledge systems in the Braj region. To begin with, the traditional practices commonly associated with the sacred natural sites can be summarized as follows.

Table 2: Traditional practices commonly associated with the sacred natural sites

Source: Authors

Rituals and Ceremonies	Pilgrimages	Conservation and Stewardship
Sacred natural sites often serve as locations for religious and spiritual rituals and ceremonies. These practices may include	Many sacred natural sites attract pilgrims who undertake journeys to visit and pay respects to these revered places. Pilgrimages often	Sacred natural sites are often protected and cared for by local communities who consider themselves custodians of these

offerings, prayers, chants, ablution, dances, and other forms of worship to honor the sacredness of the site and establish a connection with the divine or spiritual realm. (Sinha, 2014, Kumar and Singh, 2017)	involve a combination of physical and spiritual elements, with participants engaging in rituals, meditations, and communal activities along the pilgrimage route. (Shinde,2011, Mantsinen,2020)	places. Traditional practices associated with conservation and stewardship include sustainable resource management, controlled access to the site, and regulations on activities that may harm the environment or disrupt the sacredness of the place. (Kala, 2011Rautela, 2015)
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Table 3: Traditional practices commonly associated with the sacred natural sites

Source: Authors

Oral Traditions and Knowledge Transmission	Taboos and Sacred Laws	Community Gatherings and Festivals
Sacred natural sites are repositories of traditional knowledge systems. Indigenous communities pass down their ecological wisdom, medicinal plant knowledge, storytelling, and ancestral narratives associated with the site through oral traditions. This ensures the continuity of cultural practices and the preservation of traditional knowledge. (Masso, 2012, Negi, 2015)	Many sacred natural sites have associated taboos and sacred laws that guide human behavior and interaction with the site. These taboos may include restrictions on certain activities, such as hunting, fishing, or harvesting specific plants, to maintain the ecological balance and preserve the sanctity of the site. (Oladeji et al., 2021)	Sacred natural sites often serve as gathering places for community events and celebrations. Festivals and cultural gatherings held at these sites provide opportunities for communal bonding, sharing of traditional knowledge, and reinforcing cultural identity. (Illiyas et al., 2013, Mair and Whitford, 2013)

Indigenous communities have relied on their local environments for resources for extended periods, leading to their vested interest in preserving and enriching biodiversity. Their methods for biodiversity conservation are based on a collection of practical guidelines that seem to have been established through an extensive trial and error process over a significant historical period. This suggests that their knowledge base is vast and their implementation is closely tied to their belief system (Gadgil et al., 1993). Regardless of their spiritual, cultural and ecological values, sacred eco heritage sites have become a subject of consideration in conservation frameworks only about two decades ago. Ensuing the efforts of UNESCO (1998) in the form of conventions and series of workshops, international conservation organizations like WWF and IUCN have started to explore ways to integrate sacred natural sites in their conservation work (Mallarach & Verschuuren, 2019). United Nations Declarations in 2007 has endorsed the rights of the Indigenous People recognising the contribution of traditional culture and knowledge towards sustainable development and management of Sacred Natural Sites worldwide (Robson & Berkes, 2010). The guidelines presented at UNESCO conference held in Tokyo in 2006 focused on sacred natural sites that are important to the local communities. A better understanding of the extent of these sites and their role in preserving traditional knowledge systems can facilitate the development of more effective practices for conserving both ecological and cultural heritage. In line with this objective, the research utilizes an exploratory case study approach focused on the Braj Region.

Research Methodology

This research follows a case study approach, drawing on methods and theories from different fields, including cultural studies, environmental studies, and heritage management. Fieldwork for this study was conducted in Vrindavan from December to January 2018 and January 2020, as well as in Nandgaon, Barsana, Goverdhan, and other areas in November 2022 and April 2023. Research employed various methods including in-depth interviews,

participation in pilgrimage rituals, observation of public behavior, and reconnaissance surveys of sacred eco-heritage sites. Semi-structured interviews were used to gather detailed insights and robust information from a select group of participants. The field visits aimed to map cultural assets, resources, and traditional knowledge systems within the defined administrative boundaries of the project. The study was carried out in three phases: the desktop study stage, on-site documentation and mapping, and off-site analysis and evaluation.

During the Phase 1, a preliminary study was conducted to establish a framework for the subsequent stage. This involved identifying sacred natural features and settlements within the administrative boundaries of the mapping area. Archival analysis was performed, gathering secondary data on historically significant sites, local fairs, and festivals within these locations. Initial maps and routes for cultural mapping were prepared, along with inventory forms for tangible and intangible cultural assets.

Phase 2 focused on on-site documentation and mapping, aiming to collect data on the ecological condition and cultural assets while identifying associated challenges and gaps in the existing management system. Detailed forms were created for tangible and intangible assets, with contributions from the residents, local communities, stakeholders, tourists, and relevant legal documents and reports. Researchers also obtained archival documents, references, and religious scriptures from the NGOs involved in Braj Development. Technological tools such as GPS-based mapping, route-tracking applications, videography, and photography equipment were utilized to facilitate data collection and stakeholder consultation.

In Phase 3, the first stage involved inventorying the sacred eco-heritage sites in the Braj region. Data obtained from the sites and archival information were compiled and tabulated. The second stage focused on inventorying associated cultural traditions, practices, and knowledge systems by narrowing down a specific cluster of sacred eco-heritage sites. The significance of each site was assessed based on its historical, religious/spiritual, economic, and societal value. Towards the conclusion of the Phase 3, the identified traditional knowledge systems associated with the sites were summarized, and the challenges and threats were documented.

Study Area

The Braj region of India is known for its rich cultural and environmental heritage, deeply rooted in its sacred traditions. Braj is located in the vicinity of the river Yamuna, an important tributary of the holy River Ganges. The area spreads over 5,400 sq. km. It is bound by an esoteric periphery historically known as '84 Kos' (approx. 252 kms) covering the Mathura District of Uttar Pradesh, Bharatpur District of Rajasthan and Hodal in Palwal District of Haryana (Fig. 1). The city of Mathura, on the banks of Yamuna, forms the nucleus of this sacred zone. 'Braj Bhoomi' is the land where Lord Krishna and his consort Radha Rani, were born and spent most of their childhood. The region is home to numerous sacred ecological sites such as temples, rivers, forests, kunds, groves and hills that are not only important from a cultural and spiritual point of view but also serve as a repository for traditional knowledge systems. These sites have played an important role in shaping the region's cultural identity and maintaining its unique ecological diversity (Sinha, 2006).

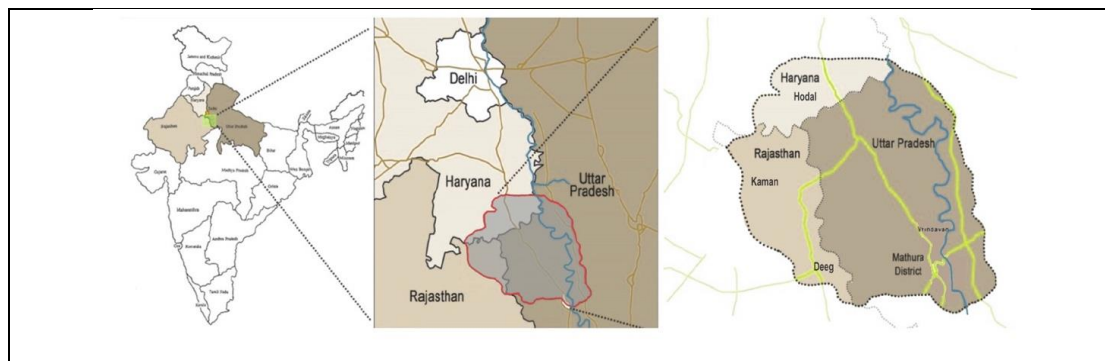


Fig. 1: Location of Braj

Source: Author

These sites are distinguished from other features of the environment by virtue of their association with intangible values: ancient myths, beliefs, and practices that envelop them and link the local communities, indigenous traditions or mainstream religions to them (Sarmiento et al., 2015). However, with the rapid pace of urbanization and modernization, these sacred ecological heritage sites have come under threat. The traditional knowledge systems associated with these places are also in danger of being lost or forgotten as younger generations increasingly move away from their cultural roots (Kodirekkala, 2017). It is imperative to study the role of these sites in the environment and develop strategies for their conservation and sustainable use.

Sacred Eco Heritage Sites in the study area:

Braj Region is associated with Lord Krishna, who is believed to have spent his childhood and adolescence there. The sacred ecological sites associated with Lord Krishna's life, such as the groves, kunds and ghats of Vrindavan, Hills at Goverdhan and Barsana attract millions of devotees from all over the world. These sites are also part of the 84 kos parikrama (circumambulation) along with the other sacred built monuments (Fig. 2).

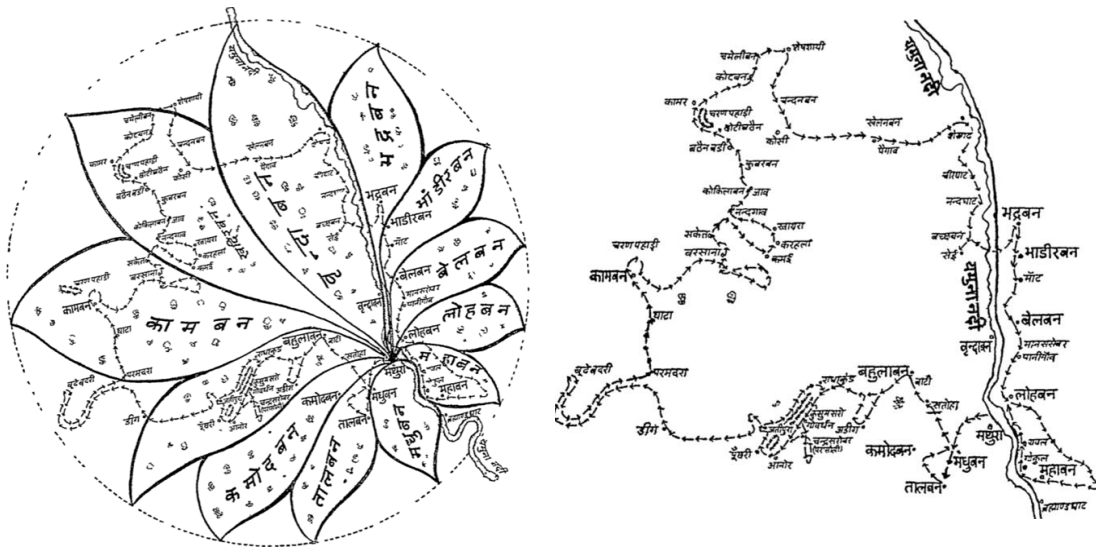


Fig. 2: Historical representation of 12 large forests of Braj in the form of a twelve-petal lotus;
Source: Mittal, 1966

In these landscapes, natural features such as mountains, rivers, and vegetation are believed to be the manifestations of Krishna, and this adds sacrality to each of the features. For example, the worship of shilas (Stones) of Giriraj Parvat is more significant for the devotees than the worship of any temple image or idol (Haberman, 2017).

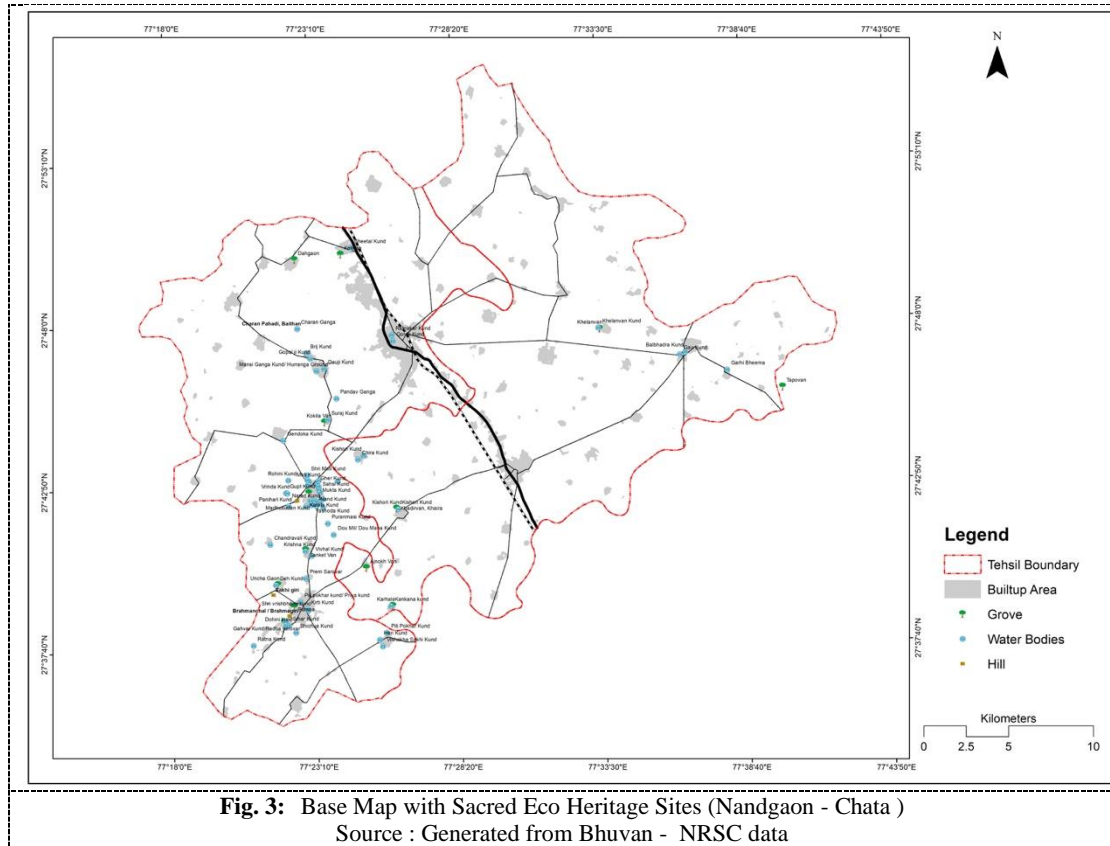
The earliest references to Braj are found in ancient literature, the Hindu religious epics, the Ramayana and the Mahabharata talking about this area and the settlement (Chaturvedi, 2010). In ancient times, Braj was part of the Vedic kingdom of Surasena, and it was later ruled by various dynasties, including the Mauryas, Guptas, and Mughals. This land existed as a stronghold of Buddhism from 500 BC to the seventh century AD. With the decline of Buddhism, the area also lost its importance (Ridhima et al., 2021). During the Middle Ages, the Braj region saw the rise of many religious and cultural movements, including the Bhakti movement, which emphasized devotion and individual spirituality (Shinde, 2012). The area is also home to many well-known saints and spiritual leaders, such as Chaitanya Mahaprabhu, Ramananda and Vallabhacharya. The arrival of Chaitanya Mahaprabhu and his followers in Vrindavan in the 16th century marks a major turning point in Braj's history. Cultural and social practices are not static; they evolve over time in response to various factors such as globalization, technological advancements, demographic shifts, and shifts in societal values. These changes can have a direct impact on the relationship between people and Nature.

The exact number of sacred natural sites of the region varies, depending upon the source and period under study, as many groves and forests have already disappeared, and there are settlements symbolizing the ones which existed once. By thoroughly examining and analyzing historical data from primary sources such as archives, maps, and manuscripts (Growse, 1874; Mittal, 1966; Drake-Brockman, 1984; Entwistle, 1987, Uttar Pradesh Braj Planning And Development Board Act, 2015), a comprehensive inventory of Sacred Eco Heritage sites has been compiled, which is as follows.

Table 4: Inventory of Sacred Eco Heritage Sites in Braj Region;
Source: Author

Clusters in Braj Region (Tehsil boundaries)	Sacred Eco Heritage Sites (Classification based on CPREEC ENVIS, MoEFCC)					
(On the basis of Braj Teerth Dev. Plan)	Hills and Mounds	Forests	Groves	Water bodies	Cave	River
Raya - Baldev		Lohavan Mahavan	Gokul Rawal	Patit pawan Kund Radha rani Kund, Rawal Krishna Kund, Lohban		Yamuna River (Brahamand Ghat)
Naujhil - Mat		Bhandiravan Belvan Bhadraavan	Persauli Maant	Maan Sarovar		Yamuna River
Nandgaon - Chata	Nandishwar / Rudragiri. Brahmagiri/Barsana pahadi Sakhi Giri Charan Pahadi (Baithan)	khadiravan	Kokilavan Kotwan Uncha Gaon Sanket Kadam Khandi Tapovan Khelavan Nandgaon Barsana Gahvar Van Dadhivan / Dahgaon Karthala	Prem Sarovar Pawan Sarovar Yashoda Kund Gomti Kund Shrikrishna Kund Lalita Kund Shri Vrishbhanu Kund Charan Ganga Dauji Kund Suraj Kund Kishori Kund Pili Pokhar / Priya Kund Gahvar Kund Panihari Kund		Yamuna River
Mathura - Vrindavan		Vrindavan Bahulavan Madhuvan Taalvan	Nidhivan Seva Kunj	Brahma Kund Shantanu Kund Potra Kund Balbhadra Kund Bahulavan Kund		Yamuna River (Cheer Ghat, Vrindavan Keshi Ghat Vasudev Ghat Yugal Ghat Vishram Ghat Nand Ghat Cheer Ghat)
Goverdhan	Giriraj	Kumudvan	Kadamvan Mridulavan Aring Goverdhan Aanyor Bachvan Paintha Radha Kund	Mansi Ganga Kusum Sarovar Chandra Sarovar Narayan Sarovar Govind Kund Haraju Kund Airavat Kund Radha Kund Shyam Kund Sankarsana Kund Narad Muni Kund Uddhavy Kund		
Kaman - Deeg	Kaamgiri / Charan Pahadi Adi Badri kedarnath	Kamyavan/Kaamvan Adi badri	Paramdara	Apsara Kund Naval Kund Shyam Kund, Baroli chauth Setubandh Kund Vimala Kund	Mani Kandali Cave Vyomasura Cave	
Hodal			Shesh Shai	Anjani Kund		

Although inventory mapping was done for the entire region of Braj, a detailed inventory of Sacred Eco Heritage sites and associated traditional knowledge was formed for the specific settlement 'Nandgaon Chata' cluster, that has the maximum number of Sacred physiographic features in each category, such as hills, waterbodies, forests, groves, caves and rivers. That ensures the findings in this cluster are more generalizable in nature and hence are the best representative samples for this study.



Importance of water resource and strategic location selection of traditional settlements

To investigate the interactions between human communities and the ecological dynamics of the SEH Sites the Socio-ecological analysis in the form of overlap of SEH Sites and Drainage Flow Accumulation has been performed using Geographic Information System (GIS) and satellite data. The selected cluster is located on the banks of the Yamuna River and is predominantly dependent on the river for its water needs. In addition to the Yamuna River, the region also has a few small rivers and streams, as well as some groundwater sources, which are used for irrigation purposes. However, most of the water supply for domestic and industrial use in the region is sourced from the Yamuna River (CGWB, 2017; Lal, 2013). An investigation of the Yamuna and its tributary's catchment condition presents an insight into the status quo of the water management of the region. The overlap of SEH Sites and Drainage Flow Accumulation Map provides insights into the flow of water across the landscape and across the settlements of the indigenous communities which are located along the SEH sites.

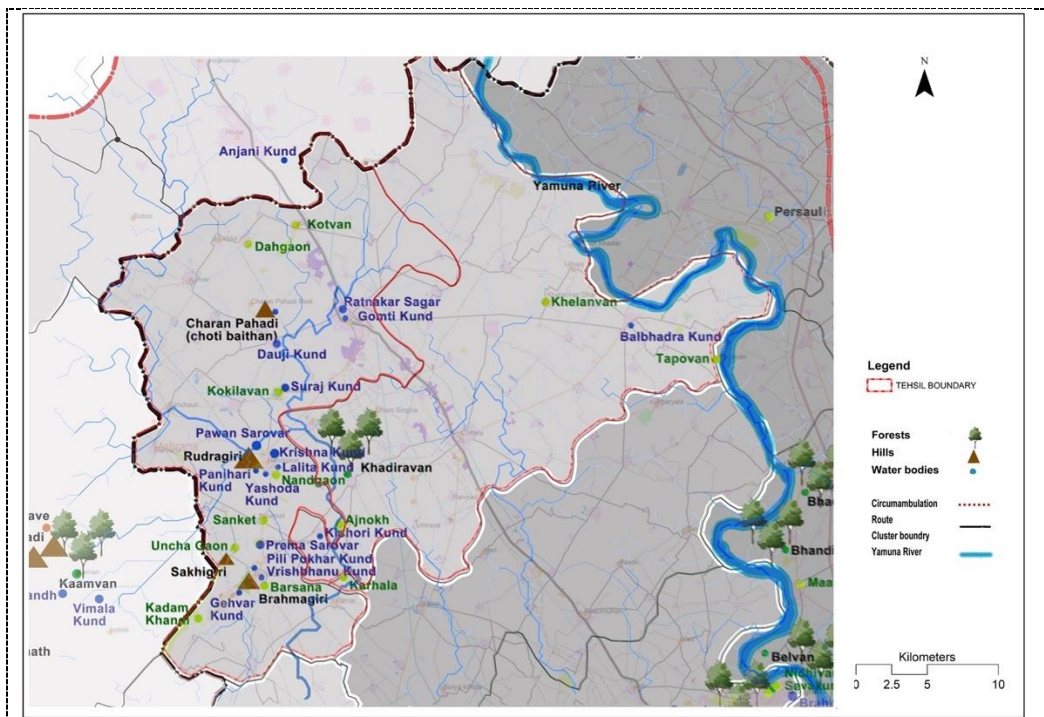


Fig. 4: Base Map with Sacred Eco Heritage Sites & Drainage Flow Accumulation (Nandgaon - Chata)
 Source: Generated from Bhuvan - NRSC data

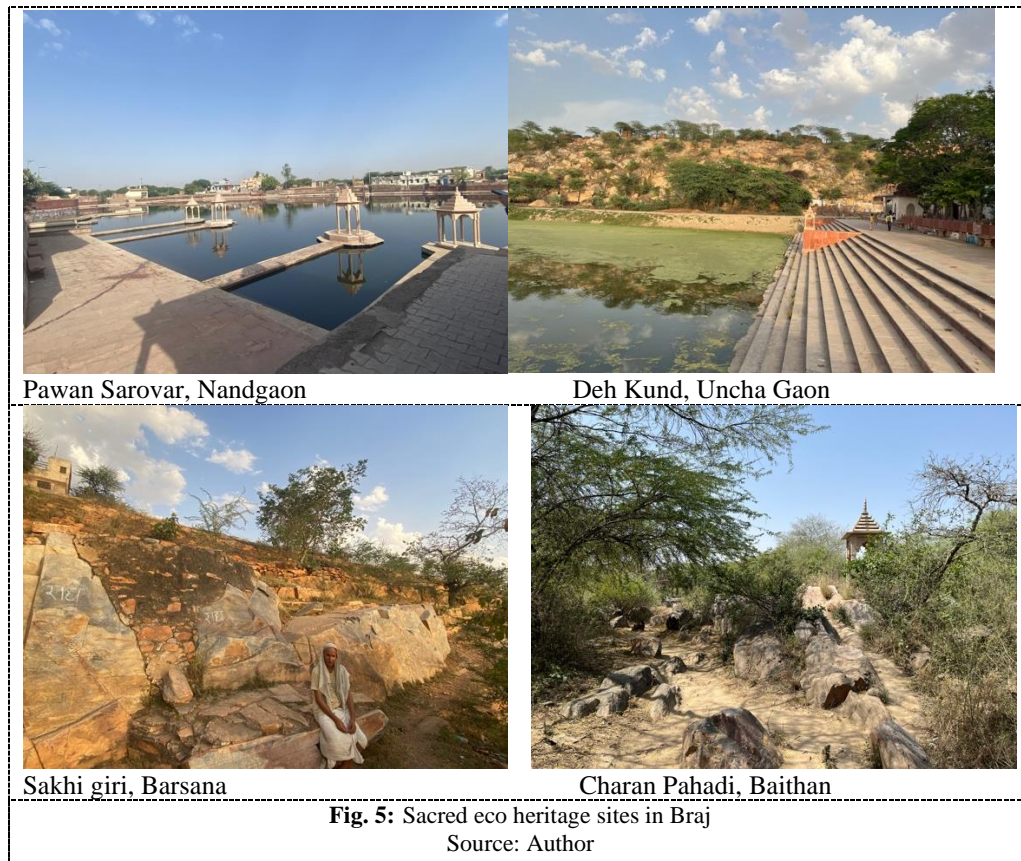
The cluster is bordered by hilly tracts of Rajasthan (some 200 - 300-meter hilly outcrop) on the Southwestern side, which put it in a high drainage frequency area (Fig. 4). It is observed that there are many significant places of cultural importance located along the major stream. This suitably substantiates the historical presence of human settlements alongside the major streams. It also concludes that the traditional, socio-cultural practices resonate with the geophysical features to frame the cultural ecosystem of the place.

Identified Indigenous knowledge associated to the shortlisted cluster:

The traditional knowledge system of the Sacred Eco Heritage sites in a region typically shares similar characteristics, derived from common socio-cultural practices. However, the association of these sites with distinct physiographic features shapes the ecological and biodiversity values attributed to them. To gain a comprehensive understanding of the traditional knowledge systems associated with the various sites and communities, an ethnographic field study was conducted focusing on a specific cluster. The template for the study is as follows.

Table 4: Attributes used for collecting data of Sacred Eco Heritage sites and associated traditions
 Source: Author

Sacred Eco Heritage sites and associated traditions Nandgaon - Chata cluster	
<ul style="list-style-type: none"> Site description: Site Name: Site Address: GPS Coordinates: Spatial Classification of Site / Description: Type of Site (e.g. Sacred Grove, Lake, Hill, Kund etc.): Access (e.g. Open to public, Restricted access, etc.): 	<ul style="list-style-type: none"> Site Condition: Overall condition of the site (e.g. well-maintained, neglected, deteriorating, etc.): Any visible damage or deterioration to cultural or natural features: Current maintenance practices:
<ul style="list-style-type: none"> Cultural and Historical Information: Historical significance of the site: Associated narrations or events with the site: Related festivals and rituals: Important cultural artifacts, built structure and objects at the site: 	<ul style="list-style-type: none"> Socio - Economic Information: Facilities available (e.g. Restrooms, Parking, drinking water etc.): Tertiary sector associated with site: Footfall at site: Safety concerns (e.g. Structural integrity, Fire hazards, stampede incidents, etc.):
<ul style="list-style-type: none"> Indigenous traditions and practices : Role of community/ traditionalist/ priests in habitat protection: Presence of deity/ artifact/ object to enhance traditional belief of local communities: Any Taboos / restrictions associated to site: 	<ul style="list-style-type: none"> Additional Comments:



The attributes used for gathering information about the intangible cultural heritage and TKS associated with these sites were intended for two purposes: one, to have a place-specific inventory and classification of TKS associated to Sacred Eco Heritage sites and, two, to list the integral assets which are not place-specific but long-existing traditional systems of this region. Following table summarizes the place specific inventory.

Table 5: Place specific inventory of intangible cultural heritage and Traditional Knowledge Systems of SEH Sites
Source: Author

S.No.	Sacred Eco Heritage Sites	Physiographic Feature	Location		Intangible Cultural Heritage attributes (defined by UNESCO)				Added by Author		
			Latitude	Longitude	Oral Traditions	Performing arts	Social practices, rituals and festive events	Indigenous Knowledge and practices concerning nature and the universe	Any Taboos / restrictions associated to site	Presence of deity/ artifact/ object to enhance traditional belief of local communities	Trees and animals of cultural significance
1	Charan Pahadi, Baithan	Hill	27° 47' 54.712" N	77° 22' 39.061" E	Katha (Narrations of life events), Bhajan kutir	Raas Lila	Darshan, Parikrama, Achman, Part of 84- kos parikrama	Gau seva, Association to sacred grove and biodiversity knowledge	prohibition to collect wood and indulging in any sort of misconduct such as disrespecting the grove or sacred Shillas(rocks)	Presence of rocks with foot print of Krishna embedded	Gau seva (care and worship of cows)
2	Charan Pahadi, Nandgaon	Hill	27° 42' 25.906" N	77° 22' 32.973" E	Katha (Narrations of life events), Bhajan	Kishor Lila/ Raas Lila	Darshan, Parikrama, Achman, Part of 84- kos parikrama	Gau seva , cleaning of charan ganga (water body)	. It is considered as 'protector' of holydham . Hill is said to be an avtar of Lord Shiva . First prashad of Krishna to be served to Nandeshwar	Presence of rock with foot print of Krishna embedded	Gau seva (care and worship of cows)
3	Gomti Kund, Kosi	Water body	27° 47' 27.940" N	77° 26' 4.989" E	Bhakti Ras, Bhajan	Dwarka Leela, Bhajan, Prayers	Darshan, Parikrama, Achman, Part of 84- kos parikrama	Gau seva	It is believed to be replica of Gomti Ganga of Dwarka, was built to worship Gomti Devi	Presence of Water body	
4	Pawan Sarovar, Nandgaon	Water body	27° 42' 54.938" N	77° 22' 56.796" E	Katha (Narrations of life events), Bhajan kutir	Raas Lila, Charkula Dance, Bhajan	Darshan, ritual bathing, offerings, Parikrama, Achman, Deepot sav, Havan, Janmashtmi, Radhaashtami, Akshay tritya Mela, Part of 84- kos parikrama	Few healers are present in settlement area with traditional medicinal knowledge.	. It is considered king of all "Tirtha" . Akshay Tritya is considered	Water of this kund is considered most auspicious	Biodiversity of this area is lost in development

									most auspicious to dip in the kund, as it is believed that Prayagraj comes with Ganga, Yamuna, Saraswati to dip in Paawan Sarovar		
5	Moti Kund, Nandgaon	Water body	27° 43' 2.451" N	77° 22' 59.188" E	Narrations of Radha and Krishna Ikietime, Raas lila	Jhulana Lila, shringar lila, Bhajan	Darshan, Parikrama Offerings, Achman, Part of 84- kos parikrama	Traditional ecological knowledge of water conservation and biodiversity	It is believed that Krishna planted Moti (pearl) trees near the kund, pilgrims sometimes collect stones near the kund.	The said tree groves are extinct now	Nilgai and mongoose can be spotted as fauna and Azadirachta indica, Albizia lebeck, Prosopis cineraria are some of the tree species present in the area
6	Uddhav Kyari, Nandgaon	Water body	27° 42' 11.944" N	77° 23' 28.213" E	Narrations of Uddhav and Gopi's Love lessons, Raas lila	Prem Bhakti Raas, Uddhav - Gopi samvaad	Parikrama, Meditation, Achman Part of 84- kos parikrama	Traditional ecological knowledge of water conservation and biodiversity	. Restrictions on noise, as many pilgrims meditate and immerse themselves in Prem ras.	Holy Basil and Kadamb tree groves	Holy Basil and Kadamb tree groves
7	Lalita Kund, Nandgaon	Water body	27° 42' 28.144" N	77° 23' 28.442" E	Narrations of Lalita Sakhi and Narad Muni, Jhulana lila, Bhajan	Jhulana Lila, shringar lila, Bhajan	Darshan, Parikrama Achman, Part of 84- kos parikrama		No taboos	Lalita Bihari Diety	
8	Yashoda Kund, Nandgaon	Water Body	27° 42' 16.975" N	77° 23' 3.755" E	Vatsalya Raas, Bhajan in Braj bhasha	Vatsalya Raas, Krishna Lila, Jhulana Lila	LathMaar Holi, Paag Bandhani, Parikrama, Drashan, Jhulana Parv, Radha ashtami, Shri Krishna Janmotsav, part of 84 kos parikrama	Organic Holi colour Making from Tesu Flowers, animal care, milk product making, Traditional healing techniques using Haar	. Believed to be bath place of Yashoda with her two kids - Krishna and Balram . Symbol of Vatsalya Prem	Hau - Bilao statue	Hau - Bilao statue & Kadamb tree groves where Krishna and balram used to play

								shringaar, Arjuna Bark, Tulsi, etc.			
9	Vrinda Kund & Gupt Kund Nanadgaon	Water Body	27° 42' 40.286" N	77° 22' 12.103" E	Bhakti Ras, Bhajan, Narrations of Vrinda Devi	Raas, meditation	Darshan, Achman, Phaag Utsav, part of 84 kos parikrama	Traditional ecological knowledge of water conservation and biodiversity	. It is believed that without Vrinda Devi's blessings no one can enter to Krishna's Goluka Dham . Vrinda is manifested by Holy Basil. It is must to offer a tusli leaf placed upon the offering to Krishna	Presence of Holy Basil and Kadamb plants and two sacred kunds	Holy Basil and Kadamb tree groves
10	Panihari Kund, Nandgaon	Water Body	27° 42' 15.663" N	77° 22' 14.138" E	Folk lores and Folk songs		ritual bathing, offerings, Achman, Deepotsav, Janmashtmi, Radhaashtami	Area used to be a sacred grove and had a very rich flora fauna, which is lost in present context.	Everyone is allowed to enter the kund regardless of caste, religion or gender		
11	Aasheshwar Kund, Nandgaon	Water Body	27° 43' 1.228" N	77° 24' 0.589" E	Bhakti Ras, Bhajan, Narrations of Shiv and Krishna	Bhakti Ras, Bhajan, Narrations of Shiv and Krishna	Darshan, offerings, Parikrama, Achman, Jal arpan Havan, Janmashtmi, Radhaashtami, Akshay tritya celebration, Part of 84- kos parikrama	Saints and sadhus visit the place and performs traditional rites and havan	. Known for giving innumerable blessings , as the name suggests.	Shiv linga which is very revered and a kund	Historically it was close to Nand Bagicha (Garden), with bounty of Flora fauna.
12	Nandgaon Forest	Grove	27° 42' 40.474" N	77° 22' 58.141" E	Bhakti Ras, Bhajan, Narrations of Krishna and Balram	Raas Lila, Charkula Dance, Bhajan	Paikrama, Vat Puja, All fair and festivals associated to vaishnav cult.	animal care, milk product making, Traditional healing techniques	Everyone is allowed to enter the grove regardless of caste, religion or gender	Sacred Groves and sacred flora fauna	Forest is lost I n settlement development
13	Kokila Van	Grove	27° 44' 55.059" N	77° 23' 34.713" E	Narrations of Narad and krishna story, Raas lila	Raas, meditation	Darshan, Parikrama(5.6 kms), Achman, part of 84 kos parikrama	Area used to be a sacred grove and had a very rich flora fauna, which is lost in present context.		Presence of suraj kund, wetlands and groves	Cuculus orientalis (Koel)
14	Sanket Van	Grove	27° 40' 51.621" N	77° 22' 48.982" E	Passtime narrations of	Vihar Raas, Jhulana Lila	Parikrama , Bhajan, Darshan, vat puja	Historically deep forest	. Considered as first meeting	Diety of Sanket Devi which is an	Historically deep forest area, but very

					radha and krishna, Raas lila			area, but very few plant varieties with Prosopis juliflora spreading across.	point of Radha and Krishna . It is believed that yogamaya creates a spiritual sentiment in the minds of the damsels of Vraja by which they think of Krishna as their paramour.	expansion of Yagmaya	few plant varieties with Prosopis juliflora spreading across.
15	Kishori Kund, Ajnokh	Water Body	27° 42' 6.331" N	77° 26' 9.816" E	Passtime narrations of radha and krishna, Raas lila	Vihar Raas, r Jhulana Lila, Jal vihar	Darshan, Snan, Aachman, part of 84 kos parikrama		No taboos	Presence of sacred water	Groves of Kadamb trees, Bees and peacocks in abundance
16	Ajnokh Van	Grove	27° 40' 15.014" N	77° 24' 58.595" E	Narrations of Krisna and vishakha sakhi, Bhajan	Raas, Jhulana Lila, shringar lila	Parikrama, Drashan, Smadhi Sthlal, Jhulana Parv, Radha ashtami, Shri Krishna Janmotsav, Kartik Mela, part of 84 kos	Area used to be a sacred grove, which is lost in present context.	Rock which produces Khol, considered as a shringar to be used for shringar of Radha Rani	Rock which is used to produce Khol.	Groves of Kadamb trees, Bees and peacocks in abundance
17	Pili pokhar kund/ Priya kund, Barsana	Water Body	27° 39' 12.238" N	77° 22' 35.945" E	Narrations of Radha Rani and yashoda meetings, Holi changs (songs)	Holi Raas, Bhajan	Darshan, Snan, Aachman, Phaag Utsav, Holi songs citation, part of 84 kos parikrama	Knowledge of local shrubs, such as Mehndi (Lawsonia inermis), holy basil, etc.	Everyone is allowed to enter the kund regardless of caste, religion or gender	Water of the kund always remains of yellowish green, common belief is that it is because of Radha Rani's mehndi.	water of this kund is considered auspicious
18	Shri vrishbhanu kund, Barsana	Water Body	27° 38' 55.941" N	77° 22' 52.445" E	Narrations of birth of Radha Rani, Bhajan	Meditation, Havan	Darshan, Snan, Aachman, Barsana Mahotsav, Smadhi sthal, part of 84 kos parikrama	Jalmahal, chatris, and traditional architecture features and their construction technique	. Believed to be bathing kund of Radha Rani's father . It is believed that the centre of kund had a Shivling, which is now established in the temple near the kund	centre of kund had a Shivling, which is now established in the temple near the kund	water of this kund is considered auspicious
19	Gahvar Van, Barsana	Grove	27° 38' 34.740" N	77° 22' 0.783" E	Raas Lila, Bhajan, Chanting	Raas, Vihar Lila	Paikrama, meditation, Vat Puja, Radha Ashtami,	Used to be a deep forest with Kadamb (burflower), Dumar (cluster fig), Karir or Kareel (Capparis decidua), Holy basil plant varieties	Prohibition to collect wood and indulging in any sort of misconduct such as disrespecting the grove , Drinking, littering are also prohibited	Presnce of radha sarovar, passtime activities of Radha Rani with her sakhis	Many sacred tree varieties such as Kadamb (burflower), Dumar (cluster fig), Karir or Kareel (Capparis decidua), Holy basil

									inside the grove.		
20	Barsana	Grove	27° 39' 2.929" N	77° 22' 22.154" E	Raas Lila, Prem Lila, Vilas Lila, Daan Lila, Bhajan, Chanting	Raas Lila, Prem Lila, Vilas Lila, Daan Lila, Bhajan, Chanting	Paikrama, Vat Puja, All fair and festivals associated to vaishnav cult.	animal care, milk product making, Traditional healing techniques	It is believed that the divine nectar is raining continuously here, hence it is called 'Barsana'	Khor (Sankri), Giri (Brahmachal Hill), Khirak (Vrishabhanu Khera), Van (Gahvar Van) – these four are only in the Barsana.	Sacred Groves and sacred flora fauna
21	Brahmachal / Brahmagiri	Hill	27° 38' 45.998" N	77° 22' 12.016" E	Maha Raas, Bhajan in Braj bhasha	Maha Raas, Krishna Lila, Jhulana Lila	LathMaar Holi, Laddu Holi, Parikrama, Drashan, Jhulana Parv, Radha ashtami, Shri Krishna Janmotsav, part of 84 kos	Organic Holi colour Making from Tesu Flowers, animal care, milk product making, Traditional healing techniques using Haar shringaar, Arjuna Bark, Tulsi, etc.	Brahmachal Hill has four peaks which are considered to be four heads of Lord Brahma, and therefore to be climbed barefoot, at morning restrictions on noise, Women to cover their head.	Brahmachal Hill has two colours, dark one depicting Krishna and Light one depicting Radha, considered auspicious and to be climbed barefoot.	Asia's largest cow care centres, Tree groves of Kadamb, Tulsi, Tamal, Harshringar and Arjuna
22	Sakhi giri	Hill	27° 39' 26.584" N	77° 21' 38.550" E	Katha, Bhajan	Shringar, Jhulana Lila	Darshan, Parikrama, Mahavar shringar, part of 84 kos parikrama	Traditional ecological knowledge of water conservation and biodiversity and agro farming	Chappan bhog prashad at Lalita Sakhi's Vivah Sthal	Hand prints of Lalita Sakhi	
23	Deh Kund, Unchagaoan	Water body	27° 39' 45.175" N	77° 21' 43.907" E	Katha (Narrations of life events), Bhajan kutir	Aarti, bhajan, Daan (Donation)	Darshan, Snan, Aachman, Daan utsav, Radha Ashtami, Krishna Janmotsav, part of 84 kos parikrama	Traditional ecological knowledge of water conservation and biodiversity	It is believed to be a place where Krishna donated Radharani's deha or 'body weight' gold to poor, so daan ritual is performed here.	Presence of sacred water	
24	Uncha Gaon	Grove	27° 39' 45.954" N	77° 21' 47.915" E	Narrations of Lalita sakhi and Radha krishna.Folk lore	Aarti, bhajan, Daan (Donation)	Janmahotsav of Lalita sakhi, Radha Ashtami, Krishna Janmotsav	Traditional ecological knowledge of water conservation and biodiversity	No taboos	presence of sacred rocks	
25	Prem Sarovar, Gazipur	Water Body	27° 39' 57.250" N	77° 22' 48.580" E	Maha bhaav Raas, Bhajan, Narrations of radha and	Jhulana Lila, Prem Lila	Darshan, Snan, Aachman, Barsana Mahotsav, Radha Ashtami, Krishna Janmotsav, part of 84 kos parikrama		It is believed that by simply touching the water of	Presence of sacred water	Area historically used to have lots of flora fauna, especially bees,

					Krishna's eternal love				sarovar, divine couple dwells in heart.		butterflies and peacocks.
26	Karhala	Grove	27° 39' 1.842" N	77° 25' 54.178" E	Maha Raas, Bhajan in Braj bhasha, Folk lore	birth place of Maha Raas, Jhulana Lila, Nauka vihar lila	Parikrama, Janmahotsav of Champaklata sakhi, Radha Ashtami, Krisna Janmotsav, Part of Asht sakhi parikrama	Traditional ecological knowledge of water conservation and biodiversity and traditional healers	No taboos	Presence of sacred water	
27	Kishori Kund/ Sangam Kund, Umrao, Khaira	Water body	27° 42' 6.331" N	77° 26' 9.816" E	krishna - gopis passtime narrations , Raashila	Raas Lila, Charkula Dance, Bhajan	Darshan, Snan, Aachman, Holi, Radhashtami, janmashtami, Jal yatra,		It is believed that the place evoke mahabhaav of union with the loved ones.	Presence of sacred water	Tree groves of Kadamb, Tulsi , Tamal, Harshringar and Dhak etc.
28	Tapovan	Grove	27° 45' 45.567" N	77° 40' 1.856" E	Folk lores, Bhajan, Jaap	Bhajan, kirtan, Jaap	Tapovan Vrat (Katyayani month), Seva, meditation and contemplation, Jaap and kirtan	Groves at Tapovan are protected lalong with flora fauna, because of strict restrictions and ecological knowledge.	. Prohibition to collect wood and indulging in any sort of misconduct such as disrespecting the grove , Drinking, littering are also prohibited inside the grove.. Restrictions on Noise	Presence of sacred trees and yamuna water	Groves of lots of flora such as, Jhar beri Shatavari, Van tulsi, especially bees, butterfly, such as Lemon pansy, Lime butterfly, Indian pioneer and peacocks.
29	Balbhadra Kund, Shergarh	Water body	27° 46' 56.220" N	77° 36' 34.070" E	Narrations of Dauji and krishna, Bhajan	Krishna and Dau Lila	Darshan, Parikrama, Balarama Jayanti, Hurranga Holi Playground, Chaitra Mela, part of 84 kos parikrama	Organic Holi colour Making from Tesu Flowers, animal care, milk product making,	No taboos	Dauji Diety	Most of the groves are lost , few varieties present are - tulsi (holy basil), haritaki (chebulic myrobalan), and giloy (heart-leaved moonseed)
30	Khelanvan	Grove	27° 47' 43.719" N	77° 33' 30.300" E	krishna - Balram passtime narrations	vihar lila, katha, bhajan	Holi, Radhashtami, janmashtami, Jal yatra	Gau seva, Association to sacred grove and biodiversity knowledge	No taboos		water body is considered auspicious
31	Khadirvan, Khaira	Grove	27° 42' 7.647" N	77° 26' 6.411" E	Narrations of killing demon Bakasur, Bhajan Kutir, Raas mandal	Raas leela at Raas mandal	Parikrama (1.25 kos/ 7.0 Kms)	Traditional ecological knowledge of water conservation and biodiversity	Everyone is allowed to enter the kund regardless of caste, religion or gender		

32	Kotwan	Grove	27° 50' 15.434" N	77° 24' 15.745" E	Narrations of Krishna and Gopi's passtime	Krishna and Dau Lila, Bhajan, Katha	Parikrama, Snan, Achman, Kartik Puja,	Gau seva	No taboos	All lost in development	Historically Woodpecker were present in great numbers.
33	Dahgaon	Grove	27° 50' 6.811" N	77° 22' 36.312" E	Narrations of Krishna and Gopi's leela	Raas, Krishna Lila, Jhulana Lila	Parikrama, Snan, Achman, Kartik Puja, part of 84 kos parikrama		Place where Krishna used to loot Milk and curd from gopis		Gau seva (care and worship of cows)
34	Mansi Ganga Kund/ Hurranga Ground, Baithan	Water body	27° 46' 32.915" N	77° 23' 19.513" E	Narrations of Dau ji and krishna, Bhajan	Krishna and Dau Lila, Bhajan, Katha	Darshan, Parikrama, Achman, Hurranga Holi Playground,	Organic Holi colour Making, animal care, milk product making,	No taboos		Gau seva (care and worship of cows)

A review of the Table above suggests that the places that are not associated with strong cultural traditions and which are not able protect their traditional knowledge systems face serious biodiversity and ecological threats. The integral assets which are not place-specific but generally applicable to various regions of Braj are:

a) ***Traditional farming practices:***

Braj has very fertile alluvial soil. Thus, its economy is based on agriculture. Agriculture is the mainstay of the economy of the region with distinct seasons, namely Kharif and Rabi. The main crops during the Kharif season are rice, jowar, pigeon peas, and sugarcane. The crops grown during the Rabi season are wheat, barley, lentils, black beans, peas, potatoes, and sesame. Agriculture and related activities employ 50% of the total workforce. Nearly 05% of the workers work in the second sector and 45% in the third sector (Kumar and Chandra, 2021).

The inhabitants of the Braj region have developed traditional farming practices that are in harmony with the local ecology. Organic fertilizers and natural pest control methods are used for farming, which help to maintain soil health and biodiversity (Vireket.al., 2017). Communities also practice crop rotation and use traditional seeds, which have been developed over generations, and have a high degree of genetic diversity, which helps to maintain the resilience of the crops (Thakur and Singh, 2008). Agro-forestry has traditionally been practiced in the Braj region, which involves the integration of trees and crops on the same land. Agro-forestry helps to improve soil fertility, conserve water, and provide additional sources of income for the farmers.

b) ***Traditional knowledge of biodiversity:***

Uttar Pradesh has a rich biodiversity including a large number of plants, some of which are used for their medicinal value. In India, plant products are used for food, fodder, fuel, shelter, heat, medicine, clothing, farm implements, hunting, drugs, poisons, gum, dye, pesticide, oil, fiber, alcohol and other miscellaneous things (Pandey and Tripathi, 2017). Indigenous communities in Braj have a long history of traditional knowledge and practices related to plants and their uses, collectively known as the ethno-botanical knowledge. The Braj region is home to a wide variety of plant species, including medicinal plants, food crops, and plants used for cultural and religious purposes. According to Dutta (2023), some of them are:

- Clerodendrum phlomidis (used locally to treat ailments)
- Plumbago zeylanica (leaves and root have medicinal properties)
- Butea monosperma (used to prepare Holi color and tilak)
- Anogeissus pendula (used to make a green dye and as fodder)
- Grewia tenax (stomach as a coolant to stop passing of blood in stools due to internal heat)
- Dichrostachys cinerea
- Salvadora persica (twigs are used as tooth brushes. Camels consume the leaves)
- Tecomella undulata (wood is prized. The seeds and bark have medicinal properties)
- Capparis decidua (edible fruits)
- Ocimum tenuiflorum (Tulsi) (commonly used in Ayurvedic remedies and religious rituals)
- Aegle marmelos (traditional medicine for various ailments, including digestive issues)
- Nyctanthes Arbor-tristis (analgesic and anti-inflammatory effects and are used in traditional remedies for joint pain and arthritis)
- Terminalia arjuna (traditional medicine for its cardio-protective properties, help maintain heart health and regulate blood pressure)
- Indian Gooseberry (to boost immunity, promote hair growth, and improve digestion)
- Convolvulus pluricaulis (memory-enhancing and stress-relieving properties)
- Commiphora wightii (anti-inflammatory and cholesterol-lowering properties)
- Tinospora cordifolia (immune-boosting properties)

Braj's indigenous communities have developed a deep understanding of the properties and uses of these plants through generations of observation and experimentation. This knowledge has been passed down through generations and is reflected in the local cultural practices, such as the use of traditional medicinal plants and herbs in the form of Ayurvedic medicines. Different parts of the plant, including leaves, stems, roots and flowers are used to make medicines for various ailments. Flowers, leaves and other plant parts in various religious ceremonies and ceremonies are used in Braj, and people have developed a deep understanding of the symbolism and significance of these plants in their cultures.

c) *Practicing Animism:*

Animism is the belief that everything in Nature, including animals, plants, rocks, and even inanimate objects has a spirit or soul (Sinha, 2006). They believe that these spirits can affect the physical world and that humans can communicate with them through rituals and ceremonies.

In the Braj Region, everything in Nature, including rocks, trees, even dust of Braj Bhoomi is believed to have a soul. This means that these natural features are not simply inanimate objects but are instead considered to be living entities with their own unique consciousness and personality. Brajwasis (Inhabitants of Braj) often believe that by offering prayers or offerings to these natural features, they can communicate with and show respect for the spirits that reside within them (Sharma, 2020). Worshipping rocks and tree groves are therefore a way to connect with the natural world.

The field study of these sites suggests that the places which have live cultural traditions association add to socio economic upgradation to the communities and they are in the better state of preservation than the ones that do not have any sort of association of cultural traditions.

For example, Govardhan Hill is a sacred site for Hindus and is considered a "natural temple". It is believed that Lord Krishna raised this hill with his little finger to protect the people of the region from the wrath of Indra, the rain god. Govardhan Hills are considered sacred and protected from development and exploitation, which has helped the local community maintain traditional practices and knowledge systems related to agriculture (Sinha, 2020).

Religious leaders in the Braj area also play an important role in promoting conservation and sustainable development. They encourage local communities to respect and protect the natural environment and adopt sustainable practices. The International Society for Krishna Consciousness (ISKCON) has been actively involved in promoting sustainable agricultural practices in the region (Shinde, 2015; 2021). The organization encourages farmers to adopt organic farming practices and use traditional farming methods. In summary, the Braj region of India has a number of sacred ecological heritage sites that have played an important role in preserving traditional systems of knowledge.



Fig. 3: Worshipping Flora and Fauna, Performing Aachman (Worshipping water) of Yamuna

Source: Author

Conclusions

The study highlights the important role Sacred Eco Heritage Sites play in preserving the cultural and spiritual heritage of the region as well as the associated ecological, agricultural and medicinal knowledge. The study highlights the importance of recognizing and preserving these sites as a means of promoting sustainable development while protecting traditional knowledge systems.

The sacred landscape of Braj has evolved in tandem with the terrain, vegetation, and water bodies. The design and construction of the rural settlements of Braj are rooted in the knowledge and practices that have been developed over generations to adapt to the local environment and ecology (Sharma, 2010). However, the advent of modern technology and globalization has caused the continual adjustment of vernacular wisdom. In this context, conservation of sacred eco-heritage places can serve as a means of preserving the traditional knowledge systems. Due to the dynamic nature of cultural and social practices, as well as the influence of human activities on the environment, it is inevitable that vernacular wisdom will undergo modifications, additions, and alterations. As societies evolve and adapt to new circumstances, traditional knowledge systems and practices may need to be adjusted to accommodate changing needs and challenges.

The loss of indigenous knowledge systems associated with sacred ecological sites can have far-reaching and significant impacts. When traditional knowledge systems are lost, valuable information about local ecosystems, including their biodiversity and potential for sustainable use can also be lost. This loss of knowledge can lead to a decline in the health of the ecosystems and biodiversity they support, as well as a loss of cultural heritage and spiritual traditions, as visible in some of the sacred eco heritage sites that are losing their significance in the absence of any cultural traditions and recognition from the new generation. The loss of traditional knowledge systems associated with the sacred ecological heritage sites could lead to the degradation of the region's unique landscape and natural resources, threatening the viability of the religious tourism industry and cultural heritage of the region.

Therefore, the preservation and promotion of traditional knowledge systems associated with the sacred ecological heritage sites is essential to protect the ecological, cultural and economic well-being of communities in and around the world.

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